NORTH CENTRAL RAILWAY

OPERATING MANUAL

2022

First Edition

(FOR OFFICIAL USE ONLY)

FOREWORD

It gives me immense pleasure and satisfaction to release this first edition of North Central Railway Operating Manual for the benefit of all functionaries of the Operating Department on North Central Railway. This comprehensively first edition aims to provide indepth information about a wide variety of subjects that are of day-to-day importance to staff, supervisors and officers of Operating Department.

Rules and guidelines of working should not be frozen in time as we live in a dynamic environment and should, therefore, respond to new requirements and impulses. In recent times, far reaching technological improvements, primarily in the arena of Information Technology, have been the foremost catalyst for the metamorphosis in Railway functioning. Hence, it is considered appropriate that there are chapters dealing exclusively with advances in train operations brought about by Information Technology, viz. “Freight Operations Information System”, and other “Application Software”. Other additions in this Manual are chapters on “Temporary Working Order & Non-Interlocked Working of Stations”, “Container Train Operation”, “Command, Control and Co-ordination of Emergency Relief & Rescue Operation on the Open Line”, “Derailment Investigations” and other miscellaneous topics. Further, many other chapters have been suitably updated. Concomitantly, the spheres which are no longer relevant have been dropped. The endeavour is to make the Manual useful in the changed circumstances and present day conditions.

I would like to compliment the staff and officials of operating branch who contributed in the making of this Manual, as also those who offered valuable and suitable suggestions.

I am sure that all users of this Manual will find it useful while performing their duties. We must all forever renew our commitment to the motto of safety, security and punctuality in train operations so as to serve our users to their complete satisfaction.

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North Central Railway

Place : Prayagraj
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AMENDMENT SLIP REGISTER

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CHAPTER-1
GENERAL INTRODUCTION TO TRANSPORTATION AND RAILWAY OPERATIONS

1001: Scope of Railway Operations:

The main objective of Railway Operations is to provide (1) safe (2) efficient (3) speedy and (4) economic rail transport. In general, the word OPERATIONS brings together all the activities required to be undertaken for working of the Railways. 'Operations' in the stricter sense used on the Indian Railways means:

(a) Planning, Organizing, Co-ordinating, Directing, Monitoring, Controlling and Supervising the activities connected with the movement and usage of the rolling stock, viz engines, coaches, wagons, other vehicles etc. that can be placed on the track and;

(b) Handling the problems, which arise in the course of movement of the stock and utilization thereof as per the objectives, goals and priorities laid down from time to time. Railway Operation, therefore, calls for utmost devotion to duty, management skills and efficiency. Various assets viz. P. Way, S&T facilities etc., Traction and Rolling Stock are planned, maintained and replaced by the Technical departments in co-ordination with the Operating Department.

1002:Functions of Operating Department:-

The Operating Department has an important role to play in Railway Operations in coordination with various other departments, who are in charge of infrastructure, for railway transportation. Various assets of the railway are available to the Operating department for optimum utilization. The Operating Department, thus harnesses the efforts of all departments and optimizes the usage of operational assets. The functions of Operating Department can be categorized as under:-

1. Planning of rail transport service on short term and long term basis.
2. Punctual Running of trains.
3. Safety in Train Operations.
4. Economy and efficiency in Rail Logistics.
5. Maximizing throughput, minimizing wagon turn round and efficient use of line capacity.

1003: General Principles of Railway Operations:-

1. Continuity:

Railway Operations and Transportation should be continuous both in time and space i.e. these should be round the clock in all seasons on an interconnected network, as justified by the transportation need.

The pattern of traffic should be so regulated that operations do not lead to excessive bottlenecks and congestion due to concentration of work at one restricted place.

2. Quality of control:

Command and direction should be given by a Central Authority. Since a good transport system is designed to operate continuously as a whole, it cannot function efficiently if operated independently at each station or section or zone with different purposes.

The general directions, priority and objectives for which the Railway system is working should be clear as far as possible. A central authority is required to control, direct and co-ordinate operations on a Division, Zonal Railway among various Zonal Railways. On the Indian Railways, this authority is vested in Member Traffic in Railway Board. At the Zonal level, this authority is exercised by PCOM on behalf of GM and at the Divisional level, it is exercised by Sr DOM/ DOM on behalf of Divisional Railway Manager.

3. Full and efficient utilisation of existing resources:

Optimum utilisation of available resources and carrying capacity is an important aspect of Railway operations. Therefore, it is essential to move the maximum volume of traffic with minimum increase in capital expenditure. This is monitored and constantly kept in view while taking short term and long term operating decisions.

The Operating Indices are regularly monitored and constant endeavour is made to sustain a high level of rolling stock utilisation, engine utilisation, staff utilisation, punctuality of trains etc., with reference to the targets, trends of past performance and potential.

4. Planned provision of adequate capacity:

Since the pattern of traffic changes due to various reasons, transport bottlenecks are likely to develop. Transport bottlenecks refer to permanent features at some stations, yards, transhipment points, big freight terminals and saturated critical sections of the Railway. Such bottlenecks prevent efficient carriage and handling of the available and potential traffic offering, even after fully and efficiently utilising the existing capacity in the normal course. The availability and requirement of additional resources and capacity should be constantly reviewed and planned. Provision of adequate capacity of terminals, rolling stock, repair and maintenance centres, control

etc. should be constantly made.

1004: Scope of the Operating manual:-

This Operating Manual attempts to provide (a) a basic understanding of the various aspects of Railway Operations and (b) guidelines for safe, efficient and reliable Rail Transport System. Since Railway Operations are inherently complex and dynamic, no manual on operations can take into account all the situations and requirements of operational efficiency. Therefore, directions given by the Authorized Officer of the Head Quarters or Divisions or Area or a station etc. should be carried out. The Manual also does not, in any way, supersede or modify the General and Subsidiary rules, Accident Manual or any other Act, Code or Traffic Book. In case of any conflict in the interpretation of applicability of any aspect of the provisions of the Railway Act, G&SR, Accident Manual, Codes etc. shall prevail.

CHAPTER-2

GENERAL WORKING OF STATIONS

2001: Railway Stations, worldwide are located in prime city centers, as Railways were started at a time when expansion of cities was yet to start. The Railway station continues to be the focal point of the central business district in almost all cities in the world.

All description of rail business is transacted at the station passengers start journey or complete it, outward parcels are booked and inward parcel consignments are received and kept ready for delivery. At stations having attached goods sheds, outward and inward freight cargo is handled there.

In their historic evolution, the stations now have catering establishments, resting facilities in the form of retiring rooms or a budget hotel. A world-class station may look or in fact be more like a mall with shops and catering establishments with attendant information, ticketing and reservation counters etc.

Station Manager/Station Superintendent/Station Master is overall incharge of the station.

2002: Duty List of Staff:

The duties to be performed by different categories of staff in connection with movement of trains are detailed below. These duties must be read in conjunction with the Station Working Rules of the station, General & Subsidiary Rule Book and Block Working Manual, as amended from time to time.

(A) Responsibility of Station Superintendent/Station Manager:

i. Station Superintendent/Manager is responsible for the efficient discharge of duties by different members of staff at his Station.

ii. Ensuring that the general working of the Station is being carried out in strict accordance with the current rules, procedures and instructions.

iii. Providing prompt and courteous service with utmost safety and security of passengers and employees.

iv. To ensure availability, helpfulness and good conduct of station staff.

v. He shall see that the general up-keep of the station is maintained by the concerned branches. If any discrepancy is found, he shall report to the concerned branch in-charge/ branch officer.

vi. He shall be responsible for keeping the safety and operating

literature including circulars, pamphlets, gazette etc. up to date and these must be explained to the staff working under him and also got noted by them.

vii. He shall be responsible for maintaining the Accident Register and Accident charts and keeping these up to date.

viii. He shall maintain figures in respect of the stock and get them relayed to the control in time.

ix. He shall investigate all public complaints and send extracts of the complaint with explanation of the staff and his own remarks to the Divisional Office in time. In case of complaints concerning other departments, intimation may be given to the subordinate In-Charge of that department immediately, so that action may be taken to avoid recurrence.

x. He shall promptly attend all accidents, assume charge of the site and assist in relief measures ensuring prompt evacuation of injured & stranded passengers. He shall take note of all the information available and ensure protection of the clues/evidence, which may be helpful in the enquiry. He shall intimate the control office at regular intervals regarding current information and ask for the required assistance i.e., Relief Train, Medical van etc. He shall investigate yard accidents, obtain statements of the staff responsible and submit his report with conclusions and joint note to the Divisional office.

xi. He shall ensure that the firefighting equipments at the station such as fire extinguisher, fire buckets etc. are in fine fettle and ready for use.

xii. The Station Superintendent/Manager should regularly test and record in the charge book, the working of Points, Signals and Track Circuit to ensure that:

(a) The Signals are back to 'ON' position, when the relevant slide/button/lever/control is put back or intended train movement has been completed.

(b) It is not possible to take 'OFF' conflicting signals at the same time.

(c) Signals are not taken 'OFF' until all points are correctly set and facing points locked.

(d) Any other manner of testing prescribed by the Authorized Officer.

(e) Panel testing: Whether Normal/Abnormal by Station Master.

(f) At stations provided with continuous track circuits or at stations having solid state interlocking/EI the method of

testing shall be prescribed jointly by Signalling and Operating Branch which shall be described in the Station Working Rules to be followed by Station Superintendent/Manager.

xiii. He must ensure that the burners and wicks of the signals/ hand signal lamps are daily cleaned, trimmed and oiled properly.

xiv. He must ensure that the essential Safety equipments at his station are complete and the deficiency should be made good without delay.

xv. He shall conduct night and surprise inspections to check the alertness of staff, as well as working of signals, points and visibility of the signals.

xvi. The Station Manager/SS/Station Master incharge at a station shall inspect his station regularly with a view to ensure efficient working of-

(a) All public facilities including fans, lights, lifts, escalators.

(b) All equipments, Deficiencies, if any noticed, must be promptly rectified or recorded in Petty Repairs Book.

(c) Safe and efficient working of trains.

(d) Cabins/Power Cabins, Station Master's office, yards, goods sheds and level crossing gates under his charge.

(e) Reservation Enquiry, Public Address system, Public Information Display System, Booking offices, Ticket Checking, Catering, Vending stalls, Parcel office, advertisement and parking etc.

(f) Drinking Water taps/booths.

xvii. He shall see that the Train Signal Register, Station Diary, Inspection Note Book, Reference Books and other station records are properly maintained and preserved for a minimum period as prescribed later in this chapter.

xviii. At bigger stations the Health Inspector is in charge of sanitation. The Station Manager shall conduct regular inspections and bring out deficiencies. He shall conduct regular inspections of waiting rooms, bath rooms, lavatories, refreshment rooms and catering trolleys, platforms, tracks and other station premises from the point of view of sanitation and ensure that arrangements in this regard are adequate and effective. Availability of safe drinking water to passengers & employees is the joint responsibility of JE/SSE (works) and Health Department. They should check that the same is available.

xix. He shall ensure that sufficient stock is available for the requirement of the day. He shall be well informed about the running of trains so

that, in case of late running of a connecting train, scratch rake can be turned out, if necessary. He shall also keep a check on reserved stock available/allotted to his station.

xx. He shall take personal interest in arranging quick clearance of reserved carriages of troops, public, prisoners, treasuries etc.

xxi. Whenever special trains are arranged to run from his station, he shall ensure that stock for the same is secured & certified and placed on the proper line, in time.

xxii. He shall fix up responsibility in case of detention to trains outside or at the station and submit full report to DRM office.

xxiii. He shall be responsible to ensure that all the operating staff working under him are relieved in time for their Periodical Medical Examination (PME), Competency and special competency programs. No one overdue PME and Competency shall be allowed to perform his normal duties.

(B) Station Master/Deputy Station Superintendent (Outdoor):

The Station Master/Deputy Station Superintendent shall be responsible for the general up-keep and proper working of the station as under-

(i) He shall maintain the safety literature, rule books & safety records. He shall counsel staff regarding rules and safety- systems.

(ii) He shall deal with public complaints and counsel commercial staff for courteous behavior.

(iii) He shall ensure right time placement and removal of terminating/originating trains and keep records in this regard and also keep a watch on Shunting operations.

(iv) He shall inspect the L/C gates, panel at the station regularly during his shift.

(v) He shall maintain close contact and co-ordination with Panel SM and Log SM for smooth running of trains and for better planning of operational work and will assist in case of any abnormal working.

(vi) He shall promptly attend to any incident or accident and assist in relief measures during his duty. He shall collect all information and inform the Control office for required assistance i.e. Relief Train, Medical Van etc. He shall also inform the local civil authorities as required and safe-guard the clues or evidences which may be helpful in enquiry. He shall fill form No. – 01 (Reporting of Untoward incidents). (See Page No. 161)

(vii) In case of abnormal working, he shall be responsible for manual operation (Hand Cranking) of Points and piloting of trains.

(viii) He shall ensure that all coaching trains scheduled to stop at the station, start within their allowed time.

(ix) Whenever Special trains are arranged to run from his station during his duty, he shall ensure that stock for the same is secured and placed on the proper line in time.

(x) He shall keep close supervision on sanitation. He shall inspect the platforms, waiting halls, waiting rooms & the track and see that the same are cleaned properly by the sanitary staff.

(xi) He shall keep a close watch on passenger amenities provided at station and their up-keep by the concerned staff.

(xii) He shall look after any other work assigned to him by the Station Superintendent/Manager from time to time.

(xiii) In case of emergency he shall also perform duty on Panel/ Log.

(xiv) All instructions received from superiors shall be recorded in the Station Order Book. Senior officers should confirm these through a control order to avoid ambiguity. All such instructions shall be implemented, provided these do not violate safety rules & procedures.

(xv) He will perform all the duties of SS in his absence.

(xvi) He shall maintain complete and up to date record of the Engg. Restrictions. He shall be responsible for bringing forward the caution order register every Monday and displaying the restrictions on notice board as well.

(xvii) He shall be responsible for ensuring delivery of proper caution orders to all trains.

(xviii) He shall keep his reference books up to date, posted with latest amendment slips and shall keep himself fully conversant with the extant rules. He shall keep his books readily available for inspection.

(C) Log/Block Station Master:

(i) He shall handle the block instrument himself when on duty and shall not permit any unauthorized person to manipulate or handle the block panel/block instrument & block telephone.

(ii) He shall keep the Station Master's control keys of block instruments/Panel/SM's slide frame in his personal custody whenever he is required to leave his office even for a short duration.

(iii) He shall maintain TSR and other connected records/ documents in good shape and ensure that all entries are completed and are up to date.

(iv) He shall attend to the control phone and give arrival/ departure of trains promptly and shall carry out instructions given by superiors, provided these do not violate safety rules & procedures.

(v) He shall inform the ESM/MSM through a written memo regarding

any failure of block working etc. and invariably enter these failures in the signal failure register.

(vi) In case of any accident, he shall inform promptly the section controller and the Station Manager/Station Master/ Dy SS immediately. He shall give all the information available with him in regard to the nature, place, cause, assistance etc. in respect of the accident.

(vii) He shall communicate reasons for late start of outgoing trains and late arrival of incoming trains to control.

(viii) He shall come on duty after taking complete rest and shall not perform his duty under the influence of liquor, drugs or intoxicants.

(ix) He shall keep his reference books up-dated, posted with latest amendment slips and shall keep himself fully conversant with the extant rules. He shall keep his books readily available for inspection when asked to do so.

(x) He shall not absent himself from duty without prior permission of his superiors. He shall not leave his duty unless properly relieved by his relief and shall not exchange his duty without prior permission from his superiors.

(xi) He shall not consider himself relieved of duty, unless he has completed transactions of trains for which he has given/ obtained line clear till the complete movement of such trains.

(xii) He shall always obey the lawful orders of his superiors so long as they do not contravene any of the extant rules in force.

(xiii) In case of any abnormal working, he shall also perform the duties assigned to Panel SM.

(xiv) He shall advise the description of the train to which he had granted line clear or obtained line clear to panel SM.

(D) Panel/Indoor Station Master:

(i) When on duty or when called upon to do so, in case of emergency, he shall be responsible for obtaining and granting line clear to trains or for shunting movements as per SWR and G&SR.

(ii) He shall handle the control panel himself when on duty and shall not permit any unauthorized person to manipulate panel.

(iii) He shall keep the SM's control keys of control panel in his personal custody whenever he is required to leave his office even for a short duration.

(iv) While coming on duty, he shall ensure that all points and signals are in good working order and all the registers, records, pertaining to train passage are completed in all respects before taking over charge.

(v) He shall personally ensure that conditions for taking 'off' the reception signals are fulfilled and the clearance of line is verified as per SWR before actually pressing the relevant button for taking off the signals.

(vi) He shall ensure from indications available in the panel that the signals are lit 'brightly' and are giving correct indications.

(vii) He shall ensure that all Shunting operations are carried out as per extant orders and provision in GR and SRs thereof.

(viii) He shall inform the ESM/MSM in writing or through a telephone message, any failure of track/signals/points/ keys or panels etc. and shall invariably enter these failures in the signal failure register.

(ix) He shall allow shunting mainly between the arrival/departure of trains or during slack period, to the maximum extent possible.

(x) He shall come on duty after taking complete rest and shall not perform his duty under the influence of drugs or intoxicants.

(xi) He shall not absent himself from duty without prior permission of his superiors. He shall not leave his duty unless properly relieved by his relief and shall not exchange his duty without prior permission from his superiors.

(xii) He shall not consider himself relieved of duty, unless he has completed transactions of trains for which he has given /obtained line clear till the complete arrival of such trains.

(xiii) He shall always obey the lawful orders of his superiors so long as they do not contravene any of the extant rules in force.

(xiv) He shall ensure that proper indications of points, signals, track circuits, crank handle, level crossing gate etc. are displayed at their proper places.

(xv) He shall be responsible for issuing required papers to trains entering/leaving the yard under the instructions of log ASM.

(xvi) He shall issue shunting order for shunting operations as per extant rules.

(xvii) He shall keep a watch on the working of shunting staff.

(xviii) He shall ensure clearance of running lines in case of failure of their track circuits and Axle Counters.

(xix) He shall maintain log book regarding train and shunting movement.

(xx) He shall be responsible for giving complete arrival of all trains to log SM supported by a private number.

(xxi) In case of abnormal working, he shall be responsible for cranking, pad locking of points and piloting of trains, in the absence of Station Master/Deputy Station Superintendent/ out door.

(E) Station Master-II (if posted):

(i) He shall report on duty, complete in uniform.

(ii) He shall be acquainted with SWR and give an assurance thereof.

(iii) He shall come on duty after taking complete rest and shall not perform his duty under the influence of liquor, drugs or in toxicants.

(iv) He shall be acquainted with the position of running lines and responsible for shunting operations in the yard.

(v) When on duty or when called upon to do so, in case of emergency, he shall be responsible for obtaining and granting line clear to trains or for shunting movements as per SWR & G&SR.

(vi) He shall handle the control panel himself/as per instructions of SM when on duty and shall not permit any unauthorized person to operate/manipulate panel.

(vii) He shall keep the SM's control keys of control panel in his personal custody whenever, he is required to leave his office even for a short duration, if Station Master is not available.

(viii) He shall personally ensure that conditions for taking 'off' the reception signals are fulfilled and the clearance of line is verified as per SWRs before actually pressing the relevant button for taking off the signals for respective lines.

(ix) He shall ensure from indications available in the panel that the signals are lit brightly and are giving correct indications.

(x) He shall also assist SM in issuing of tickets and booking/ delivery of parcels/luggage.

(xi) He shall be responsible for maintaining and completion of documents related to train operations and all other miscellaneous commercial activities.

(xii) He shall be responsible for watching safe passage of trains running through train and exchange of All-Right signal with the train crew/guard.

(xiii) He shall also prepare monthly balance sheet, returns and be responsible for their submission periodically under supervision of SS/incharge of the station.

(xiv) He shall also perform such other duties as may be assigned to him, from time to time, by the Station Master.

(F) Pointsman/ Shuntman:

(i) He shall obey all lawful orders of the SM on duty or the supervising official in-charge during the course of shunting operations, including coupling or uncoupling of vehicles of wagons, fixing rubber washers, closing wagon doors, displaying hand signals etc.

(ii) He shall exhibit danger signal to the official supervising the shunting, should the crossing be fouled during the shunting operation.

(iii) He shall pilot the trains in case of abnormal working and when ordered by the SM on duty.

(iv) He shall be in proper, neat and clean uniform while on duty.

(v) He shall come on duty after taking complete rest and shall not perform duty under the influence of liquor, drugs or intoxicants.

(vi) Neither shall he absent himself from duty nor shall he exchange his duty without prior permission of his superiors.

(vii) He shall not leave his duty unless properly relieved or authorized by his superiors.

(viii) He shall set the points properly in non-interlocked yard and man them for all shunting movements and shall not interfere with the points while the vehicles are standing and/or passing over them.

(ix) He shall be responsible to see that fouling marks are kept clear after completion of shunting.

(x) He shall always commence his duty equipped with hand signal lamps during night and flags during day.

(xi) He shall verify the correct setting of route before delivering required papers to the loco pilot either through taking 'OFF' the relevant shunt signal or by personal observation.

(xii) In case of track failure, he shall assist the SM to ascertain the clearance of line.

(xiii) He shall be responsible for lighting up of the signal indicators etc. in the evening and putting them out in the morning at the time fixed by DRM office and ensuring that these are burning brightly at night.

(xiv) He shall be responsible for cleaning and oiling the burners and trimming wicks during day time under the supervision of Station Manger/Deputy Station Manager.

(xv) Pointsman shall be responsible to ensure & communicate complete arrival of trains under exchange of Private No. to Panel/Block ASM, wherever authorized in SWR.

(xvi) He shall be responsible to deliver Operating documents related with train operation to concerned staff and also for safe working of Level crossing gates, while working as gateman.

(xvii) He shall be ensuring the complete arrival of train physically, if required, in thick, foggy and tempestuous weather impairing visibility.

(xviii) He shall also be responsible for operation of DG sets in case of power failure

(xix) He shall be responsible for correct setting/clamping and padlocking of the points during shunting operations.

(xx) He shall also be responsible for reversing the train engine and brake-van/SLR as and when required. He shall pick up inward token/tablet from incoming train loco pilot and deliver outward token/tablet or PLC ticket to the loco pilot of outgoing train.

(xxi) He shall also work as fog signal man during thick and foggy weather whenever required.

(xxii) Pointsman will be responsible for cleanliness of SM's office in absence of Safaiwala.

(xxiii) At Stations where Box Porter is not posted, Pointsman shall be responsible for loading/Unloading of line boxes of LP/Guard.

(xxiv) He shall be responsible for watching safe passage to trains running through train and exchange of All-Right signal with the train Crew/Guard from off side of the station.

(G) Gateman:

(i) He shall be responsible for proper operation of the gate as per SWR for the passage of trains.

(ii) He shall ensure that no train suffers any detention on account of late closing of the gate.

(iii) He shall keep the channels of check-rails clean and shall clean the road within the railway limits and water the area regularly.

(iv) He shall clean the gate lamps and hand signal lamps daily. He shall ensure that the wicks of the burners are trimmed so that these are lighted properly and kept burning continuously from sun set to sunrise.

(v) He shall keep the surroundings of his gate lodge clean, tidy and neatly planted with shrubs, plants etc.

(vi) He shall remain alert on duty till properly relieved. If he is required to leave the gate in an emergency, he shall close and lock the gate booms against the road traffic before leaving the gate.

(vii) He shall ensure that the equipments at L-xing are complete and in working order.

(viii) He shall produce the public complaint book when required by public for lodging complaint and to the railway officials for inspection.

(ix) He shall ensure that the road traffic is not unnecessarily held up at the gate.

(x) He shall stand in attention near the gate lodge facing the track and be prepared to repeat any signal which the guard may intend to convey to the loco pilot or show caution or danger signal should

anything appear to be wrong with the train itself as it passes.

(xi) He shall be polite and courteous in his behavior towards the public.

(xii) He shall report any defect in the gate to the ASM on duty without delay.

(xiii) He shall close the gate on sighting a train or when ordered by the SM/Dyss on duty.

(xiv) He shall attract the attention of the loco pilots and guards by shouting and gesticulating instead of showing danger signal in case of train parting.

(xv) He shall obey all lawful orders of the SM on duty.

(xvi) In case of any obstruction, accident or damage to the gates, he shall protect the gate/obstruction as per instructions and rules in force.

(xvii) He shall be responsible to ensure & communicate complete arrival of trains under exchange of Private number to Panel/ Block ASM, where ever mentioned in SWR.

2003: Duty list and hours of duty:

(i) Sr. DPO/DPO shall fix the duty hours for the staff at stations in accordance with the Railway Servants (Hours of work and period of rest) Rules, 2005, in consultation with Sr. DOM/DOM & Sr. DCM/DCM. Copies of these duty hours (roster) must be displayed at each station.

(ii) Station Staff shall handover charge at the end of their hours of duty as prescribed at the station only when properly relieved. Such duty hours shall not be exchanged without the permission of the Station Master.

Station diary book:-

(a) A station diary must be maintained at each station for the use of Station Master entrusted with train-working duties. Whenever a Station Master is about to be relieved from duty, he must enter in this book the following information in the order indicated:-

(i) What extra or special trains are to be expected during the relief's turn on duty.

(ii) Any deficiencies in the points, signals, key of points and signals, interlocking gear etc.

(iii) Any restriction of speed or other information which has to be endorsed on the "Authority to Proceed" and of which the relieving man is not already aware.

(iv) Any withdrawal of restriction of which the relieving man is not already aware.

(v) Any special instructions or orders which have to be carried out during the term of duty of the relieving man.

(vi) The correct position of each running line in the station or yard whether occupied or clear. If occupied, it must be clearly stated how the same is occupied.

(vii) If block instruments are provided with S.M.s control keys, it must be positively stated that they are made over to the relief.

(viii) Readings of all counters provided on the control panel.

(ix) Any other relevant information.

(b) The Station Master, who makes any entry for a train shall continue on duty till all entries affecting that train are completed. By this is meant that the man who gives permission for a train to enter the Block section Shall remain on duty till the train has arrived and "Train out of section" Signal has been given and acknowledged. The man who receives permission for a train to enter the Block section shall remain on duty till the "Train out of section". Signal is received and acknowledged.

(c) In the case of a Material Train Working in the block section or a train that has disabled in the block section or a train which cannot proceed due to impassable obstruction, para (b) need not be observed but the entry in the train register shall be initialed be both men. Any entry shall also be made in the Diary and initialed by both men.

(d) The process of handling over is not considered complete till the Station Diary has been signed by both the relieved and the relieving man.

(iii) Daily Mustering of Staff: The Station Master or the person authorised on his behalf shall fill in the attendance of staff at his station in the Attendance Register.

2004: SM's responsibility for assurance:

(A) Station Master's responsibility for assurances of SWRs before allowing employees to take independent charge-

1. Station Master must not allow any employee to take independent charge of a post connected with train working without satisfying himself after detailed oral examination about the knowledge of concerned staff. He must satisfy that the employee-

(a) Possesses the requisite Certificate of Competency.

(b) Has understood the working rules of the Station and is fully conversant with the duties he has to perform.

(c) Every Station Master shall maintain an "Assurance Register" in duplicate for the purpose of obtaining a written assurance from every literate employee before the latter takes independent charge of a post connected with train working and for recording a certificate in the case of every moderately literate employee that the relevant rules have been read over and explained to him. This

assurance/certificate shall be in token of the fact that the employee–

i. Has studied the Station Working Rules/Amendment slips/Station Working Diagram and other rules pertaining to his duties or has been instructed in the same;
ii. Has understood the duties he has to perform;
iii. Is capable of performing his duties independently;
iv. Understands and can read the SWR diagram.

One copy of the Assurance Register will be placed in the SM's Office as the Office copy and the second copy known as SS's copy will be kept by the Station Superintendent/Manager in his custody. Maintenance of the Assurance Register in duplicate is a Safe Guard against possible loss/non availability of the single copy maintained by the Station Master.

(d) The Assurance Register shall be maintained in three parts as follows :-

i. For the staff conversant with English;
ii. For literate staff not conversant with English and
iii. For staff moderately literate but not conversant with both.

A specimen of the Assurance Register is given below

For staff conversant with English

I hereby declare that I have gone through the SWR with diagram of this station shown in col. 2., the amendment slips in col. 3 and in token of assurance that I have thoroughly understood them and can read the SWR with diagram, I affix my signature in col. 5.	I have tested the staff whose name is shown in col. 4 in the knowledge of the SWR with diagram in col. 2, the amendment slips in col. 3 and hereby certify that he understands them and can read the SWR with diagram and in token of thereof affix my signature in col. 6.

SWR with Diagram			Amendment Slips			Name of Staff		Signature of staff		Signature of SM	
S. No.	Date of Issue	Date of receipt at the station	No.	Date of Issue	Date of receipt at the station	Name in full	Designation	Signature	Date	Signature	Date
1	2		3			4		5		6	

For literate staff not conversant with English

I hereby declare that I have gone through the SWR (Hindi Version) with diagram of this station shown in col. 2., the amendment slips in col. 3 and in token of assurance that I have thoroughly understood them and can read the SWR with diagram, I affix my signature in col. 5.	I have tested the staff whose name is shown in col. 4 in the knowledge of the SWR with diagram in col. 2, the amendment slips in col. 3 and hereby certify that he understands them and can read the SWR with diagram and in token of thereof affix my signature in col.6.

SWR with Diagram			Amendment Slips			Name of Staff		Signature of staff		Signature of SM	
S. No.	Date of Issue	Date of receipt at the station	No.	Date of Issue	Date of receipt at the station	Name in full	Designation	Signature	Date	Signature	Date
1	2		3			4		5		6	

For moderately literate Staff not conversant with Hindi & English both

I have explained the SWR with Diagram shown in col. 2, Amendment slips shown in col. 3 to all staff whose names are shown in col. 4 and have also tested their knowledge and hereby certify that they understand them and can read the diagram and in token thereof, I have obtained their thumb impression in col. 5 and I affix my signature in col. 6.

SWR with Diagram			Amendment Slips			Name of Staff		Signature / Left Thumb impression of staff		Signature of SM	
S. No.	Date of Issue	Date of receipt at the station	No.	Date of Issue	Date of receipt at the station	Name in full	Designation	Signature / Left Thumb	Date	Signature	Date
1	2		3			4		5		6	

(e) (i) Literate staff shall in token of assurance that he/she/they has/have understood them thoroughly, affix his/her/their signature(s) in the column provided for in the Register. The certificate from staff not conversant with English may be obtained in Hindi or Urdu or Gurmukhi as the case may be. The Station Master shall test the staff in his/her/their knowledge of working rules and affix his own signature in the relevant column. The Station Master shall also be responsible for explaining the Station Working Rules to pointsmen, Cabin signalmen, Cabin master, Assistant Yard Master, Shunting Master etc.

(ii) Moderately literate Staff should affix his/her/their signature(s) or left thumb impression in token of having understood the Station Working Rules. The Station Master shall certify that he has explained the SWR and tested his/her/their knowledge of SWR and affix his own signature in the relevant column.

(f) In addition to the above declaration which shall be obtained before staff are allowed to take up independent charge at a station, every employee connected with train working viz. Station Masters, Assistant Station Masters, Assistant Yard Masters, Shunting Masters, Cabin Signalmen, Gatemen, Pointsmen etc, shall record their declarations, if they resume duty after an absence of 15 (Fifteen) days or more. In such case no fresh learning is required.

(g) Whenever an Amendment slip to the Station Working Rules is received, a separate assurance from the staff concerned and a separate certificate from the Station Master (in the case of moderately literate staff) to the effect that they have understood and assimilated the importance thereof should be obtained specifying the number of Amendment slip.

(h) The declaration from subordinate staff, viz Shunting Masters, Yard Masters, Assistant Yard Masters, Cabin Masters, Cabin men, Gatemen and Pointsmen who report for duty at night after an absence of 15 (Fifteen) days or more when the Station Master is not on duty shall be verified by the Station Master on duty before such staff are allowed to resume duty. This interim declaration shall be duly certified in the morning as soon as the Station Master/Yard master is available.

2. Before an employee takes independent charge of a post connected with train working for the first time, the pickup period is generally laid down by the Sr.DOM/Sr.DOM (General). However, the following guidelines can be observed on first posting or when there

is change of system/means of working of trains.

(a) Junction stations with marshalling yard and lobby- 12 days
(b) Terminal stations with marshalling yard and lobby- 10 days
(c) Large stations or junction stations - 6 days
(d) Medium stations & roadside stations - 3 days
(e) Road side stations (working in two shifts) - 2 days
(f) It must cover pick-ups in all the shifts. (Minimum one day for each shift.)

If an employee fails to give declaration during the fixed period, he must be directed for Refresher Training at his expense or extra days should be treated as leave.

He must read Station Working Rules and must witness the actual performance of these duties for the time specified as 'pick up' time. In emergencies, however, and in cases where the duties are of a simple character and similar to those already performed by an employee at stations where he has worked before, this pick up period may be reduced by the Sr.DOM.

(B) Home Address Register:

1. Every Station Master must maintain a Register containing the name and up-to-date address including telephone/ mobile phone no. of each member of the staff employed at his station.
2. A separate Register containing list of all shopkeepers, licensed vendors, licensed coolies, contractor's coolies or any other persons working at the station, other than railway employees, must be maintained along with their up to date address and telephone nos, blood group, if available and office copy of their Photo Identity cards. Entry of such persons into station area will be permitted only after checking the I-Card.

(C) Public and Staff notices for exhibition:

The following Notices and Publications, besides those which may be ordered from time to time, shall be exhibited at each station in conspicuous places: –

1. Notice Board showing current running of trains, in the waiting hall or at the entrance.
2. Notices regarding hours of business of goods, luggage and parcels - outside the respective offices.
3. Notices regarding restrictions in Goods Booking.
4. Notices regarding Allotment of Wagons.

5. Rules regarding occupation/use of Waiting Rooms - Inside the waiting rooms.
6. Notice regarding date of payment of staff.
7. Duty Rosters and Classification lists of staff employed at station.
8. Extract of Railways Act (24 of 1989) and Payment of Wages Act.
9. A list of nearest Doctors and Hospitals with telephone nos.
10. Rules for the occupation of Rest Houses and Rest Rooms – inside the Rest Houses/Rest Rooms
11. A list of home addresses with telephone nos. of staff in Station Master's office.
12. List of persons with telephone nos. from whom conveyance can be requisitioned in emergency; list of tent houses.
13. List of nearest Fire Stations, Bus depots, Airports, Oil companies etc. with telephone numbers.
14. List of telephone numbers of Civil, Police, Military and Railway officials.
15. Other prescribed notices.
16. The List of Staff qualified in First Aid.
17. Blood groups of staff

The Station Manager must be careful to see that out dated timetables and notices are removed and replaced with current ones. He should also ensure that the telephone nos. are updated from time to time.

(D) Exhibition of public advertisements:

1. Public advertisements in the form of Boards, Posters, Showcases, Models, Neon-signs or in any other form should not be allowed to be exhibited at any place within the station limit or premises without the written permission of the competent officer of commercial publicity branch etc. The Station Master will maintain a register showing full particulars of each advertisement exhibited at the station in the prescribed form.
2. Station Masters and other railway staff including Guards and Loco pilots of any train must not permit the display of advertisement matters on engines, passenger coaches and other rolling stock, unless the prior permission of the Divisional Railway Manager concerned has been obtained.

(E) Rule Books, Manuals etc. at Stations:

1. The Station Master is personally responsible to see that rule books are kept up-to-date and are available to staff for reference. (G&SR 2.01, 2.02, 2.03, 5.02 and 5.03.)
2. Station Master is also responsible to see that all registers, forms

and charts are properly and neatly maintained and that they are not used for purposes other than those for which they are printed and supplied.

3. Station Masters are responsible for general accuracy of all periodical returns and for their submission in time.
4. Destruction of obsolete records shall be recorded in a register.

(F) Station Records:

1. Each book/Register, when completed must be stocked in a bundle with a cover showing dates of commencement and completion.
2. Records must be placed on shelves and almirahs in dry and secure places, where they shall be safe from irregular handling or removal by any unauthorized person.
3. Periods for which Station records must be kept at Stations are given at the end of this chapter. Any records pertaining to court cases/enquiries must not be destroyed until the DRM's permission is obtained.

Collection of records in connection with Criminal Prosecution or accident-

(a) Station records, when required for police investigation or court purposes must, in the first instance be taken over from the station by a responsible subordinate of the Divisional Railway Manager concerned specifically deputed for the purpose. The employee so deputed should give the Station Master a clear receipt for the records removed. He should then, personally make over these records along with a list of the same to the Gazetted Officer concerned in the Divisional Office, who as and when such records are required by the police or court authorities, shall make them over under a clear receipt and shall on completion of the case, take necessary steps for the collection of the records. Station staff shall not, on any account, make over their records directly to police or court authorities.

(b) When in consequence of an accident at a station, a senior subordinate or an officer has to seize certain records at the station, he shall take necessary action in the following order:-

(i) Put page numbers in his own handwriting on each used up page of the book or register and initial immediately below the last entry showing total number of pages used, time and date.

(ii) Issue fresh books or registers from the station stock in lieu of these confiscated.

(iii) Make out a list in triplicated of the records confiscated and ask the station master to countersign against his own signatures on this list.

(iv) Make over one copy of the list to the station master.

(v) Retain the records carefully till they are called by the D.R.M. or by the President of the Enquiry Committee enquiring into the accident.

(vi) When making over the records to any of the Officers mentioned in (v) above, one copy of the list already made out should also be made over under clear signatures on the copy of the list with the official/officer who had originally seized the records from the station.

(vii) In no case should these records be made over direct to police authorities without the written orders in this connection from an officer not below the Senior Scale in rank.

(G) Books and Notices at Level Crossing Gates:

The following books and notices are maintained at a level crossing gate provided with Gate- lodge. Where Gate-lodges are not provided, the books shall be maintained in the Station Master's office.

1. A Book showing the list of equipments.
2. Duty Rosters.
3. A copy of duty list with translation in regional language.
4. Level crossing working instructions, which should appear as a separate appendix to SWR as appendix "A".

Hand Book/Folder for Gateman:

1. Extract of the Station Working Rules.
2. Public Complaint Book.
3. Vision test and various Competency Certificates of the Gatemen.
4. Results of last Traffic Census.
5. Inspection Books.

(H) Filing of Operating Circulars:

1. Every Station must maintain files of circulars etc. subject wise.
2. Each circular must be got noted by the staff concerned. In case of Group 'D' moderately literate staff, Station Master must record that circulars etc. have been correctly explained.
3. Instructions for Guards issued from time to time must be kept in one file at Guards Headquarter stations. Guards must make themselves thoroughly acquainted with these instructions and should sign the circulars and assurance register of safety literature file while "signing on" for duty.

(I) Correspondence:

1. All official correspondence must be attended to by the Station Master, who must open all covers and see that all letters are replied without delay.

2. All inward letters must be registered in the inward letters register showing the dates & letter no. of reply with a copy placed in a file.
3. Station Masters are responsible for the accuracy of the information contained in all outgoing letters which they must sign personally.
4. The Station's name must be stamped on all returns and letters and on envelopes in which they are dispatched.
5. Every outward letter must be numbered, dated and must also bear reference no. of the subject. This must be adhered to in all subsequent correspondence when replying to correspondence; reference must be made to the letter number under reply.
6. Letters from the public asking for information must be replied to as promptly as possible. If there is any difficulty in supplying the required information, the receipt of the letter must be acknowledged and matter referred to the Sr DOM.
7. Sr DOM shall provide model draft of letters which are frequently received at stations using a model draft and will ensure that language used is polite, respectful and courteous. It should be written legibly at stations not having computers.
8. When forwarding letters or complaints from staff working under them, Station Masters must submit their own remarks while forwarding such letters.
9. Letters received by the Station Master, pertaining to departments under him e.g. Goods Shed, Booking/Parcel offices etc. may be marked by the Station Master for the In-charge concerned but the Station Master shall be personally responsible for the early compliance of such letters.

2005: Playing of Bands and presentation of Guards of Honour etc. on Station platform: -The playing of bands and presentation of Guard of Honour etc., on the Station Platform is prohibited, except with the prior permission of the DRM.

2006: Prohibition against Photography/Film shooting on railway premises: - Such Photography/Film shooting is strictly prohibited within Station limits and on the railway lines, except with the permission of the officers authorized by Railway Administration.

2007: Religious Edifices within the railway limits: - Employees are forbidden to occupy any place in the station area for praying, holding religious functions, speeches, discourses etc., to erect religious structures, either permanent or temporary or to add or alter any existing religious structures on railway land without the sanction of the General Manager.

Station Masters will keep close watch and promptly report any violation of this instruction.

2008: List of Station Operating Registers and Records required at station and normal period for which these are required to be preserved:

S.No. of the Book/Form	Description of the Book/Form	Period of preservation from the date of completion
1	Train Passing Registers/Books/Form	3 years
2	Muster Roll	Permanent record
3	Caution Order Register and Caution Order Books	1 year
4	Wagon Exchange Book/Wagon Exchange Register	3 years
5	Sick Wagon and Transshipment Register	3 years
6	Guard's Signature Book	3 years
7	Wagon Demand/Priority Register	3 years
8	Indent and Loading Register	3 years
9	Wagon Transfer Register	3 years
10	Damaged Stock Register/ Sick Wagon Register	3 years
11	Siding Voucher Book/ Record of Time of Wagon Handing over	3 years
12	Control Order Book/Conference Book	3 years
13	HQ Leaving Permission Register	1 year
14	Uniform Register	Permanent Record
15	Record of Station Equipment sent for repairs	Permanent Record
16	Register of Inward and Outward Letters	3 years
17	Register of Important Circulars	Permanent Record
18	Station Order Book	Permanent Record
19	Station Inspection Register	Permanent Record

20	Transportation Bio-Data Register, Register of Home Addresses of Staff etc.	Permanent Record
21	Spectacles Register	1 year
22	Station Diary and Charge Book	3 years
23	Unconnected Wagon Register	3 years
24	Load Report Register	3 years
25	Register showing Analysis of Late Starts To Goods Train at Important Yards	3 years
26	Watering Register	3 years
27	Summary of daily receipt and dispatch of wagons and Work Done	Local Order to be issued by DRM
28	Special Stock Register	Local Order to be issued by DRM
29	Detention of Wagon at Train Marshalling Stations	Local Order to be issued by DRM
30	Register of occupation of reception lines	3 years
31	Detention of Trains Outside signals and at adjacent station	3 years
32	Marshalling Register for Inward and Outward trains	Local Order to be issued by DRM
33	Register showing details of Arrival, Placement, Dispatch and Detention Particulars of PU, Repacking of wagons, etc.	Local Order to be issued by DRM
34	Register of Long Distance Goods Train Run	Local Order to be issued by DRM
35	Guard's Arrival Register	3 years
36	Register showing Detention to Wagons at Break of Gauge Transshipment point	3 years
37	Number Taker Book	3 years
38	Yard Wagon Balance Register	1 year
39	Guard's Duty Register	3 years

40	Guard's Rough Journal	3 years
41	Register of Train Advices	6 months
42	Form of Train Examination advice	1 year
43	Register showing load of Goods Train and Goods train runs under load	3 years
44	Statement of running of Passenger Trains	3 years
45	Diary of Yard Supervisor	Permanent Record
46	Unusual Register, other registers and Records maintained in control offices and at specified stations	Local Order to be issued by DRM

1. In calculating the period of One year or Three years, the year to which the books and documents relate and the year in which they are to be destroyed should be excluded.
2. Record pertaining to court cases, departmental enquiries should not be destroyed till three years from the date the case is decided.
3. Record pertaining to public claims etc. or those under reference from Home or other Railways should not be destroyed without permission from DRM concerned. Most of these registers can be computerized, clubbed & some can be eliminated.

2009: Testing of Crank Handle by SM/Dy SS:

In order to ensure that the crank handle operation of electrical point machine can be resorted to in case of emergency, periodical drill of extraction of the Crank handle from the interlocked key box and its operation should be regularly undertaken.

The following instructions should be observed:–

(a) The station staff should be fully conversant with the Station Working Rules regarding the method of extraction of the Crank Handle from the Panel/interlocked key box.

(b) Crank Handle testing must be carried out by SM/Dy SS once in a fortnight along with S&T staff and Pointsman during day shift regularly so that they are used to operate the same in case of emergency.

(c) Surprise checks by the supervisors of Operating and Signaling departments should be carried out to ensure that the testing of Crank Handle is being done regularly.

2010: Testing of Emergency Cross Over:-

In order to ensure that the emergency cross-overs work satisfactorily, when needed, it is essential that the working of each cross-over should be regularly tested.

The following instructions should be observed:

(i) (a) Emergency cross-over should be tested by the station staff by operating them once a day during day time in presence of S&T staff, wherever they are available at station.

(b) Emergency cross-over should be tested by station staff by operating them once a day during day time seeing the position of the train running where S&T staff are not available.

(c) Private numbers must be exchanged where points are operated by end cabin, while testing the emergency cross-over.

(ii) If any defect is noticed while testing, maintenance S&T staff should be advised immediately for its rectification.

(iii) The Maintenance S&T staff should jointly test the emergency cross-over with station staff during their maintenance round.

(iv) Proper record should be kept in a proper register regarding the testing of Emergency cross-over.

Surprise checks by the supervisors of Operating and Signaling departments should be carried out to ensure that the testing of Emergency cross-over is being done regularly.

FIRE PREVENTION

2011: Fire Prevention and Extinction:-

(a) Most fires are caused primarily due to negligence in one form or the other. If not detected and extinguished in their incipient stage, these may result in heavy loss of property. It shall, therefore, be the responsibility of all Railway employees to observe such precautions against fire as may be necessary and to take immediate action to extinguish it in early stage by making proper use of firefighting appliances provided on the premises or available nearby.

(b) The Official in charge shall be responsible for quick detection and extinction of fires in the premises. They shall so check persons for any such act or negligence which is likely to cause fire and shall report such cases to the officer in charge of a particular section or establishment if any action is necessary.

(c) Some important precautions against fires which should be kept in mind and observed are given below:-

(i) Never smoke or light a flame at a place where it is prohibited.

(ii) Provide plenty of ash trays and make use of them where smoking is not prohibited.
(iii) Never discard burning Cigarettes, Bidis etc. or match sticks without ensuring that they have extinguished.
(iv) Always keep your place of work clean and do not allow waste paper, cutting scraps and rubbish to accumulate there or nearby.
(v) Provide dust bins and incubators for throwing scraps and combustible waste materials and keep them at a safe distance from the building.
(vi) Do not overload electric circuit. Get your electrical installations checked periodically.
(vii) Do not store petrol, paints, explosive materials and gases in stores and go downs which do not conform to the standard specification for such storage.
(viii) Do not throw or drag packages, containing explosive. They should not be handled at night. Explosives should not be loaded in Oily wagons and wax seals, rivets & E.P. locks should not be used on these wagons.
(ix) Persons having shoes with iron nails should not handle explosives and no naked light or smoke should be brought near them.
(x) Do not load cinders in wagons unless properly extinguished and cooled down.
(xi) Never allow impregnated straw from Kerosene oil wagons to accumulate in the vicinity of Railway yards and goods shed.
(xii) Never use water to extinguish electrical fires.
(xiii) While dealing with fire in oil transformers and switch gears, use foam dry chemical powder and carbon dioxide fire extinguishers.
(xiv) Never bring naked flame where batteries are being charged.
(xv) Ensure that adequate fire buckets and fire extinguishers are provided for offices, stores and workshops.
(xvi) Ensure that your firefighting appliances are periodically checked and all your staff know their use.

2012: Firefighting appliances:–

(a) First aid firefighting equipment and appliances have been provided at all stations, goods sheds, yards, loco sheds, workshops, stores, offices and other railway establishments for extinguishing fires and consist of the following:-
(i) Foam Extinguishers
(ii) Dry Chemical Powder Extinguishers
(iii) Carbon-dioxide Extinguishers
(iv) Water Buckets

(v) Sand Buckets

(vi) Water Drums

Soda Acid Extinguishers, water buckets and water drums shall be used to extinguish all types of fires except those in live electric installations and oils. Water buckets and Soda Acid Extinguishers should in no case be used in live electric installations as water stream or jet is a good conductor of electricity and may prove fatal for the person using it. Their use is also not much effective on fires as it may splash it and oils being lighter than water may continue to float and burn on the surface.

(b) Foam extinguishers are specially meant for use on fires in electric installations.

(c) Carbon Dioxide Extinguishers can be used on any type of fires and are most effective for use in confined places.

(d) Sand Buckets can be utilized on all types of fires specially when water cannot be used or its use may cause damage. Use of sand on costly electrical equipment and machinery should, however, be avoided as it damages the machinery.

(e) In addition to the above first aid firefighting appliances, fire hydrants, hose pipes, stand pipes and branch pipes have also been provided at important places of risk. Sufficient water can be obtained from these fire hydrants and taken to the scene of fire by connecting hose pipes and a water jet can be obtained through the branch pipe at the fire end.

(f) Fire stations and Sub Fire stations having regular firefighting machines and fire personnel have also been established at very big Railway stores and workshops and their services should be utilized in case of fire accident.

2013: Care and maintenance of fire appliances:-

(a) The subordinate incharge shall display at a prominent place a list of fire appliances at his station and the location of each appliance. He shall also ensure that every employee working under him is aware of the location of such fire appliances. Fire fighting appliances should be kept in easily accessible unobstructed places. All railway stations, goods sheds and parcel offices should display the telephone number of the nearest railway or civil fire station just near the telephone.

(b) Officers in charge of railway establishment and Station Masters shall be responsible for ensuring that, within their jurisdiction,

(i) Fire extinguishers are dusted daily and the nozzles cleaned.

(ii) Fire buckets and sand buckets are at all times filled with water and sand.

(iii) There are at all times two buckets full of water, for every bucket of sand except at places covering electrical or oil risks where sand buckets only are to be provided.

(iv) The sand in buckets is never allowed to set or moss allowed to collect on water. Water should be replaced weekly.

(v) Water and sand buckets are refilled immediately after use.

(vi) Sand bins where provided are always kept full.

(vii) Keys of fire buckets stands, hose pipes and stand pipes must be kept by the Assistant Station Master or any other responsible person on duty so as to be readily available in case of need.

(viii) Railway fire hydrants mains shall be (a) 150 MM dia minimum (b) 'C' class piping.

(c) Periodic inspections and maintenance of Fire Extinguishers shall be carried out by the fire service personnel and Sub-Inspector (Fire) of the division will be responsible to see that it is properly carried out and its record is maintained.

2014: Recharging and testing of Fire Extinguishers:-

(a) Fire Extinguishers shall be recharged immediately after use on a fire or a fire drill. For this purpose Station Master or officer in charge of various establishments should hold a supply of two extra refills per extinguisher and ensure that sufficient refills are always available for use.

(b) Recharging of Fire Extinguishers after fire drills or use on fire will be carried out by the official in charge of the concerned department. It shall be the responsibility of the official in charge to get the Fire Extinguishers refilled immediately from the agency, duly authorized by the divisional administration.

(c) Date of testing and annual refilling shall be painted on the lower portion of the body of extinguisher near the bottom end.

2015: (i) Training in Fire Fighting: - Station Master and officers in-charge of other Railway establishments shall ensure that all the staff under them are fully conversant with proper use of first aid fire fighting appliances and methods of fighting fires.

Subordinate in charge, in whose premises the chemical fire extinguishers are installed, should ensure that all staff under them are trained in its operation. For this, they should contact Divisional Inspector (Fire) and make out a programme for such training.

(ii) First Aid Fire Fighting Appliances: - It is a machine designed to project water or other fire fighting media under pressure on fire for extinguishing or keeping the fire under check in initial stage only, till arrival

of the fire brigade. The following types of first aid fighting appliances are used:

(a) **Soda acid type: -** Its nozzle of discharge is on the body of the extinguisher and it is used in cases of fire in wood, paper, cloth and where purely a cooling effect is required. It should not be used for extinguishing fire on live electricity, petrol and paints. For using it, the plunger should be struck against any hard surface after lowering the nozzle to have the plunger driven into the extinguisher. It should be checked that the plunger rod is not driven in and the nozzle is not choked to determine that it is in working order.

(b) **Foam type: -** Its nozzle is on the cap only and is fitted with a releasing device. It is used for fire in petrol, Kerosene oil, paints, varnishes etc. It covers the burning liquid like a blanket cutting off fresh air from it. Check that the sealing valve handle is in closed position and the nozzle is not choked to ensure that it is in working order. After taking the extinguisher by its handle the bayonet seal or turn cock should be released, turned upside down, shaken violently and then the jet should be directed against any substance near the fire to cover the burning material, but it should not be struck with its face. It can be used in electric fire after switching off the current.

(c) **Dry chemical powder extinguisher:-**
One flexible discharge tube with squeeze grip discharge mechanism at the end is fitted on the body of the extinguisher. It is used for fire in cars, Gas cylinders, transformers, electrical motors and battery charging room. By feeling the weight of the extinguisher, we can determine whether it is in working order or not. For using it, the extinguisher should be taken by its handle and after removing the safety clip from the spindle knob in the cap and by holding the squeeze grip in the right hand, the knob should be struck with the left hand. Then the flow of powder should be directed on the burning material or liquid.

(d) **Carbon dioxide (CO_2) type fire extinguishers:-**
Discharge tube is provided with a horn at the end and for operation, wheel valve is provided at the top of the extinguisher. It is used specially for electrical risks (fire) being non-conductor of electricity and on delicate equipments and machinery.
For using it, take the extinguisher off from the bracket and after approaching the fire hold the discharge horn with left hand and

turn the wheel valve in anti-clockwise direction, directing the discharge on the burning material.

As the discharge is in the shape of snow, it is advisable to put on hand gloves to prevent snow burning of the hand.

2016: Fire Drills:-

(a) Railway staff at stations and other railway establishments shall be trained to extinguish fire and for this purpose a surprise fire drill shall be held once a month during day and once in three months during the night.

(b) The official in charge shall be responsible for holding fire drills.

(c) The fire alarm shall be sounded. Except where otherwise provided for, the continuous ringing of the station bell for about two minutes shall constitute the fire alarm.

(d) In addition to the fire alarm, a member of the group 'D' staff shall be sent round to rouse staff in the vicinity.

(e) On hearing the alarm all staff shall rush to the place of call and assemble at the nearest fire point, from where they shall be guided to the scene of fire by the senior most official present.

(f) The senior most official present, will detail parties for carrying out different jobs and staff shall carry out the allotted duties or render such help as is considered necessary in an organized and disciplined manner.

(g) At each fire drill, the state of fire buckets, Hoses, Hydrants etc. shall be examined and all defects promptly brought to the notice of the officer in charge. Where there are hydrants, water pressure shall be noted and if the pressure is very low, a report shall be made to the Divisional Railway Manager. The pressure can be judged by the throw of the water after it leaves the nozzle of the fire hose.

(h) Only buckets of water shall be used, the sand being reserved for actual fire.

(i) At stations and depots provided with patent Fire Extinguishers, staff shall be instructed in their use. Only One extinguisher shall be emptied at each demonstration and the same shall be refilled immediately thereafter.

(j) A record of every fire drill shall be made in the Miscellaneous Register at the station.

2017: Hints on fire:-

(1) Attention is drawn to General Rule 6.10 and its subsidiary rules which must be carefully observed in cases of fire.

(2) Staff should not smoke, carry naked lights or light fires in the vicinity of goods, sheds, petrol installation and wagons containing petrol or other inflammable liquids or articles.

(3) The presence of all the following factors together causes fire:-
   (a) Combustible substance
   (b) Oxygen
   (c) Heat

(4) The methods adopted to extinguish fire are:-
   (a) Starvation or causing the absence of combustible substances by removing them far away from the neighborhood of fire e.g. removing furniture and records of an office room on fire, or by removing the fire away from the neighborhood of combustible substances e.g. separating a wagon or coach on fire from others.
   (b) Smothering or causing the absence of Oxygen and preventing the access of fresh air to the site of fire by:-
      (i) Closing all openings of a room, wagon or coach on fire.
      (ii) Throwing sand or earth on fire.
      (iii) Using foam extinguishers.
      (iv) Covering a person whose clothing is on fire with a rug or blanket.
   (c) Cooling by reducing the degree of temperature with water.

(5) When fighting a fire, every effort should be made to save life and property.

(6) If the fire is serious, Municipal or Railway Fire Brigade where available, should be called without delay.

(7) The cause of the fire should be investigated as promptly as possible. This information is necessary when dealing with claim arising as a result of fire.

2018: Fighting a fire: - The following action shall be taken simultaneously as soon as a fire is noticed:-

1. Shout “Fire” “Fire” to warn others, sound the fire alarm and send someone to call other for help.
2. Try to put out the fire in its early stage by making proper use of fire extinguishers, fire buckets or by any other means that may be available nearby.
3. Inform the Railway Brigade, City Fire Brigade and the senior most railway official available on duty, giving him in brief the correct location of fire and also the material involved, if possible.
4. Rescue any one in danger and send the injured immediately to the nearest hospital, salvage documents and property.
5. In case of fire in electrical installations, switch off the mains before using any fire extinguisher or water on it. In case this is not done, it may prove fatal as water is a good conductor of electricity.
6. Keep the doors and windows of the room, coach, wagon etc. closed till

such time as fire appliances are ready for use on fire or till the time of arrival of fire brigade, if the fire has flared up. Keep the gates open and road free from obstructions for easy access of fire brigade engines.

7. Push away coaches and wagons and remove other combustible materials, if any, from the vicinity of fire in order to check its spread. All shunting movement in the vicinity of the affected area should be stopped.
8. The senior most officer/official on the spot should organise bucket chain system, fire fighting party, rescue party, salvage party and watch party for carrying out operations methodically and efficiently.
9. Appropriate fire appliances available should be used immediately to put out the fire. If fire hydrants and hose pipes are provided on the premises, a line of hoses should be laid out from the hydrant and water jet should be brought into action.
10. Water column or any other source of water supply can be used freely for fighting fires, if required. If fire breaks out in a wagon or coach, the same should be placed immediately beneath the nearest water column or hydrant. If the fire is detected in a sealed wagon; the seal lock and rivets should be immediately broken. In case of fire in locked goods shed and parcel shed, the lock should be opened after breaking it and action taken to extinguish the fire.
11. On arrival of the fire brigade, the fire officer should immediately be apprised of the nearest source of water, the risk involved and risk apprehended and may be given any other co-operation that may be needed. The senior most official of the Fire Brigade will be responsible for efficient working of the unit of the fire.
12. Cause of fire should be investigated and ascertained without delay and any material, clues found or detected must be preserved, if sabotage or incendiarism is suspected.

2019: Fires caused by Electricity: - The following precautions must be taken:-

1. Switch off the current before using the fire extinguisher. If this is not done, the use of water can be fatal as water conducts electricity. In case the fire is on running train and in a coach fitted with dynamo and batteries, the guard must remove the dynamo belt and battery fuse links and send the information by quickest means to the Station ahead where train lighting staff is available to rectify the defect.
2. Inform the Electrical Department, who shall switch off the circuit supplying electricity to the locality involved.
3. The in-charge of the operation at the site of the fire must personally satisfy himself that the electric supply has been cut off at the affected area.

4. Use only CTC or CO_2 type fire extinguishers or loose dry sand.
5. If the fire brigade is summoned, a responsible official of the electrical department should make dead all electrical equipment adjacent to the fire, before operations are commenced.

2020: (a) Action to be taken in case of fire in trains:-

(i) If any electrical equipment of a train catches fire, the Guard should put off the main switch and disconnect Kent couplers of the carriage, isolating it from the rest of the train. He should take all steps to extinguish the fire and report the occurrence to the nearest station master.

(ii) An equipped or feeder coach should be detached from the train, if possible, otherwise, the dynamo belt should be taken out by removing the belt fastener pin. The coach should not be put on again on train unless detached and examined by an electrician.

(iii) If a coach standing in a station yard catches fire, the SM should put off the main switch on the carriage and take steps to extinguish the fire.

(iv) The portion of the train behind the affected coach must be detached and front portion drawn ahead to a safe distance.

(v) All efforts should be made to extinguish the fire with the help of fire extinguishers, dry sand or earth.

(vi) If water is available nearby, Loco Pilot in consultation with Guard may draw the front portion ahead with the affected coach near the water.

(vii) If a vehicle carrying passengers catches fire, the safety of the passengers should be the first consideration and if it contains mail all efforts should be made to save it.

(b) Fire on traction electrical equipment:-

(i) In case of fire on OHE, the affected part should be electrically isolated from the distribution system and TPC concerned informed immediately.

(ii) A person not authorized to extinguish electrical fire, if he notices it should make no effort to extinguish it but should inform TPC directly or through nearest station master.

(c) Fire in EMU or Electric Engines:–

(i) Action should be taken as per GR 6.10 and their SRs of G&SR Book for working electric trains.

(ii) If fire brigade is called, it should not be allowed to commence operations until all electrical equipment adjacent to the fire has been made dead by a responsible officer of the electrical department. Water should not be used for extinguishing fire.

(d) Only CTC and CO_2 type fire extinguisher or loose dry sand should be used for extinguishing electrical fires.

2021: Fires caused by Petrol or any other inflammable, liquids, acids or gases:-

1. Segregate the affected wagon, coach or area involved.
2. On opening a wagon, do not enter it immediately and thus, avoid fumes, which may be dangerous.
3. Use foam type extinguishers and sand and not water or soda acid type fire extinguishers.
4. Do not bring naked lights near the site of fire.
5. Inform the nearest Railway or Civil Fire Station intimating that the fire has been caused by Petrol or any other inflammable liquids or gases or acids.

2022: Fire caused by crackers, detonators or gun powder:-

1. Inform the nearest Railway or Civil Fire Station intimating them that the fire has been caused by crackers, detonators or gun powder.
2. Segregate the wagon, coach or the area involved.
3. Cordon off the affected area as the risk of explosion is always there.
4. Do not use water. Use sand or dry chemical fire extinguisher.
5. Act under the expert advice of the Fire Officer.
6. Preserve clues and ascertain the actual cause of fire (such as overheating, combustion, inefficient or insufficient packing, mishandling of packages etc.) for the Divisional Railway Manager who has to send a Report to the Chief Inspector of Explosives, Nagpur and the Inspector of Explosives concerned.

CHAPTER-3
STATION WORKING RULES (SWRs)

3001: General Rule 5.06 stipulates:

(a) In addition to General Rules for Indian Railways and Subsidiary Rules of a Zonal Railway, each station shall be provided with Station Working Rules, applicable to the station, issued under special instructions.

(b) A copy of the Station Working Rules or relevant extract thereof shall be kept at stations, cabins and level crossings concerned.
SWRs shall be issued in Bi-lingual i.e. in English and Hindi (Devanagari script) form.

(c) Object: The object of issuing SWR is to inform all staff concerned with working of trains about the special features of the station to ensure safe train operations at & between stations including level crossings depending on local conditions.

3002: Authority to issue SWRs:

(a) (i) Under the provisions of GR 5.06, the authority to issue SWRs rests with the Authorized Officer of a Zonal Railway. The power to issue SWRs has further been delegated to the Sr.DOM/Sr.DOM(G)/DOM, Sr.DSTE/DSTE and Sr. DEN concerned jointly for all stations within the Division. TWR is a part of SWR and this should be signed jointly by Sr.DOM, Sr.DEE/TRD.

(ii) SWRs are issued in conformity with the G&SR and cannot, in any way, supersede them. In case of any conflict, the provisions of G&SR will prevail.

(b) SWRs requiring sanction of Commissioner of Railway Safety (CRS):

(i) At stations where relaxation has been obtained from provisions of General Rules under Approved Special Instructions, the approval of CRS already obtained shall find place in the SWRs.

(ii) Railway administration must obtain sanction of the CRS, when the SWRs are revised as a result of any work listed in Para 1302 of the Indian Railway's P.Way Manual and Chapter XV of G&SR Book.

(iii) Works requiring the sanction of Commissioner of Railway Safety and notice thereof (See List of work in Para 1302 of chapter XIII of IRPWM).

(iv) SWRs of Special Class Stations.

(c) Procedure for Preparation of SWR:

(i) The Sr.DSTE/DSTE will prepare/amend the Rule Diagram on the basis of signalling plan/appendices and will arrange to draft station working Rule and send the station working Rule diagram with SIP and Station working Rule to Sr.DOM/Sr.DOM (G)/DOM for Checking the SWRD and Station working Rule.

(ii) Since the Rule Diagram has a vital bearing on the preparation of the SWRs, the Sr.DOM/Sr.DOM(G)/DOM will scrutinise the Rule Diagram & SWR and have these checked at the site.

(iii) The Sr.DOM/Sr.DOM(G)/DOM will arrange to check the SWR prepared by Sr.DSTE/DSTE by the Transportation Inspector in the Standerd Format, after which these will be checked and approved by the Sr.DOM/Sr.DOM (G)/DOM personally. In case of electrified sections Sr.DEE/DEE (TRD) shall also be associated in checking of Station Working Rules.

(iv) If there is a 'D' (Flag Station) and 'DK' (station with siding) between two Block Stations, the SWRs of the Block Stations on either side shall contain a reference to such D/DK class Station (in Appendix 'F' of the SWR). In the case of a DK class Station, the special instructions for working the siding shall also be incorporated in the SWRs of the Block Stations situated on either side of the 'DK' class Station. A copy of these special instructions along with the Rule Diagram shall be made available at such DK class Stations also.

(v) LC Gates controlled by the Stations (either traffic or engineering) and rules for their working shall be incorporated in Appendix "A" of SWR.

(vi) The detailed working instructions of Ghat sections shall also be appended in Appendix to the SWRs of adjacent block stations of Ghat section.

(d) Responsibility of the Officers signing the SWRs:

(i) SWRs are the functional rules governing the working of stations. These need to be prepared with care and attention as any deficiency in these rules can endanger safety, in which case, the officers signing the SWRs shall also be held responsible along with other staff for breach of safety rules.

(ii) It is obligatory that the rule diagram of the ground conditions is compared at site to confirm accuracy of rule diagram In the absence of officials signing the SWR having verified it personally, the Transportation Inspector, SSE (Engg.) and the SSE (Signal)

will, after having jointly inspected the site, certify in writing that the actual layout conforms to what is shown in the Rule Diagram and the number of points and signals quoted therein are correct.

(e) Reviewing of SWRs:

The SWRs should be reviewed once in every five years. In case the review brings out the necessity of carrying out changes, the SWRs should be re-issued. In the event of more than five amendment slips having to be issued, the SWRs should be reissued without waiting for the periodical review to be conducted every five years as mentioned above.

(f) Method of amending SWRs:

Whenever any addition/amendment is required to be made in the said rules, the entire page/pages duly signed by concerned officers on which the provisions requiring addition/amendment appears should be replaced. The method of pasting amendment slips by hand in the SWRs is not permitted.

(g) Responsibility of Transportation Inspectors (TI):

(i) The Transportation Inspector is responsible to see that SWRs of stations on his section are correct and up to date. He will also be responsible to ensure that the station staff viz. Station Supdt., Station Master, Switchman, Cabinman, Pointsman, Gateman and any other staff who are in any way connected with train passing duties, possess correct knowledge of the Rule Diagram and the SWRs and observe them strictly.

(ii) Transportation Inspector will also check the SWRs and Rule Diagram and point out irregularities, if any, detected by him. If he finds that certain rules are impracticable thereby forcing the staff to infringe them, he shall immediately bring this matter to the notice of the Sr. Divisional Operations Manager/Sr Divisional Operations Manager (G)/DOM. If he detects any error or omissions which, in any way, affect safe running of trains, he shall take immediate steps at the spot as necessary for safe working of trains and report the matter to the Sr. Divisional Operations Manager/Sr. Divisional Operations Manager (G) /DOM concerned for necessary amendment/modification in the SWRs.

(h) Responsibilities of Station Manager/Station Superintendent/ Station Master incharge:

The Station Superintendent/Station Master on receipt of the SWRs must immediately check to ensure that these conform to the local

conditions at their stations. If he finds any discrepancy in the said rules, he shall immediately bring such discrepancies and difficulties to the notice of the Sr.DOM /Sr.DOM (G)/DOM and Transportation Inspector of the section. The Station Manager/Station Superintendent in charge shall see that all staff having definite responsibilities in train passing at their stations correctly understand and follow the SWR.

(i) Assurance of staff:

(i) All the staff who are in any way associated with train passing duties, must sign a declaration in the Assurance Register in token of having studied the SWRs, Rule Diagram and other instructions pertaining to their duties and understood the same and that they are in a position to take up duties independently at the Station. In case of moderately literate staff, the Station Manager in charge/ Yard Master/Assistant Station Master shall personally explain the SWRs, Rule Diagram and their duties and obtain their acknowledgements in the Assurance Register as a token of their having understood the instructions. The SS/YM/SM/ASM shall also certify that the staff concerned has understood the instructions pertaining to their duties.

(ii) Fresh assurance shall be obtained in the Assurance Register from the staff concerned when -

(a) He joins at the station as a new member,

(b) There is any change in the Station Working Rules,

(c) He resumes duty at the station after an absence of 15 consecutive days or more.

3003: Distribution of Station Working Rules:

Copies of SWRs shall be distributed as minimum two sets of English and Hindi language at every roadside station and at large stations at every independent working point.

3004: Standardization of SWRs:

To maintain uniformity in the SWRs, the following format shall be used while framing/revising the Station Working Rules for stations. Care May, however, be taken to ensure that –

(a) The SWRs framed as per the format are self-contained, brief, precise to the point and written in simple spoken language and

(b) General and Subsidiary Rules need not be reproduced in the SWRs. Relevant GR/SR number, may be mentioned in bracket against each para when required.

(c) Sr.DOM/Sr.DOM(G)/DOM, Sr.DSTE/DSTE and Sr.DEE/DEE (TRD) are required to add those special items or features having a bearing on

safety in operation at the co ncerned Station, that are not covered in the format given below (This format has been fixed by RLY Bd) :

No……. RAILWAY…… DIVISION……

STATION WORKING RULE OF…… (Name of the station)

…… (BG/MG/NG)

Date of issue……

Date brought in force……

NOTE:

(i) The Station working rules (SWR) must be read in conjunction with General & Subsidiary Rules and Block Working Manual. These rules do not in any way supersede any rule in the above books. The language of SWR should be simple, brief and unambiguous applying provision of rules to the specific conditions at the relevant station. These rules must be in simple language intelligible to ordinary railway men. However, relevant GR & SR numbers may be mentioned in the brackets.

(ii) The SWR must be page numbered with the station name code written on each page and signed by the Sr Divisional Operations Manager(G) /Sr Divisional Operations Manager, Sr Divisional Engineer (where engineering gate working) and Sr Divisional Signal & Telecom Engineer at interlocked stations. At non-interlocked stations, the same should be signed by Sr Divisional Operations Manager (G)/Sr DOM/DOM and Sr Divisional Engineer on each page.

(iii) The SWR should be issued afresh after every **five years** or after issue of **five** amendment slips and reviewed as and when required.

(iv) Any new innovations introduced to facilitate train operation should be incorporated in the SWR.

1. **Station working rule diagram:**

SWR Diagram No. ---------- based on CSTE/----- Railway and Signal Inter locking Plan No. -----should show the complete layout of the yard, Points, Signals, gradients and interlocking arrangements of the station including the non-interlocked sidings, exact and actual holding capacity of all the individual lines in meters, actual inter signal (demarcation point) distances, names of adjacent stations and IBH signals, where provided, on either side of the station with their respective distances from the central line of the station building to the central line of the adjacent stations and any other information necessary in the day to day operation of trains. The particulars of date up to which it is corrected should also be mentioned. SWR diagram should show actual distances and not the minimum prescribed. It should be signed by the Sr Divisional Operations Manager (G)/Sr Divisional Operations Manager, Sr

Divisional Engineer and Sr Divisional Signal & Telecom Engineer. The detection table, Lever Collar Chart and Pull Sheet may be provided in Appendix 'B'. Pull Sheet should be reproduced on a board brightly painted in the cabins to be placed above the Lever Frames.

2. Description of station:

2.1 General (Location)

-------- (Name of the station) is a ------- class station on the ---------- (name of the section) double/single line Electrified/non-electrified (BG/MG/NG) section of -------. Railway on ---------- route. It is situated at KM ------- from---- (a nominated point on the Railway). The number of cabins should be furnished.

2.2 BLOCK STATIONS, IBH, IBS ON EITHER SIDE AND THEIR DISTANCE AND OUTLYING SIDINGS.

-------Station is situated between-------- (Name of adjacent station on one side) in the---------(North/South/East/West) side at a distance of-----km and (Name of adjacent station on the other side) in the --------(North/South/ East/West) at a distance of km.

In case of IBS signal being provided in the adjacent section, the mention of the same need to be made as follows: The section between ------ ------ (name of the section on which the IBS is provided) has been split into two Block sections by providing Track Circuit/Axle Counters and Intermediate Block Stop Signal at Km. -------- and Km. ------ on Up and Dn lines respectively, which are controlled by Track Circuit/Electronic Axle Counter and Double Line Block Instrument.

In case the adjacent section is provided with automatic signals, necessary mention of the same needs to be made in the SWR literature.

In case of outlying sidings/DK station taking off from the section its name and Km in Up/Dn direction should be mentioned. Their detailed working instructions should be given in Appendix 'F'.

2.3 BLOCK SECTION LIMITS ON EITHER SIDE OF THE STATION IN DIFFERENT DIRECTIONS

Points up to which block section in rear terminates and the point from which the block section in advance starts should be indicated in the following tabular format:

Between Stations.	The point from which the "Block Section" commences	The point at which the "Block Section" ends

2.4 GRADIENT IF ANY :

The gradients in the yard and the adjacent block sections should be mentioned with their locations. Any gradient which is steep enough to warrant special precaution in train operation should be mentioned.

2.5 LAYOUT:

Under this head, information pertaining to the number of running lines in the main yard (namely UP Loop, UP Main, DN Main and Common Loop etc.), Goods sheds/siding, Hot Axle siding, Engine sidings, engineering sidings, sidings taking off from the yard with the details whether electrified/non-electrified etc. and how they are isolated from the running lines should be mentioned. The information in relation to provision of low/high level platforms on the running lines/goods sidings should be given.

2.5.1 RUNNING LINES, DIRECTION OF MOVEMENT & HOLDING CAPACITY IN CSR:

The direction of movements on all the lines and Clear Standing Room of running lines in terms of metres need to be specified.

2.5.2 NON RUNNING LINES AND THEIR CAPACITY IN CSR.

2.5.3 ANY SPECIAL FEATURE IN THE LAYOUT.

Any special feature of the yard such as catch siding, slip siding, non-standard turnouts, curves, spring points etc. having bearing on the operation of trains needs to be mentioned.

2.6 LEVEL CROSSINGS:

Detailed working of the gate along with the particulars regarding LC gate No., location, class, normal position, whether interlocked or non-interlocked, whether communication provided or not and whether Train Actuated Warning Device (TAWD) provided or not, how the gate is operated etc. need to be mentioned in Appendix 'A'.

3. SYSTEM AND MEANS OF WORKING:

System of working in force: - Absolute/Automatic by using Double line, Single line Token/Token less Block Instruments, whether co-operative or non-co-operative, the staff responsible for their operation and custody of keys should be clearly mentioned. Mention should also be made of the availability of block telephone at the station and Telephone provided at IBS posts to establish contact by the Loco pilot with Station Master in rear, in case of any necessity.

4. SYSTEM OF SIGNALLING AND INTERLOCKING:

4.1 The Standard of interlocking, type of signalling i.e. Modified Lower Quadrant/Two Aspect Lower Quardrant/Multi Aspect Upper Quadrant /Multi Aspect Colour Light Signal (MLQ/TALQ/MAUQ/MACLS), method of operating the signals/points from Lever Frames/Control Panel/VDU/CTC, provision of axle counters/track circuits on running lines, Calling-On Signals/IBS, special signalling features such as fixed Warner, stop boards at terminal stations, emergency cross- overs, permanently locked points, motor operated points at otherwise mechanically worked stations, emergency/ crank handle keys and their custody, indications (electric/banner type) of points/trap points /signals /track circuits/axle counters need to be mentioned. The detailed description

of the Lever Frame/control panel/Video Display Unit for route setting using point/signal/gate control switches, individual operation of points, operations of gates within the station limits, setting of points using the crank handle and the maintenance of proper records of emergency operation counters provided on the panel need to be mentioned here. Procedure for working of stations provided with Train Protection and Warning System and Anti Collision Device need to be mentioned. The procedure for resetting of the system in case of failure of Axle counter on berthing portion as well as IBS section, emergency operation of points, emergency route cancellation, clearing of block etc also need to be mentioned from operations point of view.

(Details of signalling and interlocking should, however, be given in Appendix 'B' and details of Anti Collision Device, TAWD and TPWS if provided, be given in Appendix 'C').

4.2 CUSTODY OF RELAY ROOM KEY AND PROCEDURE FOR ITS HANDING OVER AND TAKING OVER BETWEEN STATION MASTER AND S&T MAINTENANCE STAFF: Procedures as per the provision laid down in SR14.03 of G&SR Book should be mentioned in SWRs.

4.3 POWER SUPPLY:

The sources of Power supply for Signalling such as Dn AT/ Up AT/ Local supply (State Electricity Board)/ Diesel Generator/UPS/ Integrated Power Supply etc. should be mentioned here. It should be clearly mentioned whether the change over from one source of supply to the other shall be automatic or manual in case of failure of normal source of supply. The procedure for manual change over should be described.

5. TELECOMMUNICATION:

The availability of the telecommunication facilities at the station and their operational aspects should be clearly defined:

(i) Section Control/Dy. Control/Traction Power Control Telephone, etc.
(ii) Auto/DOT Telephones,
(iii) Magneto Telephone with the cabins/gates,
(iv) IBS Telephone with IBS at Km,
(v) Telephone with Axle Counter reset boxes,
(vi) Telephone for yard communication,
(vii) VHF Sets, and
(viii) Mobile Train Radio Communication(MTRC)

The action to be taken in case of failure of communication given above to be clearly spelt out. (Details of working should be given in appendix 'B')

6. SYSTEM OF TRAIN WORKING:

6.1 DUTIES OF TRAIN WORKING STAFF:

The duties of the train working operations staff such as Station Master, Station Assistant, Switchman, Cabinman, Leverman, Pointsman, Platform

Porter, Gateman for train operation should be mentioned in detail in Appendix 'D' giving specific references to the G&SR of the Railway and the Block Working Manual.

6.1.1 TRAIN WORKING STAFF IN EACH SHIFT:

The availability of above operations staff provided at the Station in each shift with their duties for working of trains should be mentioned in Appendix 'D'.

6.1.2 RESPONSIBILITY FOR ASCERTAINING CLEARANCE OF THE LINES AND ZONES OF RESPONSIBILITY:

Responsibility for ascertaining clearance of lines and zones of responsibility of each of the staff on duty should be clearly mentioned here. Mention should be made that Private Number Book should be under the custody of train passing staff who is authorised to use it.

6.1.3 ASSURANCE OF STAFF IN THE ASSURANCE REGISTER :

Every train passing staff posted newly at the station or leave reserve staff at the station or regular staff who has resumed his duties after more than 15 days of absence must go through Station Working Rules in force and give assurance in the prescribed Assurance Register.

6.2 CONDITIONS FOR GRANTING LINE CLEAR :

Under this head, principles of the System of Working in force on the station should be described briefly and clearly as applicable to the station. Specific points on the track, up to which the line is required to be kept clear must be indicated. Mention of outlying sidings, if involved, may also be made.

6.2.1 Any special conditions to be observed while receiving or dispatching a train.

- 6.2.1.1 Setting of points against blocked line.
- 6.2.1.2 Reception of train on blocked line.
- 6.2.1.3 Reception of train on non-signalled line.
- 6.2.1.4 Dispatch of train from non-signalled line.
- 6.2.1.5 Dispatch of train from line provided with common starter signal.
- 6.2.1.6 Any other special conditions should be mentioned giving reference to the G&SR.

6.3 Conditions for taking 'off' approach signals:

This needs to be mentioned here giving reference to the relevant provisions of the G&SR.

6.3.1 Responsibility of station master for restoration of signals to 'ON'.

Station master should ensure that signal is put back to 'ON' after passage of the train as per GR 3.36(2).

6.4 Simultaneous reception /dispatch, crossing and precedence of trains:

This should mention the specific setting of points and traps for the purpose of achieving the desired signal overlaps/isolations to Sand Humps/sidings etc. while receiving trains simultaneously, crossing and giving precedence to trains at the station.

6.5 Complete arrival of trains :

Responsibility for verification of complete arrival of trains before closing the block section should be made clear. In case Block Proving by Axle Counter (BPAC) is installed on the section, the procedure of block working should be mentioned, giving reference to the relevant provisions of G&SR and Block Working Manual.

6.6 Dispatch of trains:

Particulars regarding starting of trains from running lines, non-signalled lines, issue of caution orders, etc. should be mentioned giving reference to the provision of G&SR and Block Working Manual. In case IBS is provided, the procedure for dispatch of trains up to the IBS and thereafter to the next station should be clearly defined.

6.7 Trains running through:

The provisions given in G&SR should be mentioned.

6.8 Working in case of failure:

Working in case of failure of track circuits, points, signals, block instruments, axle counters, Axle Counter Block procedure for working over damaged points, reception of trains on obstructed lines, non-signalled line including failure to read the occupation of line by trolley or light engine etc. should be mentioned in detail here.

6.9 Provisions for working of Trolleys/Motor Trolleys/Material Lorries/Light Motor Trolleys/Moped Trolleys/Scooter Trolleys :

Some of the precautions such as given below should be mentioned:

(i) The section where axle counters are provided in lieu of track circuits, Trolleys, Motor Trolleys, Lorries, Light Motor Trolleys, Moped Trolleys, Scooter Trolleys etc., which are not insulated shall not be allowed to run except on line clear.

Motor Trolleys/Tower Wagon/Material Lorries/Light Motor Trolleys /Moped Trolleys/Scooter Trolleys are not likely to actuate the Axle counter correctly. When they are to run over the section split by Axle counters the whole section to be treated as one and next train to be started after the last train has arrived complete.

(ii) In all other respects the working of a light Motor trolley shall conform to the rules laid down for ordinary trolleys while running without block protection and to those laid down for motor trolleys while running under block protection or following another light motor trolley or a motor trolley.

(iii) Any other restriction on movement of trolleys / motor trolleys/ material lorries / light motor trolleys / moped trolleys / scooter trolleys / tower wagons etc.

7. Blocking of line:

The precautions to be taken by the Station Master, when lines are blocked by stabled vehicles or otherwise for maintenance works, to be detailed here.

8. Shunting:

8.1 General precautions

8.2 Shunting in the face of approaching train

8.3 Prohibition of shunting, special features if any.

8.4 Shunting on single line –

Within station section

Between Last Stop Signal and opposite First Stop Signal.

Beyond opposite First Stop Signal

During failure of block instrument on single line.

8.5 Shunting on double line.

Block back

Block forward

Following a train travelling away.

Up to IBS

Beyond IBS

During failure of block instrument on double line.

8.6 Shunting in the siding taking off from station yard/ goods yard.

9. Abnormal conditions:

(a) The rules to be observed in the event of Abnormal Conditions.

The procedure to be followed in the event of following abnormal conditions should be specifically mentioned.

(i) During partial interruption/failure of Electrical communication instrument.

(ii) The authority to proceed in the occupied block section in case of obstruction of line or accident etc.

(iii) Trains delayed in block section

(iv) Failure/passing of intermediate block stop signal at 'ON'.

(v) Failure of Axle Counter Block/ BPAC

(vi) Failure of MTRC (Mobile Train Radio Communication)

(b) Procedure for emergency operation of points by Crank Handle.

(i) The detailed procedure of GR 3.39 for emergency crank handle operation of motor operated points at different lines at the station from operation point of view should be mentioned here.

(ii) Procedure for Emergency operation of point with point zone axle counter/ track circuit failure and emergency route release, giving reference to GR 3.39, 3.51 and GR 3.77 should be mentioned here.

(c) Certification of clearance of track before Calling-On Signal operation is initiated.

Mention should be made that before taking off Calling-On Signal during failure of track circuit/axle counter, the route and the clearance of the track over which train would pass is to be verified by SM/ASM.

(d) Reporting failure of points, Track Circuit/Axle Counter and Interlocking.

(i) Mention should be made that whenever there is a failure of points, track circuit/Axle Counter or any other interlocking gear at the station, the failure should be reported by SM/ASM on duty to the concerned Signalling Maintenance Staff on duty responsible for attending to the failure and only after receipt of the written memo from the Signalling Maintainer for rectification of the fault, SM/ASM should restore the normal working.

(ii) The entries in failure register to be done with message to the Section Controller and

(iii) H.Q. Station of maintenance staff.

9.1 TOTAL FAILURE OF COMMUNICATION

Provision of the SR and instructions laid down in Block Working Manual relating to the working of trains during total failure of communication at the station should be briefly summed up giving the action to be taken and by whom and what precaution to be taken giving reference to the relevant provisions of the G&SR.

9.2 TEMPORARY SINGLE LINE WORKING ON DOUBLE LINE SECTION.

9.3 DESPATCH OF TRAIN UNDER AUTHORITY TO PROCEED WITHOUT LINE CLEAR OR TO ASSIST THE CRIPPLED TRAIN.

10. VISIBILITY TEST OBJECT:

Position of the Visibility Test Object in each Zone of operation and the officials authorized to check the VTO from a nominated place at the station should be mentioned here.

11. ESSENTIAL EQUIPMENTS AT THE STATION:

The list of the essential equipment should be given in Appendix-'E'.

12. FOG SIGNAL MEN NOMINATED TO BE CALLED IN CASE OF FOG:

In thick and Foggy or tempestuous weather or in dust storm when VTO cannot be seen from the earmarked place on the platform on which the SM's Office is located, the SM shall send trained men to act as fog signalmen. Instructions regarding their selection from Traffic and Engineering Departments, entry of their names in the Fog Signal Register and taking assurance by the SM is to be mentioned clearly.

LIST OF APPENDICES:

Appendix 'A' Working of level crossing gates
Appendix 'B' System of signalling and interlocking and communication arrangements at the station
Appendix 'C' ACD (anti-collision device) (raksha kavach), TPWS and TAWD
Appendix 'D' Duties of train passing staff and number of staff in each shift.
Appendix 'E' List of essential equipments provided at the station
Appendix 'F' Rules for working of DK stations, halts, IBHs, IBSs, and outlying sidings
Appendix 'G' Rules for working of trains in electrified sections. (To be jointly signed by Sr. Divisional Operations Manager (G)/Sr. Divisional Operations Manager and Sr. Divisional Electrical Engineer)
Appendix 'H' Working of Automatic Signalling System.
Appendix 'I' Working instructions for Ghat Sections.

CHAPTER-4
INTERLOCKING

4001: Definition: Interlocking means an arrangement of signals, points and other appliances, operated from a panel or lever frame, so inter-connected by Mechanical locking or Electrical locking or both that their operation must take place in proper sequence to ensure safety.

4002: Basic Principles: The basic principles of interlocking are as follows:

(i) It shall not be possible to take "Off" conflicting signals at one and the same time.

(ii) It shall be possible to take "Off" signal for a running line only when:

(a) All points on the running line are correctly set and facing points are locked.

(b) All points, giving access to the running line from the sidings and goods lines, are set against the running line.

(c) Level crossing gates, if included or controlled by interlocking are closed and locked against the road traffic.

(d) A signal lever/Button, when operated must lock or back lock, as necessary, the levers/Buttons operating the points and gate locks referred to above.

Once a signal is taken 'Off', it shall not be possible to alter the points, to unlock the gate lever etc until all signals which were taken "Off" have been put back and Route released.

(iii) When all signals are in the "On" position, all points which would be locked by taking 'Off' such signals must be free for shunting purposes/testing etc.

(iv) It must be impossible to take "Off" a Warner Signal, until all the relevant stop signals in advance have first been taken "Off" and when "Off" it must back lock all such signals.

4003: Interlocking:

Points, Signals and other units are usually operated by means of levers and panels. Interlocking between these levers is accomplished either by mechanical or by electrical or electro- mechanical or electronic means. In the former method, some mechanical contrivance variously designed, controls the relation between one lever and the other.

At less important stations the point, signal and other levers are interlocked by means of keys which are used to lock or release the levers, either in the normal or in the reverse position, as required. At other stations the levers are interlocked by means of tappets inside a box of the lever frame, which is

normally kept covered and sealed.

At Panel station, Points, Locks, Gate and Signals are interlocked by means of electro/ mechanically or electronically with the help of relays & track circuiting.

4004: Types of Interlocking:

(i) Mechanical Interlocking.
(ii) Panel Interlocking (Relay)
(iii) Route Relay Interlocking.
(iv) Solid State Interlocking/Electronic Interlocking.

Mechanical Interlocking:

The era of interlocking started with mechanical frames. In mechanical signalling, since the functions are operated by levers, the relationship that should exist between the functions can be transferred to exist between the levers. To ensure that the signal can be taken 'OFF' only after the point is correctly set & locked, we can arrange the interlocking between the signal lever and point lever to be such that the signal lever can be reversed only after the point lever is in the correct position, viz. 'Normal' or 'Reverse', as the case may be.

As the size of yards & train movements increased, size of lever frames also increased. These lever frames not only increased in size occupying more space but also required intensive maintenance.

Panel Interlocking:

With the advent of Electro-mechanical relays, lever frames gave way to relay interlocking based installations. This development resulted in relatively faster operation, fail-safe operation and reduced size of buildings required for housing of interlocking installations. With further increase in traffic and expansion of railway network, panel Interlocking installations were commissioned. In such interlocking, points are set individually for the required route.

Route Relay Interlocking:

Route Relay interlocking is the same as Panel Interlocking with Electro Mechanical Relays doing the Interlocking except that it can be employed for big yards. The interlocking is done between one route and another route. Another Important feature in terms of operating point of view is that the SM has to only press two buttons, Signal button & Route Button (entry-exit system). He doesn't have to individually operate the points to the required position.

Solid State Interlocking (SSI)/Electronic Interlocking (EI):

RRI uses thousands of Electro-mechanical relays requiring complex wiring and Inter-connections. The wiring diagrams for such installations run into

hundreds of sheets. Individual relays, wiring and interconnections along with thousands of shouldered joints are required to be physically examined and certified. This exercise requires traffic blocks of long duration and large manpower to manage the traffic during blocks.

Even for small yard re-modelling like addition of a loop line, all the above activities are required to be redone. Therefore, the advantages of relay based interlocking installation are being nullified.

Unlike PI or RRI, in the SSI system (Computer based interlocking) Microprocessors (IC'S) are doing the Interlocking based on pre-determined logic circuits. This occupies considerably less space, consumes less power, is more reliable and is easy to install and maintain. Also initial commissioning & changes due to yard re-modelling can be carried out in negligible time requiring minimum manpower for traffic management during the blocks.

Advantages of SSI:

- Increase in sectional capacity.
- Faster operation.
- User friendly operation.
- Fail safe technique
- Multiple mode operation.

Significance of SSI for operating staff:

- Reduces man power
- Centralised operation
- Multiple mode of operation
- Control cum indication panel
- Video display unit (PC)
- CTC (Centralised Traffic Control) - permits remote control
- Significant reduction in traffic block time
- Easier & simple operation

4005: Indirect and Direct Interlocking:

(a) Indirect interlocking means that the points are set & locked from one place and the signals are operated from another place and another lever frame; the interlocking is effected by means of keys carried from one place to the other.

(b) Direct interlocking means that all levers, viz. the point, the point locks and the signal levers are concentrated in one lever frame and worked. Therefore, the interlocking is effected by means of rigid connections between levers without the use of keys.

4006: Standards of Signalling and Interlocking:

Interlocking at stations is standardized into four different classes viz. I(R), II(R), III(R) and IV(R). The regulations prescribing the four standards have been drawn up primarily to meet the needs of crossing stations on the single

line but, with such modifications as may be necessary in regard to the equipment of signals, these are also applicable to other stations, both on single and double lines. The standards are as follows:
Note: For further details see paras 170 to 174 of "Indian Railway Signal Engineering Manual".

Two aspect signaling:

(a) Standard-I. (R)

(i) Speed – upto 50 kms. Per hour.
(ii) Isolation - Isolation of the main line is recommended, but is not essential.
(iii) Points - the facing points should be provided with key locks, locking both switches independently and the switches being detected independently by relative signals.
(iv) Interlocking - Interlocking between points and signals may be carried out indirectly by means of key locks.
(v) Signals - Outers and Bracketed Home signals shall be provided. The provision of Starter signals is optional. Working Warners may be provided for meter gauge stations, where trains run through, if considered necessary but are not required for other stations signalled to standard-I.

(b) Standard-II.(R)

(i) Speed – upto 110 kms. Per hour.
(ii) Isolation of the main line is essential.
(iii) Points - the facing points should be provided with plunger type locks, locking both switches independently and the switches being detected independently by relative signals.
(iv) Interlocking - The interlocking between points and signals may be direct or indirect. Where indirect interlocking is used, signals shall be worked from a position under the control of the Station Master and key must be provided to enable the Station Master to lock up the signal frame.
(v) Signal - Outers, Warners and bracketed Home signals must be provided and Starters where considered necessary; Where Starters are not provided, the "off" position of the Warner signal shall be dependent upon the receipt of 'Line Clear' on the block instrument from station in advance.

(c) Standard-III(R)

(i) Speed – upto 140 kmph speed.
(ii) Isolation - same as for Standard II.
(iii) Interlocking - the interlocking between points and signals must be direct.

(iv) Signals - Outers, Warners, Bracketed Home Signals and Starters must be provided and Advanced Starters as may be necessary.

(d) Standard-IV(R)

(i) Speed upto 160 kmph

(ii) Isolation - as per Standard-III

Multiple aspect signaling:

The Standards, their speeds, requirements of isolation equipments of points and requirements of interlocking between points and signals are the same as in the case of two aspect signalling. The Signalling, however, should be as under:

(i) Standard-I (R) - A Distant and a Home Signal in each direction.

(ii) Standard-II (R) - A Distant, a Home and a Starter Signal in each direction.

(iii) Standard-III (R) - A Distant, an Inner Distant, a Home and a Starter signal in each direction.

(iv) Standard-IV (R) - A Distant, an Inner Distant, a Home and a Starter signal in each direction.

Sl No.	**Item**	**Std. I (R)**	**Std. II (R)**	**Std. III (R)**	**Std. IV (R)**
	Maximum Speed (kmph)	**Upto 50**	**Upto 110**	**Upto 140**	**Upto 160**
1	Isolation	Y*	Y	Y	Y
2	2 Aspect(2A) Semaphore/Multi Aspect	2A/MA	2A/MA	MA	MA
3	Double Distant	N	Y**	Y	Y
4	Point Operation	Mech	Mech/Elect	Mech/Elect	Elect
5	Point Locking	***Key/FPL/HPL	***FPL/Pt m/c	***FPL/Pt m/c	Clamp type direct %
6	Point Detection	Mech/Elect	Mech/Elect	Mech/Elect	Elect
7	Lock Detection	N	Y	Y	Y
8	Mode of Interlocking	Key/Mech	Mech/Elect/ Electronic	Mech/Elect/ Electronic	Electric/ Electronic
9	Track Circuiting	N	Mech Interlocking: Run Through Lines(Main), Elec/Electronic:	All Running Lines	All Running Lines

			All Running Lines		
10	Block working (Min.)	Token	Token/ SGE***	# SGE/ TC***	# SGE/ TC***
11	Preventing signal passing at Danger	N	N	N	Y%

* Isolation is not compulsory, provided that the conditions laid down in the second paragraph of the General Rule 4.11 are complied with "Limits of speed" while running through stations.

** Double distant on sections where goods trains have a braking distance of more than 1 km.

*** FPL - Facing Point Locking, HPL – Hand Plunger Lock, Pt m/c- Point Machine, SGE – Signal & General Electric Company, TC – Track Circuit.

% Desirable

At station, provided with Central Panel Interlocking (CPI) on high density routes, means for verifying complete arrival of train by suitable means.

Note: The provisions of the new revised IRSEM Para 7.131 will only apply to future Signalling and Interlocking installations. Wherever existing installations do not fulfill these requirements existing speed of operation may be permitted to continue.

4007 : Painting of Levers: Levers shall be painted in the following colours:

(a) Warner signals (two-aspect)lever	Green
(b) Distant signal (multiple-aspect) lever 45^0aspect	Yellow
(c) Distant signal (multiple-aspect) lever 90^0 aspect	Green
(d) Other Signal levers	Red
(e) Slot lever mechanical	Same color as of the lever slotted, with a 6" (150 mm.), wide blue band in the middle
(f) Slot lever Electrical	Same color as of the lever slotted, with a 6" (150 mm.) ,wide yellow band in the middle
(g) Points lever	Black
(h) Facing points lock lever	Blue
(i) Economical facing point lock lever	Upper half-black lower half-blue.

(j) Station Master's control lever	Upper half white lower half-black.
(k) Level-crossing gate control lever	Chocolate.
(l) Release lock lever	Black, with a 6" (150 mm) wide blue band in the middle.
(m) Setting lever, "List and Morse" signalling	Blue with a 6" (150 mm) wide black band in the middle.
(n) Detector lever(D.W.)	Red and blue band 6'' (150mm) wide alternately
(o) Route lever	Upper half red, lower half black
(p) Siding key control lever	Black
(q) King lever	Red and white bands 6" (150 mm) wide alternately.
(r) Spare lever	White

Numbering of levers in frames:

1. All levers, including spares are numbered consecutively through the frame from left to right. Each lever is provided with a name plate showing its function and the number of the other levers in the order of operation which must precede to release it.
2. The levers are broadly classified into three groups:
   (i) Up signal levers/slotting levers.
   (ii) Down signal levers/slotting levers.
   (iii) Point, lock, shunt signal and other levers.
3. The group to which the lever is connected to the first approach signal or Warner signal, situated to the left of the person working the levers is allotted the first set of consecutive levers, lying to the left of the frame. The second set of consecutive levers is allotted to group (iii), and the third set of levers lying to the right is allotted to the remaining (ii) group. All levers, including spares/specific of each group are then numbered consecutively, starting from the first lever on the left. The relative position of the levers of each group, generally corresponds to the relative position of the units they operate.

4008: Isolation: A line is said to be isolated from the adjacent line or lines when no movement on the adjoining lines as well as on same line can foul it. Isolation can be achieved by any of the following methods:
(a) Snag dead end, (b) sand hump, (c) trap points, (d) by setting of points (e) permanently locked points, (f) Scotch Block, (g) Hayes Derail. (h) Derailing Switch.

Note: - For the purpose of definition of isolation, (f) scotch block and (g) Hayes derail are not means of isolation. Otherwise definition of isolation may be changed as "isolated from the adjacent line or lines as well as any movement on same line."

(a) Snag Dead End:

(i) This is an extended portion of track with an erected obstruction with buffers at the end.
(ii) The length is at least 180 meters.
(iii) This is used to isolate main line from loop line.
(iv) This is an efficient substitute for signal overlap.

(b) Sand Hump:

Sand hump is an extended portion of rail embedded in sand. It is total 60m in length, with increasing gradient of 1 in 60, of which the first 30 m is laid with normal track embedded in sand and remaining 30 m is an earthen lump of uniform 4 m width.

(c) Trap Points:

(i) This is a single rail cut.
(ii) This rail cut will be away from the adjacent line.
(iii) To provide isolation, the trap point will be open.
(iv) When it is open and if a vehicle moves the vehicle will derail.
(v) This is provided to isolate running line from non-running line and main line from loop line.

(d) By setting of points:

At interlocked stations, isolation can also be obtained by setting of points.

(e) Permanently locked points:

(i) Certain points, including traps, are kept permanently locked and
(ii) The keys for these points are kept in the custody of the on duty station Master.
(iii) These points have to remain set and locked in normal position.
(iv) These keys are handed over, when these points are required to be worked.

(f) Scotch Block:

(i) A lump of log covered with iron sheets and colored red.
(ii) This will be connected with a chain tied up on the earth.
(iii) This is placed across the rail and locked to prevent vehicles from moving away.
(iv) If the vehicle moves the vehicle will derail.
(v) This is used normally to isolate running line from non-running line.

(g) Hayes Derail:

It is a device designed to limit the movement of free rolling, uncontrolled wagons/vehicles. This is accomplished by grinding the flange of a wheel up and over the railhead, dropping the wheel clear of the rail on outside of the rails. The wheels lodging in the tie cribbing and ballast halt movement of wagons/vehicles.

(h) Derailing Switch:

This is an extended portion of track ending with some sand.

- The distance from the points is about 15feet.
- This is used to isolate main line from loop line.
- This is an efficient substitute for signal overlap under approved special instructions.
- The normal setting of points is for derailing switch.
- If the vehicle moves, the vehicle will derail on the sand at the end of the derailing switch.
- Simultaneous reception is possible with CRS permission.
- This should not be obstructed.

4009: Explanation of certain terms:

(i) COUPLED POINTS: When two or more points are worked by the same lever.

(ii) CROSSINGS: The appliances provided at the Junctions where two lines cross or join one another.

(iii) COMPENSATOR: It is an appliance provided to compensate for difference in length of roddings and wires due to variations in temperature.

(iv) CRANK: It is an appliance fitted with the rodding to change the direction of the motion given by the lever.

(v) DETECTOR: It is an electrical or mechanical device which prevents the signals from being taken 'OFF' unless the points are correctly set.

(vi) ECONOMICAL POINT LOCK OR S.L.M. (Switch & Lock Movement): When the facing points and the facing point lock are worked by the same lever, it is called "Economical Point Lock" or "S.L.M."

(vii) FACING POINT LOCK: It is a plunger bolt provided at facing points, which ensures that the points are correctly set and locked to prevent them from being moved.

(viii) FACING POINT LOCK BAR: It is a bar provided at facing points and is connected with a facing point lock, which prevents the facing point lock from being moved while a vehicle is passing or standing over it.

(ix) FOULING BAR: It is a bar provided at the fouling points between two diverging roads which prevents points being set and locked and signal being taken 'OFF' for one road while a train is standing short of clearance on the other road.

(x) LOCKING: A lever is said to be locked when in the normal position it cannot be pulled over. A lever is said to be locking another lever when owing to the former/ remaining or in the normal or reverse position the latter cannot be pulled over.

(xi) RELEASE: A lever releases another lever, when due to its operation the latter can be pulled. If lever No. 2 can only be pulled over when lever No. 1 is pulled then lever No. 1 is said to be de-releasing lever No. 2.

(xii) SLOT: It is an electrical or mechanical arrangement whereby a signal can be lowered only by the joint operation by two or more persons, but can be put back to 'ON' by any one of them.

(xiii) TONGUE RAILS: These are rails with tapered movable ends which control the setting of the route.

4010: PANEL BUTTONS:

1. Signal buttons	GN
2. Route buttons	UN
3. Point buttons	WN
4. Calling on signal buttons	COGN
5. Emergency buttons	EGGN, EUYN,EUUYN, EWN
6. Reminder collars	XT RES PB + A/C RES KEY, POWER FAIL, ACK, SYS, HL/SLMECR FAILEDFAIL, ACK
7. Point group buttons	WWN
8. Gate signal buttons	LXN
9. Slot release, slot lock buttons	YN

S No	Button	Description	Colour	Location
1.	SM KEY	SM KEY		Top Left of the panel
2.	PANEL/PC SWITCH	Provided only at Stations where Panel and PC are available for train operation. Used during the procedure transferring control Panel to PC or vice versa.		Nearby to SM's key
1.	GN	(Main) Signal Button	RED	Close to signal and on the first track

2.	SH-GN	Shunt signal button	YELLOW	Close to Signal and on the first track
3.	UN	Route Button	WHITE	Centre of the berthing or last control track circuit
4.	WN	Point Button (used only for point operation)	BLUE BLACK	Close to the point demarcation
5.	WWN	Point Button (used for point operation and also for route section release)	BLACK OR BLACK WITH WHITE DOT ON TOP	Top of the PANEL
6.	LXN	Level crossing control release button.	GREY	Close to the level crossing demarcation
7.	KLYN	(Point) key lock Release Button	BLACK	Close to the slotted point demarcation
8.	COGGN	Calling on Signal control Button (common)	RED WITH WHITE DOT	Top of the panel and below COGGN COUNTER
9.	EGGN	Common Button to replace a cleared Signal at 'ON'	RED	Top of the panel and below EGRN COUNTER
10.	GBN	Common Slot Release Button (For Gate, Crank handle)	GREEN	Top of the panel
11.	GBRN	Common Slot Return Acknowledgement Button	BLACK	Top of the panel
12.	EWN	Common point button for (emergency operation)	BLACK WITH RED DOT	Top of the panel and below EWN COUNTER
13.	AGGN	Common Button to introduce Auto working of a Main Signal.	GREY	Top of the Panel
14.	AGGRN	Common Button to cancel Auto working of a Main Signal	GREY	Top of the Panel.
15.	EUYN	Emergency Route Cancellation button	GREY	Top of the panel and below EUYN COUNTER.

16.	EUUYN	Emergency Route Release button	GREY WITH RED DOT	Top of the panel and below EUUYN COUNTER
17.	OYN	Emergency Overlap Release Button	WHITE	Top of the panel and below OYN COUNTER
18.	E/WHLME FAIL, WSLME FAILT	Signal lamp Failure Alarm acknowledge button	WHITE	Top of the panel and below FILAMENT FAIL INDICATIONS
19.	E/WHLME RECT, WSLME RECT	Signal lamp Failure Rectified Alarm acknowledge button	WHITE	Top of the panel and below FILAMENT FAIL INDICATIONS
20.	POWER FAIL ACK	POWER Failure Alarm Acknowledge Button.	RED	Top of left side of the Panel
21.	SYS FAIL ACK	SSI SYSTEM FAILURE ACKNOWLEDGE	WHITE	Top of the Panel and system on indications
22.	G/U/W/GR N ACK	BUTTON HOLD ALARM ACKNOWLEDGE	RED WITH WHITE DOT	Top of the Panel
23.	FCOR PB	FALSE FEED ALARM ACKNOWLEDGE	RED	Top of the Panel
24.	XYRESPB	Loop line axle counter re-set button	GREY	Below Axle Counter Reset Counter
25.	TRAIN Entry ACK	Train entering next station block section alarm acknowledgement button	BLACK	Top of the advanced Starter Signal Domino

4011: PANEL BUZZERS:

1. Button hold buzzer
2. Signal filament failure buzzer
3. Power fail buzzer
4. System fail buzzer
5. Block release buzzer, train entry buzzer
6. False feed buzzer

4012: PANEL COUNTERS/BUTTONS

1. Emergency signal replacement counter (EGGN)
2. Emergency route release counter (EUUYN)
3. Calling on signal counter (COGGN)
4. Emergency route cancellation counter (EUYN)
5. Emergency point operation counter (EWN)
6. Emergency overlap release counter (OYN)

4013: Panel Button Description & Panel Operation Chart:

S.N	Gear Type	Buttons to operate	Required Conditions	For Route Release		
				Signal Cancel	Emergency Route Release	Emergency Route Cancel
1	Home Signal	GN+UN	Control Tracks overlap tracks pick up, required point detection including overlap/isolation point detections, gate is locked and concerned CH locked plus concerned MCB's switched on.	GN+ EGGN	GN+ EUUYN	GN+ EUYN
2	Calling-On Signal	GN+COGN Release only COGN keeping GN pressed and press UN	Calling-On Track in front of Signal must be occupied and rear/ replacement track must be high [clear]	GN+ EGGN	GN+ EUUYN	GN+ EUYN
3	Main Line Starters	GN+Ad.St. UN GN+St.UN	Control Tracks up, required point detections including isolation point(s) and concerned CH locked plus concerned MCB's switched on.	GN+ EGGN	GN+ EUUYN	GN+ EUYN
4	Loop Line Starters	GN+AdSt-UN GN+St.UN	Control Tracks up, required point detections including isolation point(s) and concerned CH locked plus concerned MCB's switched 'ON'.	GN+ EGGN	GN+ EUUYN	GN+ EUYN

			Approach clear, Clears after berthing track is occupied for 48 seconds.			
5	Shunt Signal	SHGN+UN	Control Tracks up, required point detections including isolation point(s) and concerned CH locked plus concerned MCB's switched on.	SHGN+EGGN	GN+ EUUYN	GN+ EUYN
6	Auto Signal Set.	GN+AGGN	The Signal should be lowered first	'A' Marker will lit.		
7	Auto Signal Cancel	GN+AGGRN		'A' Marker will not lit.		
8	Loop Line Axle Counter Reset	XT RES PB+A/C RES KEY	Loop line Axle Counter Track failed	Station Master will ensure personally for clearance of line		
9	Power Fail ACK	POWER FAIL ACK		Buzzer will stop on pressing the BUTTON, the RED indication remains till the problem is rectified.		
10	System Fail ACK	SYS.FAIL, ACK	System Fail Buzzer should give sound	Buzzer will stop immediately		
11	HL/SL MECR Failed	HL/SL MECR FAILED	On hearing a Buzzer for MECR (Signal filament failure) along with the indication.	Buzzer will stop immediately		
12	HL/SL MECR Rectified	RECTIFIED	Signal filament rectified.	Buzzer will stop immediately		

New Technological developments

4014: AXLE COUNTER: INTRODUCTION:

Detection of presence of Train/Vehicle or otherwise in a given section of track is the backbone of Railway Signalling and Safety in Train Operation. Since quite some time the Track circuit is used as the means for such detection on a portion of Railway track, using Rails as conductors by de-energizing the Relay connected at the end of the Electrical circuit. Axle counters form one such effective and now proven method, used by Railways all over the World, to monitor the specified section of track for the presence of Vehicle. The number of Axles entering a specified portion of track at one end and leaving at the other end are counted Electrically/ Electronically and if the 'In-count' and the 'Out-count' tally, the section is deemed to be clear of the presence of vehicles.

Axle counters, like Track circuits, can be used in various facets of Station Signalling, Block Signalling and other Safety applications:

(i) Track circuiting of Berthing lines, Point Zones & long stretches of running lines at Stations.

(ii) Block Working – for Detection of presence of Vehicles in Block section and proving clearance of Last Vehicle (LV) from it or proving Complete Arrival (CA) of the Train in Station section.

(iii) For splitting up of the Block section and monitoring each portion for the presence of Vehicles in Intermediate Block Signalling (IBS) and Automatic Block Signalling.

(iv) For detecting the fullness of Marshalling Lines in Marshalling Yards.

(v) Approach Warning at Level Crossing Gates – Manned & Un-Manned.

COMPONENTS OF THE AXLE COUNTER SYSTEM:

Axle Counters essentially comprise of Trackside field units, which are placed on either side of the Rails, Electronic junction Boxes and the Evaluator along with field units so as to prevent failures caused by indiscriminate use of Push-Trolleys, which is a normal feature. With the introduction of short Track circuit in which the field device is placed, the Axle Counter will not count unless the Track circuit is shunted. This shunting of Track circuit will not take place by means of Push-Trolleys as their Axles are insulated.

In phase Reversal type Tracks devices, Trolley Suppression Track circuit is not required which makes the application of Axle Counters in Train Detection areas a simple one. Phase Reversal of 180° is used in these Devices to detect the presence of a wheel instead of the 'Dip' in the Signal in Analog type Devices. Use of High Frequency Signals in the range of 29 to 30 KHz. in Track Devices of Digital Axle Counters, as against 5 KHz. in case of Analog Axle Counters also reduces the effect of Noise interference. DACs, not having

phase Reversal technology in Track Devices, however, can be in any case used for BPAC applications since we already have Home & Advance Starter Track circuits for use as Trolleys Suppression Track circuits.

4015: BLOCK PROVING USING AXLE COUNTERS (BPAC):

At present at most of the sections on IR, verification of clearance of Block section is done by Station Staff manually except under Automatic Block Signalling System. With continued increase in traffic density and inescapable need to ensure Safety in Train Operation, manual Verification of Last Vehicle (LV) by checking up the LV Board by day and Tail Lamp by night, has become increasingly difficult. Any failure to adhere to this procedure strictly may cause Block being closed even if parting had occurred in the mid-section and the Train had arrived incomplete. BPAC is a system, which can provide for automatic clearance of Block section by replacing conventional Block Instrument by a Block Panel. The 'In-count' of Axles at Advanced Starter Signal of the sending end Station and 'Out-count' at Home Signal of receiving end Signal provides a check of Complete Arrival of a Train and can be used to prove block clearance automatically. The System, thus overcomes the problem of human dependence to verify Complete Arrival of a Train in the Station Section. BPAC system, in addition, results in improving the Line Capacity considerably. Average Block closing time in conventional Block working – Lock & Block or Token less type, works out to about 1 minute which is usually 20% of the average Block section running time. This time can be saved if Axle Counters are used and the Block section is kept ready for re-use, once the Block overlap is cleared.

The system uses 1½ Quads for Double line, including the circuits for speech communication between the Stations. The Operating Panel is used for obtaining Line clear and cancellations etc. and the Axle Counter for automatically verifying that the section from last stop signal (LSS) up to the Block Overlap beyond first stop signal (FSS) at Receiving end is clear of any Train before the Line clear can be obtained from the Station in advance and also to automatically verify that the Train which had left the Dispatching Station had arrived complete at the Receiving Station before the Block section can once again be closed.

Important requirements for the application of Axle Counters in Block Proving are enumerated as under:

(i) The equipment is actuated by Wheel Flanges and not by any other part of the Train like Brakes, Toilet Pipes and Suspended Chains etc.

(ii) The equipment is not susceptible to Operation by Maintenance tools at or near the track devices.

(iii) The equipment is sensitive to extraneous Magnetic or Electric fields such as due to Traction Return current and Traction Motor fields, on electrified sections.

(iv) The equipment is sensitive to mechanical vibrations.

(v) The equipment is immune to adverse weather conditions like dust, heat, humidity, rain and thunderstorms.

(vi) The equipment is robust in construction and shall work on the permanently energized principle.

(vii) The equipment installed on the track have no moving parts and shall require little maintenance.

(viii) Equipment installed on the track is capable of withstanding flooding of tracks and capable of functioning in partly or wholly submerged conditions of the track.

(ix) Installation of the equipment in the track is simple, preferably requiring no modifications to the track.

(x) Equipment installed on the track shall not infringe the Schedule of Dimensions.

(xi) Equipment is sensitive to Supply Voltage fluctuations of +20% and -15% of the Rated Voltage.

(xii) The equipment is 'Count-in' or 'Count-out' the Axles at the end of monitored section depending upon the direction of the movement.

(xiii) The equipment is capable of simultaneously Counting in and Counting out i.e. simultaneous 'Counting-in' and 'Counting-out' of Axles from the ends of monitored section shall not interface with each other.

(xiv) Majority of disturbances in Axle Counter functioning are caused by secondary sources such as Power Supply, Cable network and maintenance, rather than by equipment failures or counting errors. Reliability levels of 1 mis-count per 5.5 millions Trains have already been achieved in the equipment.

(xv) Today's Microprocessor controlled Axle Counters can be connected efficiently and economically with modern SSIs through serial Data links, which would be more cost efficient and reliable than the cumbersome connection through Relay contacts.

4016: SOLID STATE INTERLOCKING:

(A) INTRODUCTION:

With the development of Fault Tolerant and Fail Safe Techniques, Electronics and particularly Microprocessors have found acceptance in the area of Railway Signalling World over. Railways in advanced countries in Europe, North America and Australia have gone in for large-scale introduction of Microprocessors based Solid State Interlocking (SSI) Systems. SSI Systems occupy considerably less space, consume less power, are reliable, easy to install and maintain. Availability of these Systems gets enhanced due to inbuilt Redundancy, Self-Diagnostic Features, high Mean Time between Failure (MTBF) and low Mean Time to Repair (MTTR). Also, initial

commissioning and changes due to Yard remodelling can be carried out in a very short time, requiring skeleton manpower for traffic management during the Blocks. Alternations in these Systems are managed through Software programming.

(1) Seeing the advantages of SSI System over conventional Relay based Interlocking System, Indian Railways have taken up an ambitious Programme to introduce SSI Systems progressively through replacement works.

(2) Q-Series Types Relays are used for INTERFACE

(3) For handling VITAL and Non-VITAL inputs separate softwares are used.

(4) X Panel, with Thumb Switch/Buttons at Entrance & Push Buttons at Exit were given.

(5) Points first to be operated individually.

(B) ADVANTAGES OF SSI OVER PANEL INTERLOCKING:

(i) Interlocking logic is based on Software, requiring no wiring in the System for individual Route/Signal.

(ii) Installation time is drastically lower than for a conventional Relay Interlocking Installation. For a standard 4-line station, it takes about 30 to 40 days for preparing Relay Contact analysis, doing Relay to Relay wiring, continuity testing, soldering and simulation test in a conventional Relay based PI System, whereas, with the same manpower set up for SSI System, it is possible to cut short this period to 15 to 20 days. In addition, if the Rack is pre-wired, the time can still be reduced further.

(iii) Alterations do not require any wiring changes. Only Data of the CPU will have to be changed. Therefore, Yard Re-modelling will not require large scale wiring alterations and testing, obviating the need for long duration traffic Blocks. This is, in fact, the most important advantage of SSI Systems. The work during non-interlocking (NI) period is only of replacement of EPROMs and functional testing. Indoor work is, thus, not at all a critical factor in deciding the period of non-Interlocking.

(iv) No Relays are required for interlocking function. Only field gear actuating Relays are required. Power Supply, Relays, Relay Racks and Accessories and Indoor wiring, thus, get reduced proportionally.

(v) Since there is no physical Relay-to-Relay wiring in SSI System, there is no possibility of physical wiring fault subsequently during its life span. There is also absolutely no possibility of fear of direct feed being given by some staff to stick Relays since there is no physical state between the Input and Output. The possibility of meddling with the circuits, as such, does not arise in SSI Systems.

(vi) SSI has got extensive self-diagnostic features. Any failure in the system is located and annunciated on the Display Panel. Down time of the installation in case of failure is reduced substantially due to Module Replacement Methodology adopted to handle failure in the system. Spare Modules are kept available at site for this purpose.

(vii) Number of fuses required for internal circuitry is less. As a comparison, for a standard 4-line station, the numbers of indoor fuses in a conventional panel are approximately 150, where as in a SSI System, this is approximately 50.

(viii) Cost of indoor equipment is 25% less for a wayside station and is likely to go down further.

(C) TYPICAL HARDWARE USED IN SSI:

Physical interface with the operator is same as in RRI/PI logic, consisting of Switches/Buttons and indicators but the connectivity between SSI Logic and the Panel is a Digital Serial Channel. The Data Logger and the maintainer's terminals are the enhancements to the Systems, which help in System Diagnosis and Management of an otherwise complex system. The Data Logger logs the status of SSI inputs and outputs with time-stamping for later off-line failure analysis. The Maintainer's Terminal has a VDU and Keyboard and provides an on-line indication of detailed status of SSI System. This can enable Maintainers to quickly identify and replace faulty modules for low System down Time.

The following should be the important features of the SSI System selected:

- System should meet Functional requirements and have future expandability.
- System should meet the requirements of environmental conditions, Electromagnetic interference etc.
- System should be User Friendly and Economical.
- System Architecture should be such as to give very high overall Availability, while ensuring high degree of safety.
- System Validation should meet safety integrity level-4 (SIL-4). The internationally accepted value of Probability of Wrong Side Failure (PWSF) for critical systems with lives on stake is 10^{-9} per hour, which has been further enhanced to10^{-10}.

(D) SOFTWARE USED IN SSI SYSTEM:

The required software in SSI System can be divided into the following three groups:

(i) **Executive Software/System Software:** This Software is common to all SSIs of a specific vendor.

(ii) **Application Software:** This Software is as per the site requirements of

the station. This software is specific to each station and depends on the table of control of the yard.

(iii) **Diagnostic Software:** This Software performs safety checks to detect failures and to control the System**.** Normally, this is interlinked with Executive Software and is common to all SSIs of a specific vendor.

4017: DATA LOGGER (EVENT LOG): INTRODUCTION:

(a) Data Logger is a Computer Micro Processor/Micro Controller based Electronic device used for storing/logging the data in relay interlocking /Solid Sate Interlocking installation. Data concerning operations of relays, change of status in the position of relays, level of AC/DC voltage and channels in the Axle Counters is collected in a battery backup memory IC of the data logger with date & time stamps. Data logger was primarily conceived as a maintenance tool for providing an effective condition based predictive maintenance system, for quick analysis of signal failures and monitoring of events.

(b) Block schematic of field unit data logger system comprises of processing units (the data logger), analog & Digital Scanner units (ASUs & DSUs) MODEMs, Printer & UPS. Scanner Units connect the inputs from outside world to Data Logger. A typical Digital Scanner Unit (DSU) can house Digital Scanner Cards, each capable of reading up to 64 inputs. These scanner cards contain Multiplexers for addressing the Inputs and Outputs– Isolators for input isolation. A typical Analog Scanner Unit (ASU) can be provided with a maximum of 3 analog scanner cards, each capable of reading 8 analog inputs. All analog signals are converted to DC voltages and then are connected to Analog Scanner Cards. Analog Signals are ground isolated from each other. Modems are connected to Data Logger equipment. Data Logger equipment of a station can transmit time stamped and addressed data packet in UP & DN directions. Data Logger of Adjacent station receives these packets and retransmits the packet along with locally generated packets in Up & Dn direction till the packet reaches front end processor at the Central Monitoring Station.

(c) Inter connectivity of Data Loggers of various stations with Central Monitoring station in Control Office has made the online monitoring and processing of health of signaling equipment at the central location, a reality. In this scenario, an additional functionality may be derived from the Networked Data logger System to automate Train Charting, which in turn can provide online information of running of trains to passengers, through appropriate interconnected Hardware & Access System.

(d) Train running information collected from networked Data Loggers can also be used for management control of train operation in the Division.

(e) Signal Engineering Manual provides for all relay interlocking installations to be equipped with Data loggers.

OBJECTIVES OF DATA LOGGERS:

(a) To record signal infractions and help in preventive maintenance.

(b) To detect SPAD cases.

(c) To ascertain the status of signals in the event of a dispute (i.e. accident enquiries etc.)

(d) Corporate Safety Plan (2003-2013) stipulates target for all types of signal defects, Signal Failures, Point Failures, Track Circuit/Axle Counter Failure, Block Failure, Panel Failure, Interlocking Failure etc.

BENEFITS OF A DATA LOGGING SYSTEM:

(a) Digital Data Loggers that would not only record signal infractions but will also help in detecting SPADs, preventive Maintenance and for ascertaining the status of signals in the event of a dispute.

(b) Provision of Data Logger system shall chronologically monitor and record the status of various field functions like track circuits, points, signals, Operating Push Buttons/ Switches (Digital Inputs) and level of various signals like DC & AC Supply Voltages, Axle Counters Signals etc.

4018: Anti Collision Device:

Anti-Collision Device (ACD) is a fully integrated Electronic Control System designed to minimize collisions and increase safety on Railway system. It is a non-signalling system and provides additional cover of safety in train operations to prevent dangerous train collisions caused due to human errors or limitations and equipment failure. Being a non-signalling and interlocking system, it does not replace any existing signalling and interlocking system and does not alter any procedures of train operations in vogue.

ACD is a Network of Anti -Collision Devices (ACDs) comprising of a variety of devices such as on- board (Mobile) ACDs for Locomotives and Guard vans and track-side (Stationary) ACDs, Level Crossing ACDs, Loco Shed ACDs, Sensor based ACOs and ACO Repeaters. All these work on the principle of distributed control systems. All ACDs along the ACD route communicate with each other through radio communication when they are within a radial range of at least 3 kms. On board computers use inputs from Global Positioning System (GPS) for determination of train location, speed, course of travel and time. Both mobile and stationary components of ACO system exchange information and take decisions based on train working rules and

embedded software to apply brakes automatically without any input from the users. If two ACOs are deemed to be at a risk of collision, the ACD system activates automatic braking operation to prevent collisions. Loco ACO is designed to interface with various types of braking systems of locomotives.

The system provides audio-visual "Train Approach" warning to road users at level crossings. At Manned LC Gates, when the approaching Loco ACD detects "Gate Open" condition, the speed of the train/loco is reduced and kept under a pre-defined speed. Similarly, it can also provide warning and regulate speed in case of movements of land slopes in deep cuttings that are "sensed" through Inclinometer grids, embedded in such slopes. ACD system does not interfere with normal working of train operations.

More than 2,000 Anti Collision Devices have already been installed over 2,700 Route Kms of track on the Indian Railway system, out of which about 1900 Route Kms are on North East Frontier Railway and balance are on Konkan Railway. Further proliferation of this safety device on the balance BG network of Indian Railways is being planned.

4019: TRAIN PROTECTION AND WARNING SYSTEM (TPWS):

INTRODUCTION:

Best of the signalling systems would serve no purpose if a Loco Pilot disregards a signal showing 'Danger' or 'Caution' Aspect. A number of Accidents due to disregard of signals by the train Loco Pilot have occurred on Indian Railways. This situation gets further aggravated during foggy weather. Density of train services is increasing and this trend shall continue in future as well. Mental stress to which Loco Pilots are subjected to has increased manifold. While many safety aids have been provided to train running staff at stations, adequate gadgets for aiding the Loco Pilot have so far not been introduced on Indian Railways.

A reliable method of tackling Loco Pilot failures to observe and obey Signals in time is the Automatic Warning System (AWS), wherein a Loco Pilot receives an Audio-Visual Warning in his Cab in regard to the aspect of the stop signal that he is approaching and should he pass the signal at 'Danger', automatic application of Brakes takes place. This is made possible by the installation of two separate devices, one on the track, which is governed by the signal ahead and the other on the locomotive, which is activated by the Track Device to set it into operation according to the aspect of the signal. AWS, thus, on one hand assists the Loco Pilot in the proper observation of the Signals and on the other guards against the possibility of an accident, which may arise from failure of the Loco Pilot in this respect by automatic application of breaks.

TYPES OF AWS SYSTEMS:

Depending upon the way the information is transferred between the Cab and the Track, the Systems are classified as:

(i) **Intermittent:** here the information is provided only at designated places (Signals). The update of information is also done at these places only. This means that the Train has to travel on the basis of previous data until the next input. No advantage can be availed of the less restrictive conditions after the Train has passed over the Track Device Input.

This may result in slowing down of the Train needlessly, when conditions do provide for higher speed of travel. Here Speed-Distance Profiles are pre-programmed into the Track Device. Though it obviates the need for calculating speed in Real Time, System allows optimal Train running only if all trains have the assumed performance characteristics.

(ii) **Continuous:** in this type, the System updates Information to the Train on continuous basis. Any change/deviations from the schedule can be updated immediately. This also includes any change in running speed and alteration in Route ahead. This reduces delay and improves Line Capacity. A Train that has passed 'caution' aspect can respond immediately to the early clearance of the next Signal. This implies, it need not continue to obey the earlier information until it reaches the next information point as it happens in case of Intermittent type of Systems.

TRAIN PROTECTION AND WARNING SYSTEMS (TPWS):

Train Protection and warning system is a train control system, which can be used as Overlay on an existing Signaling System. System provides for the complete range of functions needed in Safety Aids for the Loco Pilot's continuous monitoring of speed of the train and Automatic application of brakes when required. Signals in the Loco Pilot's cab have self-diagnostic features for enforcement of temporary speed restriction at worksite.

TPWS comprises of a track side sub-system and an on-board sub-system. On-board computer continuously gets updated by information transmitted by the Balises. Balise is a passive device of size 534/500/40 mm enclosed in a dust & water proof glass fiber sealed packing. It weighs approximately 5 Kg. Its height is only 40 mm and as such can be easily mounted on a sleeper. It interfaces with the interlocking and transmits the data (called Movement Authority) to the Train when it is Tele-powered from the Balise Antenna fixed underneath the Locomotive. Interlocking interface ensures Fail Safe transmission of Information of the status of Signals, Track circuits, Route, level Crossing between the interlocking and the Balise. Based on the details

received in the Movement Authority, On-board computer supervises the Train.

On-board equipment basically consists of a Vital Computer (VC), Man Machine Interface (MMI), Odometer and Balise Antenna. The VC controls the movement of the Train on the basis of information exchanged with the Balise. System Architecture is based on 2 out of 3 Topology. Hardware and Software is organized to meet European Committee for Electro technical Standardization – Safety Integrity Level-4 (CENELAC - SIL-4) requirements. MMI provides TPWS information to the Loco Pilot. It displays to the Loco Pilot all the needed information like Measured speed, maximum authorized speed, target speed and target distance and enables him to send Commands as required.

Odometer is used to determine the Train speed, Acceleration/ deceleration of the Train and the distance covered by the Train in a given Time Interval.

Balise Antenna continuously searches the Balise and extracts the information stored in it.

Movement Authority contains the Static Speed Profile (SSP), which is a speed step function verses distance curve. On the basis of SSP, on-board computer further calculates dynamic braking curve and this curve is supervised. A warning is given to the Loco Pilot to enable him to react and avoid intervention from TPWS equipment at the actual acceleration at that time. If the train exceeds the permitted speed by **10 kmph**, the speed does not exceed permitted speed. At this point of time, the Loco Pilot can release service brakes. If the full service braking is not likely to stop the train at the target, the train borne equipment applies the emergency brakes. The Loco Pilot is permitted to release the emergency brake, when the train comes to a stop.

4020: GSM-R (GLOBAL SYSTEM FOR MOBILE-RAILWAY):

GSM-R caters to requirements special to Railways, like:

(a) Fast call set up time,
(b) Location dependent and functional addressing,
(c) Voice broadcast calls and group calls, and
(d) Priority calls. GSM-R Technology can provide for seamless communication with 95% to 99% coverage, at Train running speeds up to 500kmph.

Fast call setup time: Call setup time for various types of calls are indicated below:

(a) SOS Emergency call: <= 1 second.
(b) Mobile to Mobile urgent call: < 2 seconds.
(c) All operational calls: < 5 seconds.

Location Dependent Addressing: A Train journey may encompass several areas of controllers. The connection between the train Loco Pilot and controller of respective area should be easy to establish. The train Loco Pilot should have no need to dial longer numbers. The train Loco Pilot will only dial a short number or press a programmed key for the controller and call will be automatically routed to the controller under whose jurisdiction the train is actually moving through.

Functional Addressing: Provides for Functional Addresses. With this facility, the controller can make calls in a simple and user-friendly manner. To contact a Train Loco Pilot, Controller only uses the Train Number, rather than dialing 10 digits mobile no. Similarly, other Functional Addresses are permitted in GSM-R for ground-based Maintenance Staff & Shunting Staff.

Voice Broadcast Call: Public GSM networks are designed for point-to-point connections. Railways' requirements are that Controller should be able to communicate with many Loco Pilots or a Group of Personnel at a time i.e. he should be able to make multiple calls. Voice Broadcast service allows distribution of speech of Controller to all Group of subscribers located in a pre-defined geographic area. Standard Duplex channel is provided to the Controller and a Simplex channel is provided to the Receive Subscriber. Voice Broadcast call will be mainly used for making Emergency calls.

Voice Group Call: Voice Group call allows a Group of Subscribers to hold a speech conversation. Voice Group call service has all the functionalities of Voice Broadcast call service. In addition, the originator can pass the full Duplex call to other Subscribers. Controller involved in the calls can talk at any moment, while the service Subscribers will have to give the Signal, when they wish to talk. In a Voice Group call service, any person in a Group can become a Master and can initiate a Group call. Voice Group call will be mainly used for Shunting communication and by Maintenance Staff.

(i) Priority Service: In public GSM network, all persons have equal Priority. Railway application requires release of communication channel, if it is blocked by low Priority calls. Railway Emergency calls are required to be set up immediately and they have the highest Priority. The Priority service consists of two parts.

(a) Precedent: Assigns a Priority level for call set up and call continuity in case of handover.

(b) Preemption: In the absence of resources, a call of higher-level Precedents can cease the resources being used for a call of lower Priority. Enhance Multi-level Priority and Service prevents network congestion, while ensuring prioritized connection for emergency situations.

(ii) Emergency Call: is required to alert Railway Staff in a specific area of an emergency situation. This feature supports:

(a) Fast call setup.

(b) Area definition.

(c) Single Emergency Key/Button operation.

(d) Call origination from the Controller or other wireless Subscribers like Train Loco Pilot, Shunting Staff or Trackside Maintenance Staff etc.

4021: Train Collision Avoidance System (TCAS/KAVACH):

TCAS is an Automatic Train Protection (ATP) System with the capability to prevent train accidents that are caused due to Signal Passed at Danger (SPAD) by a train, non-adherence to train speed restrictions etc. by automatic application of brakes if the Loco Pilot fails to do so. It would, in addition, also avoid certain other collision-like scenarios even in case of non-interlocked or non-signalled territory. It also provides assistance to Loco Pilots by means of real-time display of signalling related information, in their cab such as Movement Authority, Target Speed, Target Distance, Signal Aspects etc. TCAS includes key features of Anti Collision Device (ACD) and TPWS at much lower cost. It does not suffer from issues like need of customization of braking model etc. of TPWS for use on any specific Railway. It can be used with various types of signal interlocking. Unlike TPWS Level-1, TCAS provides continuous update of Movement Authority and thus obviates undue operational constraints. It does not need to address the safety issues associated with 'Release Speed' on approach to a signal at danger.

Requirements of ATP System for Indian Railways.

95% of Indian Railways is presently Non-automatic Absolute Block System with each interlocking having individual Signal Operator. Speeds in near future are not likely to exceed 200 kmph. The requirements for IR include key features of TPWS and ACD:

- Prevention of SPAD
- Speed Control for Permanent & Temporary Speed Restrictions.
- Facility of SOS
- Continuous Update of Movement Authority
- Reasonable cost
- Limited trackside passive equipment

Train Collision Avoidance System (TCAS) has been envisaged as a low cost Automatic Train Protection (ATP) System for speeds upto 160/200kmph.

Any ATP System needs the following real-time information at the minimum, which is obtained in the following manner in TCAS:

Requirement	Mechanism in TCAS
Location of Trains	Distance traversed beyond a RFID tag on Track Sleeper (Rail-road Tie) through Tachometer
Extraction of dynamic Signalling information	Interface with interlocking
Transfer of Signalling related information to Train	Radio Communication among various Stationary & Train units through dynamic TDMA (Time Division Multiple Access). Stationary units are allocated timeslots according to topography and their size. Mobile units, i.e. trains, are assigned slots dynamically. This provides efficient utilization of channels.
Knowledge of Braking Characteristics of Train	Crude but adequately reasonable braking characteristics are determined by carrying out Brake Test at the start of the mission. Adaptive braking logic to control brakes seamlessly is based upon deceleration and closed loop control.

Main components of TCAS:

TCAS consists of Station Equipment, Loco Equipment and RFID tags on Track.

Stationary TCAS Unit:

This shall be provided at Stations, Intermediate Block Signal (IBS) and mid-section interlocked Level Crossing Gates to cover all the trackside signals. This shall be interfaced with interlocking equipment to acquire real-time dynamic information related with signaling, such as various signal aspects. It has database of static signalling related information such as location & details of RFID tags, Speed Restrictions in its database. It is interfaced with interlocking for the purpose of extracting dynamic signalling information, such as aspects of various signals. It gets real-time information regarding locations, speed etc. of various trains in its jurisdiction through UHF Radio Communication. On the basis of this information, it detects any emergency situation and can direct the command to loco to take action to stop.

RFID tags on Track Sleepers or Rail-Road Ties:

These provide site specific static information to the locomotive. Apart from acting as Location references, these relieve the Radio Channels and provide immediate information such as crossing the signal etc. to Loco Unit.

Loco TCAS Unit:

The loco TCAS Unit receives signal aspects, movement authority etc. from stationary TCAS Units. It gets some information from RFID tags installed on track through RFID antennae and reader. It transfers the ID of the last RFID tag crossed, current

location of train and speed etc. to the stationary unit. It can detect an emergency situation on its own or can get this information from the stationary unit. In case the Loco Pilot fails to take action of application of braking in time, the loco TCAS Unit automatically applies the brakes to prevent an untoward situation. For example, in case of finding the train running too fast towards a signal at danger to result in SPAD, it shall provide protection through automatic application of brakes much in advance. The loco unit also has a driver machine interface which provides real-time information to the loco pilot, such as Signal Aspect, Movement Authority, Distance to Signal on approach, Target Speed, Target Distance, Speed Dial, Concerned RF Field Strength Indicator etc. The Loco Pilot can invoke overrides, specific modes and initiate SOS through this DMI (Driver Machine Interface).

Assessment of Braking Characteristics:

Braking characteristics of any specific train are assessed by the "Brake Test" at the start of the mission. These parameters are used to determine the spot from where braking by the Loco TCAS unit needs to commence. Frequent placement of RFID tags in the vicinity of Signal on approach shall enable the loco motive unit to dynamically adjust braking effort for stoppage of train.

Determination of Train Length:

Station Interlocking and Locomotive units together determine train length. The determination is crude but within tolerances to determine substantial change in configuration.

The loco unit memorizes its position along the track in FIFO (First in first out) manner. The train detection mechanism of interlocking detects time stamps of 'Start' & 'End' events and the Station TCAS unit passes on the information to the Loco Unit. The Loco unit registers locations pertaining to 'Start' and 'End' events. The difference between two locations is Train Length.

Radio Communication for TCAS:

At present, full duplex UHF Radio Communication is being used for transfer of information between Stationary and Locomotive units. The Stationary Units normally transmit on frequency channel f1 and receive on f2. The Locomotive Units normally transmit on frequency channel f2 and receive on f1. In an emergency situation, the locomotive shall additionally transmit on f1 in a timeslot and tune back to receive on f1. Transmission by Locomotive on f1 in case of an emergency situation shall enable other trains in the vicinity to get the immediate message without routing through the Stationary Unit.

In Absolute Block Territory, signals are located in the vicinity of stations or interlocked LC Gates or IBS only. Therefore, the requirement of communication ranges between the Stationary Unit & Loco Unit for the purpose of transmission of signalling information. This is limited to approach of outer most signals i.e. approximately 3.5 km.

However, transmission of emergency messages such as “Infringement / Side Collision Message” etc. by derailed train on both the frequencies shall enable these messages to be received by both other locomotives as well as stations.

Summarizing salient features of TCAS:

- TCAS is based on continuous real-time update of signal aspect or ‘Movement Authority (MA)’ which is quite suitable to requirements of operations in countries like India.
- Due to this continuous MA update feature, it is able to restrict the train before the signal at Red itself.
- Operational Convenience to Loco Pilots – no need to feed train configurations such as braking characteristics, train length etc.
- Retaining specific needs of Indian Railways which are fulfilled by other indigenous ACD systems– provides protection in case a train derails and infringes adjacent tracks
- Quite Cost-effective – doesn’t need Mobile Radio, Active track balise.

CHAPTER-5

TEMPORARY WORKING ORDER AND NON-INTERLOCKED WORKING OF STATIONS

5001: Temporary Working Order: Temporary Working order (TWO) is an embodiment of detailed instructions issued and circulated by the Sr DOM/Sr DOM(G)/DOM whenever any pre-planned work of signalling, electrical (OHE) or engineering department is to be executed, requiring special safety precautions to be observed by staff.

5002: Circumstances under which 'TWO' is to be issued:

1. When the nature of work is such, that it will require the imposition of speed restriction for more than one day.
2. In all cases when additions or alterations in the layout of the yard or to permanent way, signalling and interlocking arrangements are to be made.
3. When overhauling of the signal and lever frames is to be undertaken.
4. When the nature of work involves temporary cessation of working of trains.
5. For construction of all new installations on or near the track, such as new station, foot over bridge, OHE, renewal of track, providing temporary diversions, etc.

5003: Procedure for preparation of Temporary Working Order/ Instructions:

The draft of TWO is prepared by the supervisor concerned viz. SE (P.Way) for engineering works by the SE (Signal) for signalling and interlocking work and the SE (Elec.) for electrified sections etc. for electrical works detailing the requirement of the work and precautions to be observed. This pre- planning of the work is known as Draft of TWO.

Draft TWO is submitted by the SE (P.Way)/SE(Signal)/SE(Elec.) to their Divisional Officers i.e Sr DEN/DEN/ Sr DSTE /DSTE/Sr DEE/DEE. After the draft TWO is checked and justified by the divisional officer of the department concerned, Sr. DEN/DEN/ Sr. DSTE /DSTE/ Sr. DEE/ DEE will send the draft TWO to the Sr DOM/Sr DOM(G)/DOM who will include instructions for regulation of Traffic during the execution of work and will issue the TWO with detailed instructions, including the safety precautions to be observed during execution of the work.

5004: Details of TWO:

1. Number and date of TWO, subject of TWO and station at which or stations between which the work will be undertaken;

2. Nature of the work, mentioning details of the work to be undertaken and completed in different phases showing the period of days;
3. Date of commencement to be given if possible i.e. if previously decided by Sr DEN/ DEN/ Sr DSTE/ DSTE/Sr DEE/DEE and Sr DOM/ Sr DOM(G)/ DOM/ DOM(G);
4. Duration of work;
5. Measures to be taken for protection of line;
6. Particulars of speed restrictions;
7. Details regarding issue of Caution Orders, including the names of stations that will issue Caution orders for up/down trains;
8. Procedure for working of points and signals in detail for passage of trains. It will also include the number of signals to be disconnected;
9. Procedure for train movements in abnormal circumstances;
10. (a) Details of the work, which will be undertaken for blocking of line with duration, the cancellation of trains during such block;
    (b) Procedure to be followed for blocking the line on field telephone.
11. Details of officials to whom copy of TWO is issued;
12. Procedure to be followed on completion of work;
13. Validity of TWO i.e. three months from the date of issue.

5005: Responsibility of SS/SM and the supervisor concerned:

1. On receipt of TWO it will be acknowledged.
2. The paper of TWO shall be kept in TWO file. Details of TWO are entered in TWO Register.
3. All the messages received subsequently in reference to the TWO should also be kept on TWO file and all the train working staff should note TWO.
4. The supervisor concerned viz. SE (P.Way), SE(Signal), SE(Elec.) will issue notice to all concerned 48 hours before he proposes to start the work, when he has made the necessary arrangement and received TWO from Divisional Office.
5. On receipt of 48 hours notice from the Work Incharge for taking work in hand, it will be acknowledged. This will also be repeated to Chief Controller through Section Controller supported by private number by Station Master on duty.
6. On receipt of 48 hours notice, SM must ask for additional staff as mentioned in TWO and obtain their signatures in the Assurance Register to be opened afresh for this work.
7. On receipt of 48 hours notice, entries regarding particulars of work recorded in red ink in train signal register on the page which will be in use on day of commencement of work should be made. The entry is made in SMs diary and charge book.

8. On the day on which work is to be taken in hand, the work incharge will give a detailed message to SM, which will be transmitted to CTNL through Section Controller.
9. Before the permission in writing is given to SE (P.Way)/SE(Signal)/SE (Elec.) to start the work, SM must ensure that necessary additional staff and equipment i.e. erection of goomties, telephone, walkie-talkie facilities, light, water, switch clamps of standard design, pad-locks, HS lamps/flags, detonators, control's permission etc. have been arranged and Caution Order Message has been acknowledged by all concerned supported by private number.
10. Particulars regarding block are recorded in RED ink in TSR.
11. Ensure that during block period, no train is allowed to enter the block section except the materials train required at site of work to be sent on authority to proceed without line clear or other proper authority, duly piloted by engineering officials.
12. Before giving block in station limits, ensure that necessary signals are disconnected, the line is protected by banner flag and stop collars are used.
13. Before removing the block, ensure that 'track safe' certificate is obtained on completion of work and necessary precautions as per instructions are observed.

NON-INTERLOCKED WORKING OF STATION

5006: Non Interlocking:

(i) N.I. Working means temporary disconnection of points, signals, track circuits, axle counters and other signaling gadgets for any designated works. This kind of working is normally resorted to works such as overhauling of lever frames, yard remodeling, introduction of panel/ RRI working, cable etc.,

(ii) In another sense, at an interlocked station, when points and signals become defective, station becomes non-interlocked for the purpose of working.

In both the cases, the safe guards ingrained through normal functioning of various signalling equipment are missing and, as such, responsibility on the part of staff increases manifold. N.I. working puts staff under severe strain and hence, they become prone to lapses. Unflagging attention from every quarter is the need of the hour so that safety is ensured.

Non-Interlocked working entails not only slowing down of train operations; it is also a less safe system as compared to interlocked working. Since it is desirable to avoid NI altogether, both from safety as

also customer convenience point of view, attempt must be made at the project proposal stage itself to dispense with NI altogether and undertake the work by means of traffic blocks.

Instructions given below are in addition to existing rules for Non - Interlocked working such as issue of Green Notice etc. They must be read together with existing provisions in G&SR, Block Working Manual etc.

5007: Requirements of Non - Interlocked Working:

The following guidelines are laid down for a correct assessment of whether NI working is required in the first place or whether it can be dispensed with altogether:

(a) NI working should not be resorted to as far as possible, in case of installation of new S&T gears. NI is unavoidable only if modifications are to be made to existing S&T gears.

(b) For new S&T gears, there is no need of NI and the work can be managed through well- planned pre-change over works (insertion of points & crossings, etc). The final change over to new gears can be carried out under partial or complete traffic block.

(c) At the project proposal stage itself, S&T department should make it clear, whether the project requires NI or not; and if it does, the duration of such NI. This fact must be mentioned in the check list on the original tracing itself.

(d) Sr. DOM & Sr. DCM must quantify the actual impact of such NI, and deduce it to monetary terms, by calculating anticipated losses both on account of passenger and freight traffic. These should include losses on account of cancellation, short termination, diversion, rescheduling, detention to trains and imposition of restriction on booking/movement of freight traffic.

(e) Expenses likely to be incurred on account of TA/DA of temporary NI staff and other administrative costs should also be added to arrive at the traffic cost of proposed NI working.

(f) This traffic cost of NI should be communicated to S&T, who will evaluate if new gears can be installed without resorting to NI for less than the expected cost of proposed NI, if necessary by constructing a new building etc. as the case may be.

(g) If new gears can be installed in a new building and commissioned under traffic block at a cost that is comparatively less than the overall traffic cost of proposed NI, then the project should be recorded as one to be taken up without NI.

(h) This entire exercise must be carried out under the personal supervision of DRM, who will ensure that all estimates are reasonable and no figures

are unrealistic both with regard to duration of NI or the anticipated traffic cost.

(i) Thus, NI will be undertaken only if found to be unavoidable and this fact will be recorded on the original tracing, to be signed by branch officers concerned, and the DRM.

5008: Minor and Major Works:

1. Guidelines given below should be followed for deciding whether NI working is required or not. NI working is not required and the work can be managed by traffic block in the following cases:
   - (i) Replacement of Mechanical lever frame by another Mechanical lever frame.
   - (ii) Replacement of Mechanical lever frame by panel.
   - (iii) Replacement of Panel by RRI.
   - (iv) Replacement of RRI by SSI.
   - (v) Commissioning of new SSI/RRI.
   - (vi) Amalgamation of newly constructed double line portion into existing conventional double line.
2. NI working is required only for following cases:
   - (i) Overhauling of cabins.
   - (ii) Replacement of Panel by Panel at road side stations.
   - (iii) Meggering of cables.
   - (iv) Changes in yard layouts
   - (v) NI working can be divided into two distinct categories, namely minor and major works.
   - (vi) Minor works - Overhauling of cabins at road side stations.
   - (vii) Major works - Changes in yard layouts, overhauling of cabins etc. at comparatively bigger terminals and junction stations.

5009: MINOR WORKS:

Procedure to be followed for Non-Interlocked Working for Minor Works:

Road side stations on double line having up to 2 lines in each direction, and on single line having up to one main line and 2 loop lines are covered under this heading of Minor Works.

(a) Duration of NI working for Minor Works:

- (i) A road side station would normally have about 21 levers in each end cabin (including spare levers).
- (ii) S&T department must suitably augment the strength of their NI gang so that each cabin can be completed in one day.
- (iii) NI working at the first cabin should start at 8/- hrs in the morning and by 18/- hrs the same must be interlocked and handed back to traffic.

(iv) The same procedure should be repeated the next day for the second cabin.

(b) General Instructions for Train Operation:

(i) Speed restriction of 15 kmph shall be imposed over all facing points.

(ii) No train/wagon should be stabled on any running line of the NI station.

(iii) The common line should not be used for reception of trains coming from opposite directions.

(iv) Emergency and other crossovers including sidings taking off from the station should be set for normal position and clamped and padlocked. The keys of all padlocked points must be kept in the personal custody of the overall in-charge of NI working to prevent their being used even by mistake.

(c) Train running on double line section during NI working:

(i) Twin single line should be suspended during the duration of NI working and section worked as conventional double line only.

(ii) No temporary single line working should be introduced during NI period, except in case of an accident or blockade of through communication.

(iii) At road side stations on double line, route must be set for platform line in each direction and clamped and padlocked.

(iv) In case there is more than one platform in each direction, route must be set for one nominated platform.

(v) At all such stations no precedence should be arranged.

(vi) During the NI period, the station should basically function as a halt station.

(d) Train running on single line section during NI working

(i) Ideally, if possible, only one platform line should be nominated for train running.

(ii) The route must be set for this platform line in each direction and clamped and pad locked.

(iii) No precedence or crossing should be arranged at this station.

(iv) In case it is not possible to nominate only one line, then 2 specific lines should be nominated for Up and Down movements.

(v) In that case, while crossings would have to take place, no precedence should be arranged at this station.

(e) Staff requirement:

(i) Sectional TI and SI will be overall in-charge of NI working at the station.

(ii) Additional staff, if required, should be managed locally.

5010: MAJOR WORKS:

Procedure to be followed for Non - Interlocked Working for Major Works:

Changes in yard layouts, overhauling of cabins etc. at comparatively bigger terminals and junction stations are covered under this heading of Major Works.

(a) Duration of Non Interlocked Working:

(i) NI working must not be simultaneously introduced at more than one station in a Division.

(ii) NI must be planned during temperate weather, to avoid wrong actions on account of harsh and inclement weather.

(iii) Period of Non - interlocked working must be kept to the bare minimum as it is a potential safety hazard.

(iv) Staff of all departments must work round the clock in three shifts so that the work can be completed at the earliest.

(v) For NI working of up to 3 days, plans will be finalized in consultation with DRM, Branch Officers and concerned HOD of Construction/RE Organization.

(vi) For NI working of more than 3 days, plans will be finalized in consultation with COM (G), CTPM, CPTM and HOD of RE/Construction Organization at Zonal level to assess the duration and arrangements of NI working.

(vii) For more than 3 days NI, plans should be worked out for cancellation, diversion, rescheduling, short termination or even extension of trains, as the case may be.

(viii) For NI working of more than 7 days personal approval of the General Manager must be obtained.

(ix) No NI working should last for more than 14 days.

(b) Sanctions, clearances and preparatory works:

(i) Signal Plan must be finalised in Hd. Qrts. at least 45 days in advance.

(ii) All plans and clearances, including CRS sanctions that are required for NI working must be available at least 1 month before commencement of NI working.

(iii) Under no circumstances should this period of 1 month be relaxed.

(iv) NI working must be postponed in order to provide for 1 clear month before start of NI either in case of :

(i) Delay in receipt of above clearances/sanctions etc.

(ii) Last minute modifications to Signal Plan.

(v) All pre - NI work that can be carried out without non - interlocking must be completed before actual NI working begins. These include changes in yard layout, insertion/ removal of points & crossings etc. Changing/installation of new point machines must be done in advance.

(vi) Preparatory work in connection with OHE work must also be done in advance, including shifting of neutral section, if required.

(vii) Lessons learnt during previous NIs must be gone through in detail so that shortcomings of earlier occasions are avoided.

(c) Level of Supervision/Responsibility:

(i) Responsibility to ensure availability of proper arrangement for NI working shall be of Construction/RE organization.

(ii) Though the responsibility to provide necessary arrangement will be of Construction/RE organization, concerned branch officers from open line shall be responsible to ensure its availability and functioning during train operation. For this he shall be the coordinating officer for the department concerned.

(iii) The Program Evaluation and Review Technique (PERT) chart should be made out detailing various activities to be completed on a day-to-day basis.

(iv) For round the clock working, PERT chart should be made out detailing various activities to be completed on a shift to shift basis.

(v) Dy. CSTE/ Dy.CE /Dy.CEE, as applicable, shall make themselves available in non- interlocked area where the work is being undertaken.

(vi) The concerned Project in-charge (XEN, DSTE/Con. etc) shall camp near the non- interlocked area till completion of non-interlocked working.

(vii) Overall in-charge for NI working will be Sr.DOM/Sr.DOM(G)/ DOM, as the case may be, for both Safety and Operations.

(d) Green Notice:

(i) Construction officials responsible for carrying out the work should send a 'circular notice' to the Sr.DOM/Sr.DOM(G)/Sr.DSO at least two months in advance.

(ii) They will advise as to when the work will be undertaken with a request to issue special instructions. A copy of the notice shall also to be sent to SS of the station concerned.

(iii) Sr.DOM/Sr.DOM(G)/Sr.DSO on receiving such 'circular notice' get special instructions prepared for that station. These are then issued to all concerned.

(iv) 'Green notice' is to be issued by Sr. DOM. It should incorporate the following :

(v) Details of existing yard layout and its various provisions.
(vi) List of all works to be completed by Civil Engg./S&T/Elec. before start of NI.
(vii) List of all works to be undertaken by Civil Engg./S&T/Elec. during NI period.
(viii) Additional facilities to be made available after commissioning of new works.
(ix) Existing facilities that are to be dismantled.
(x) Details of yard layout to be made available after completion of NI.
(xi) Signalling Plan must indicate permissible routings and simultaneous movement facilities to be made available.
(xii) Signalling Plan must invariably indicate whether any of the existing facilities for train movement are to be (i) either curtailed, (ii) modified or (iii) restricted.

(e) Time Tabling changes:

For assessing the impact of NI working at a bigger terminal or at a Junction station, a detailed exercise has to be undertaken, as indicated below:

(i) During the course of NI working, changing of points manually after passage of a train and after completing all formalities takes about 10 minutes time.
(ii) The capacity of the junction station to handle maximum number of trains during a particular time period has to be worked out keeping in mind the above constraints.
(iii) Every possible train movement of reception and dispatch must be clearly documented:
    (i) Along with time of movement.
    (ii) With exact sequence of points, whether in normal or reverse.
(iv) For time-tabled moves, trains demanding same point either at the same time or within 10 minutes must be identified, since this is the time required before an existing setting of points and can be changed. In case of conflicting moves, the less important moves have to be cancelled, rescheduled or diverted.
(v) Crossing and precedence must be restricted to the bare minimum with few specific routes being selected for most movements.
(vi) As a thumb rule, only 80% of the reduced capacity as worked out should be utilized since unforeseen failures such as ACP, equipment failures etc. are likely to take up the remaining 20% of the available capacity.
(vii) In all such planning, it is better to keep adequate cushion in train operations and initially cancel, reschedule or divert more number

of trains than what may be required. In case NI working progresses smoothly without major detentions and it is felt that some of the cancelled trains can be restored, the same may be done after a week or so.

(viii) Clear corridor for freight must be charted out, with exact number of moves possible and extra freight trains that cannot be handled should be planned to be diverted to other routes. In case diversion is not possible then operating restrictions must be imposed.

(ix) More time must be spent in precise planning of each move during NI period, such that the station is not brought under pressure at any time.

(x) Changes in PRS reservation system for cancellation, diversion, rescheduling etc. must be done in advance as per the advance period of reservation.

(f) Advance preparation for Train Running:

1. Stoppages on Platform:

(i) Duration of stoppages of Mail/Express trains must be reduced to the extent feasible.

(ii) Loading/unloading of parcels should be reduced to the bare minimum. If possible handling of parcels should be suspended, giving due publicity in the Press and other media.

(iii) Running of trains with single SLR must be prohibited.

(iv) Shunting operations must be restricted to the bare minimum and preferably avoided altogether as far as possible.

(v) Booking of through carriages, inspection carriages etc. to the NI station must be restricted.

(vi) Quick watering of coaches must be ensured by deputing additional staff as required.

(vii) Nominated stations for watering of coaches may also be changed if alternate stations are available.

(viii) Extra TXR staff should be deputed on platforms for attending to defects in rolling stock and promptly attending to complaints.

(ix) Extra train lighting staff must also be deputed on platform duty for promptly attending to complaints.

(x) Special squads of commercial and RPF staff must be deputed on platform duty for checking ACP etc.

(xi) All efforts must be made to minimize detentions.

2. **Crew Changing:**
   (i) Loco Supervisor must be kept on round the clock duty on the platform for quick change over of crew.
   (ii) If possible, crew changing for through passing trains may be planned at adjoining stations.
   (iii) If necessary, LIs may be deputed to accompany the loco pilot from one station before NI station till one station after NI station.
   (iv) Traffic Supervisor must be kept on round the clock duty on the platform for quick change over of guards.
   (v) At notice stations, computerized print out of caution orders must be used for saving time.
   (vi) Similarly, extra porters should be deputed for delivering these caution orders to loco pilot and guard.

3. **Loco motives**:
   (i) Engine changing for through trains must be curtailed.
   (ii) Locomotives must be freely extendable beyond territorial jurisdiction.
   (iii) If it is unavoidable, then changing of locos may be done at either side of NI station.
   (iv) For avoiding changing of locos from Diesel to Electric and vice versa, train routings may be changed during the duration of NI working.
   (v) For traction changing, half shunt of locos may be freely resorted to.
   (vi) Attaching of locos in rear should be resorted to in case of stations where trains reverse.
   (vii) Sending of light engines to sheds must be restricted. For this purpose, an out pit may be opened, if necessary.

4. **Controlling of Trains:**
   (i) In case of major terminal stations, a mini control office may be opened at the station. This mini control will liaison with divisional control office for purposes of train running. The jurisdiction of this mini control office would be the NI station itself and 2 - 3 stations on either side in each direction.
   (ii) Station undergoing NI must not be permitted to be brought under any pressure whatsoever at any time during NI working.
   (iii) All relevant notices must be issued in advance.

(g) Goomty Arrangements:

Location and number of goomties is an extremely important aspect of advance planning for NI. Sr.DOM/Sr.DOM(G)/DOM should personally approve final arrangements regarding goomties. Guidelines in this regard are as below:

(i) Cabins should not be used as goomties.

(ii) For a group of maximum of three sets of points operated from the ground, one goomty should be made.

(iii) Ideally, only 2 sets of points should be controlled from a single goomty.

(iv) Each goomty should be provided close to the group of points that it controls. This will ensure that physical movement of staff is reduced to the bare minimum.

(v) A group of 3 - 4 goomties at one end of the yard should be put in one zone.

(vi) Under no circumstances should two ends of the same points/crossings be with different goomties. This must be specially ensured for diamonds with single slips and also with double slips. Each such diamond must be under the same zonal in-charge.

(vii) Location of each goomty as also number of points that are controlled from it should be tentatively marked out in yard diagram. This should then be physically cross checked at site by visiting the station yard.

(viii) At site, it must be ensured that staff are not required to walk long distances for setting of points.

(ix) Both ends of each point must be clearly visible from the goomty itself.

(x) A goomty must be provided near the first stop signal for prompt issue of Operating forms etc. as required. Another goomty must be provided at the last stop signal to ensure correct dispatch of trains.

(h) Staff Arrangements:

Staff Requirement:

(i) Each goomty should have one ASM and two Pointsmen in each shift. These extra ASMs posted in goomties shall be called goomty ASMs, ASM posted with indoor ASM will be termed as co-ordinating ASM.

(ii) For cabin operated points, extra commensurate staff as required (ASM/cabinman/pointsman) should be provided. However, cabins should not be used as goomties as far as possible.

(iii) Goomty ASMs during their duty hours shall be fully in-charge of working of points/levers under their charge. They shall discharge all obligations of the cabin man/points man working at the station/cabin. They shall work under the direct supervision and instructions of the co- ordinating ASM on duty.

(iv) A group of four goomties or more at each end of the station should be put in one zone. Each zone should be under the charge of a TI in each shift. TI will periodically keep moving about amongst the goomties within his zone. He will check up and monitor the working of group of goomties under his charge.

(v) For non-interlocking work at major terminal stations, necessary arrangement for additional staff should be made, if necessary, from adjoining divisions, before undertaking NI working.

(vi) Under no circumstances should NI working be started unless full complement of staff is available at the station as per above norm and adequate training has been imparted to them.

(vii) Preferably those staff should be drawn from outstation who have
  (i) Adequate knowledge of NI working.
  (ii) Previous experience of the same.

(viii) Boarding and lodging of outstation staff is an important aspect of NI preparation. Dormitory type arrangement would be ideal, if these can be arranged. At major junctions these can be taken care of by stabling a few coaches at sidings. However, facilities will have to be arranged for electrical charging, watering, cleaning of bathrooms, sanitation etc.

(ix) On divisions where separate non-interlocking gangs are already in existence their strength may be adjusted accordingly. However, composition of such NI gangs should be periodically changed by inducting fresh faces and with drawing earlier ones.

(x) Round the clock engineering gangs with crow-bars and handles should be available to move points in emergency. One gangman should be available with each goomty in each shift for this purpose.

(xi) At each non-interlocked station, one Asst. Scale officer of operating department will be nominated for overall supervision.

(i) HWPR (Hours of Work & Period of Rest) Rule:

(i) Under no circumstances HWPR violation should be permitted during NI working. As far as possible duty hours of staff should be restricted to 8 hrs duty per shift in continuous roster.

(ii) For catering to unexpected casualties such as leave, sickness etc. during the NI period, RG and LR staff must invariably be provided for.

(iii) RG and LR must be made available shift wise. The standard of RG and LR should be the same as that of regular duty cadre staff for that shift as stipulated.

(j) Duty Rosters shift wise:

1. Meticulous detailed planning must be carried out for drawing up roster of staff to be deputed for NI working. While drawing up roster of staff for various shift duties, following guidelines must be followed:
   (i) Duty rosters must be drawn up as per guidelines given below.
   (ii) These should be drawn up for the entire duration of NI period.
   (iii) Duty rosters drawn up should be openly displayed and given wide publicity.
   (iv) No staff shall be permitted to mutually exchange his duty roster with any other staff, without prior permission of his departmental officer at site.
   (v) Level 'N + 1' shall be responsible for ensuring that level 'N' has followed all instructions etc. as laid down above.

2. Night Shift (00-08 Hrs.) Duty:

   (i) Regular staff permanently posted at the NI station must be rostered during the last night shift.
   (ii) Second preference should be for staff who have previously worked at that station.
   (iii) Best and most competent supervisors should be deployed for last night shift duty.

3. Evening Shift (16-24 Hrs.) Duty:

   (i) Regular staff permanently posted at the NI station, if still available for deployment after covering last night shift, should be rostered for first night shift duty.
   (ii) Second preference should be for staff who have previously worked at that station.
   (iii) Amongst outstation staff, preference should be as follows :
      (i) Senior staff having previous experience of NI working.
      (ii) Staff who are presently posted at major junctions.

4. Day Shift (08-16 Hrs.) Duty:

   (i) Comparatively junior in experienced staff from outstation should be deputed for day shift working.
   (ii) Teams for different goomties should be so formed as to include at least one staff having previous experience of NI working.

(iii) For day shift working, more number of staff may be deputed per goomty, if required, to cater for comparatively inexperienced staff.

(k) Temporary Working Instructions (TWI):

(i) When NI is undertaken, inter-locking provisions stipulated in SWR are no longer available. Hence, the SWR in its existing form becomes invalid.

(ii) TWI is basically meant to replace some portion of Station Working Rules of the station during the period of NI working. While they need not be as detailed as the original SWR of the station, nevertheless, they must cover all aspects of train operation that are included in the existing SWR.

(iii) Static information of SWR will continue to be valid. These include :
- (i) Inter – station distances.
- (ii) Description of yard layout.
- (iii) Level crossing gates.

(iv) TWI is to be read in conjunction with G&SR, Operating Manual & Block Working Manual. It must also be read along with existing SWR of the station.

(v) Portions of SWR that will get replaced pertain to :
- (i) Ensuring clearance of running lines.
- (ii) Granting of line clear.
- (iii) Reception/dispatch of trains.
- (iv) Working of level crossing gates.

(vi) All checks that are done by means of :
- (b) Slots.
- (c) Lock bars.
- (d) Point locks.
- (e) Signals.

All these checks have to be taken care of manually.

(vii) TWI should list out :
- (i) Number of goomties.
- (ii) Portions of yard that each goomty would control.
- (iii) Which goomties are to be involved for reception/ departure of a train on/from different lines.

(viii) TWI should list out different conditions required to be fulfilled for reception/dispatch of trains :
- (i) How line clear is to be granted/obtained.
- (ii) How clearance of nominated line is to be ensured.
- (iii) Procedure for closure of level crossing gates, if any.
- (iv) How the route is to be set.

(v) What are the series of points involved

(vi) Which ones of them are to be in normal position and which ones in reverse.

(vii) How signals are to be lowered.

(viii) Which staff would do what.

(I) Field level Advance Preparation:

(i) Detailed working instructions clearly specifying the zone of responsibility of each and every staff and supervisor along with temporary working instructions must be issued well in advance of the NI working.

(ii) In any case these should be ready at least 15 days in advance of NI working.

(iii) Station Superintendent/Traffic Inspector who is overall in-charge should be fully aware of his responsibilities/duties. Temporary working instructions should clearly stipulate these unambiguously.

(iv) Each Station Master/Assist. Station Master, Cabin Man and points man deployed on shift duty should be supplied with copies of temporary working instructions. In addition, SM/ASM and Cabin Man shall be supplied with yard layout diagrams and pull charts for their guidance.

(v) The temporary working instructions shall be supplied to SS/ASM/Cabinman and Points man in advance for study by them and for explaining to illiterate staff.

(vi) The instructions should be prepared in Hindi, English and Vernacular language and assurance to the fact that they have understood shall be obtained.

(vii) Readymade pull charts indicating normal and reverse position of points for specific routes must be prepared goomty wise. All such pull charts should be prepared at least 15 days in advance.

(viii) TI should be entrusted with the job of personally checking each and every pull chart. Compliance report must be submitted by TI at least 10 days in advance.

(ix) These pull charts must be printed, laminated and displayed in goomties as also given to each staff concerned.

(x) Draft instructions and pull sheets must be computerized and prepared in advance. Thereafter these should be revised on a day to day basis. Actual revision should take into account the progress of work as per the original time schedule.

(xi) A checklist of items to be inspected jointly by Traffic, Signal and Permanent Way Inspector should be drawn and controlling

officers should monitor that instructions in the checklist are complied with.

(xii) The exact location on the stock rail where clamps are to be fixed must be marked with white paint and clamps should actually be fitted to check that there are no obstructions.

(xiii) It may not be possible to fix clamps on motor operated points provided with second leading stretcher bar. In all such cases, provision must be made for cotter bolting of points.

(xiv) In any case, cotter bolting of points must always be preferred as compared to clamping and padlocking since it is a much faster method.

(xv) Normal/reverse position of points should be painted on tongue rail to indicate position of the route.

(m) Mock Drill and Staff Assurance:

(i) Before the SM/ASM/Cabinman/Pointsman and other staff connected with train passing work are allowed independent duty, the Station Superintendent shall obtain their verbal assurance that they have understood the same.

(ii) With regard to semi - literate and illiterate staff :

(iii) SS/TI should explain detailed working.

(iv) Test their knowledge.

(v) Satisfy himself that they can work independently.

(vi) Before starting actual non-interlocked working, a “mock drill” or “hands-on” demonstration/training should be given to all staff for at least 1 to 3 days in advance (depending on the size of the station) to familiarize them thoroughly with the type of work they have to handle.

(vii) This should be carried out in all the 3 shifts to ascertain difficulties, if any, which may be encountered during NI working.

(viii) Teams already formed for different shifts should be deputed as per roster.

(ix) “Mock drills” should be carried out without actually disconnecting signal gears, points etc.

(x) Whatever deficiencies are noticed during this period, should be rectified before introduction of actual NI. This experience should also be used to accurately estimate capacity to be available during NI and the number of trains planned to be handled should be accordingly revised.

(xi) Written assurances are required to be obtained before staff connected with train passing duties are allowed to work independently.

(xii) This written assurance should be taken from the staff only after they have :

(xiii) Participated in the "mock drill".

(xiv) Worked independently as per their laid down roster.

(xv) Successfully carried out all responsibilities entrusted to them during the "mock drill".

(xvi) No staff should be deployed unless proper entries are made in the "Assurance Register" and relevant signatures obtained.

(n) Dissemination of information:

(i) All aspects of working during NI and changes post-NI should be clearly documented and explained at all Loco pilot/Guard lobbies, whose staff pass through that yard.

(ii) For this purpose, loco/traffic inspectors & senior subordinates will be nominated to visit these lobbies with yard plans and camp at these lobbies.

(iii) Assurance of each and every running staff regarding these changes should be recorded in respective lobby assurance registers and complete report submitted to Sr.DOM/ Sr.DOM(G) /Sr. DSO/Sr. DME/Sr. DEE on return.

(iv) Adjoining divisions/railways, including notice stations and inter-change points, should also be intimated of the detailed program pertaining to NI working.

(v) All control staff including CHC, Dy. CHC, Section controllers, Power controllers, TLCs, TXR control etc. should be appropriately briefed.

(vi) The section controllers working on control boards must be fully conversant with the proposed changes pre-NI, restricted movement during the course of NI working and post-NI facilities to be made available.

(vii) Adequate publicity must be given through newspaper advertisements, electronic media, announcements at stations etc. informing the public of the likely repercussions on train running.

(o) Telecommunication, Lighting and Medical:

(i) Absolutely foolproof arrangements must be made regarding communication between the station and two adjoining stations on either side so that under no circumstances should there be a situation of total failure of communication between these stations.

(ii) Satisfactory arrangements for telephonic communication between station (indoor), Cabins, Goomty and Level Crossings Gates should be made to ensure efficient functioning of telephones provided at various locations.

(iii) Additional fail safe communication between control office and the NI station must be provided as a backup to existing section control channels.

(iv) Arrangements for public address system should also be made so that the same can be used for warning the public etc.

(v) Loud speakers must be provided on each goomty for making announcements regarding train movement.

(vi) Walkie - Talkie sets must be provided to all supervisors working at site.

(vii) Gangmen, Keymen and Patrolmen in 2 block sections on either side of the NI station must be provided with walkie - talkie sets, electronic hand signal lamps etc.

(viii) Arrangements of staff and recharging facilities should be available for charging of batteries of telecom equipment including walkie - talkies.

(ix) General lighting in yard should be adequate.

(x) Separate lighting should be provided in each point zone. Lighting should be adequate so as to ensure that each point controlled from a goomty is clearly visible to the ASM/Cabinman in charge of that goomty.

(xi) Adequate generator backup should be provided. Spare bulbs should also be provided at each location.

(xii) Round-the-clock medical post with doctor and para-medical staff must be provided. They should be equipped for handling first aid and crush injuries. Anti-snake venom (Covalent) should be available. Road ambulance should be permanently stationed for quick transportation, if needed.

(p) Safety Equipment:

(i) Safety equipment required for each location such as goomty, cabin, level crossing gate etc. must be spelt out in detail and full complement arranged.

(ii) Adequate spares must be arranged for safety equipment such as of hand signal flags, detonators, switch clamps and pad locks etc.

(iii) LED based flashing Hand Signal Lamp must be provided at each such location for better visibility.

(iv) Cotter bolts, cotter pins and switch clamps & padlocks must be thoroughly tested to be in proper working condition.

(v) Spare numbered crank handles must be provided in goomties where point machines are pre- dominantly working.

(vi) Each goomty must be provided with the following safety equipment:

(i) Switch Clamps, padlocks, detonators.
(ii) Flags, hand signal lamps etc.
(iii) Relevant pull sheets, yard diagrams etc. duly laminated.
(iv) Torches, emergency light, in addition to normal lighting.
(v) Umbrellas, caps, raincoats, as required.
(vi) Cotton Gloves for staff handling points etc.
(vii) Table, chairs in tent or covered area.
(viii) Containers and glasses for drinking water.
(ix) Thermos for tea/coffee and provision of snacks and meals for staff deployed from other station or headquarters.
(x) Mosquito/insect repellant creams.
(xi) Magneto phones and VHF walkie talkies, Public Address Equipment.
(xii) Private number books, paper, pens.

(q) Security arrangements:

Adequate RPF security staff round the clock must be arranged at following locations:

(i) ASM's office.
(ii) Central place at the station.
(iii) Level crossing gates.
(iv) Outer most goomties on either end.

(r) Introduction of NI working:

(i) Before permitting introduction of NI working, DRM/ADRM will satisfy himself regarding arrangement of staff, safety equipment, lighting, telecommunication and ground position.
(ii) On the day of commencement of NI working, branch officers concerned from Operating, Safety, Engineering, Signal, Electrical and Mechanical along with DRM/ADRM will visit the place of work. They shall satisfy themselves of availability of necessary arrangement as per standard before permitting introduction of non- interlocking.
(iii) On the notified day, for introduction of NI working, Signal Inspector concerned shall give a general disconnection memo for gears proposed for NI working.

(s) Train Operation during NI period: Working of Signals:

(i) Speed restriction of 15 kmph/30kmph must be in force over all points and crossings. Speed restriction Board of 15 kmph/30kmph must be exhibited at the foot of the first stop signal.
(ii) The following signals should be provided with caution aspect:

(i) In case of colour light signals, a common NI home signal without route indicator.
(ii) In case of MAUQ/TALQ, single arm NI home signal.
(iii) Warner signals, if any, are to be put out of commission by putting 2 cross bars.

(iii) NI Home/Starter signal can be taken off only after ensuring that :
(i) All points on the route are correctly set, both facing and trailing points are clamped and padlocked.
(ii) In addition to correct setting, clamping and padlocking of facing points, they must also be manned.
(iii) Level crossing gates on the route have been closed against road traffic.

(iv) Last stop signal should not be disconnected throughout NI working except at the fag end.

(v) Movement of trains to and from the block sections should be controlled by taking off the last stop signal.

(vi) Normally, no Paper Line Clear Ticket/ Authority to pass signal in ON position should be issued to the loco pilots as authority to proceed in the block section; if unavoidable, then it should be delivered at the foot of signal.

(vii) A traffic block of 2–3 hrs. should be taken for disconnecting the last stop signal and block instrument and reconnecting the new last stop signal and new block instrument.

Train Running:

(i) Each train movement must be announced well in advance on the loudspeaker:
(i) Along with the number of the goomty involved.
(ii) Sequence of points required to be set and locked in normal or reverse condition.

(ii) Trains must be allowed to enter cautiously at 15kmph.

(iii) Loco pilot of an incoming train must not under any circumstances pass the outermost facing points even though signals have been taken “off”:
(i) Unless he also sees that the points are manned.
(ii) A proceed hand signal is exhibited towards him from the points.

(t) Failures:

(i) All indicative accidents during the period of NI working must be immediately reported to the site in charge, in order to ensure prompt corrective action and avoidance in future.

(ii) Details regarding such cases must be promptly intimated to DRM and Sr.DOM/ Sr.DOM(G) /Sr.DSO.

(iii) A register must be opened at each goomty in which, before handing over charge, staff will enter details of whatever difficulties they have faced during their shift. The person in charge of NI working at that station must scrutinize this register daily.

(iv) Cases of bursting of NI target should be appropriately dealt with and individual responsibility should be fixed up.

(u) Revised Station Working Rules:

(i) After completion of NI working, new works are to be commissioned.

(ii) Since the yard layout, facilities etc. have changed, the previous SWR is no longer valid.

(iii) A new SWR duly approved by CRS is to be brought into effect after completion of NI.

(iv) Staff assurances for the revised SWR must be taken afresh.

(v) Completion of NI Working:

(i) NI working must not be terminated unless and until each and every item originally scheduled for completion has been successfully complied with.

(ii) The designated operating officer must visit the NI station and verify the following:

  (i) Completion of work as per program.

  (ii) Correspondence of yard layout as per SWR.

  (iii) Correspondence of movements permitted as per SWR.

(iii) The installation shall jointly be tested by Traffic, S&T and Engg. Officials for their correct functioning. They shall ensure that :

  (i) The lever/knobs, signals, points and connections work freely and properly and that the installation fulfils its objective.

  (ii) Signals are properly focussed, the indications on the panel correspond with the signal aspect and point position at site. Engineering officials shall check the proper housing of points, gauge level etc.

(iv) Before issue of Safety certificate and taking over of stations, the Transportation/Safety Officer shall counsel the station staff about functioning of the interlocking installation and test them in their knowledge of the signalling arrangement.

(v) Engineering and S&T officers shall give a certificate stating that all works as per the approved plan have been completed.

(vi) Staff concerned shall be notified through Station Order Book, Control Order Book and their acknowledgement obtained. All inspectors and other supervisors shall ensure strict compliance and report any deviation or violation with promptness to notify, then and there.

(vii) On the day of completion of work, branch officers concerned shall visit the work site to ensure completion of work as per program.

(w) Post NI analysis:

(i) Within 7 days of completion of NI, a brain storming session should be held with all the senior supervisors involved for taking stock of lessons learnt.

(ii) These lessons learnt should be compiled at one place for successive NIs, so that they are available for future reference.

(iii) A copy of the same may also be sent to other divisions for reference purposes.

CHAPTER-6
INSPECTIONS

6001: Objects of Inspections:

The Railway network is spread over a vast area. It is estimated that for running a train over a section, co-operation and co-ordination of thousands of Railway staff is essential. A vast organisation, such as the Indian Railway system, functions on the basis of a carefully arranged system of selective Autonomy, Accountability and Responsibility. Rules and instructions lay down the procedure of work and the staff are properly trained and the officials at various levels monitor, supervise, counsel and direct the staff from time to time by different means. Inspection is an important function of management, particularly in the field of Railway Operations to ensure efficient working at all levels.

Following objects shall be borne in mind while conducting inspection:

1. Verify whether every Railway employee is fully conversant with rules, instructions and procedures relating to his duties.
2. Ascertain that the staff is performing their duties according to rules, instructions and the procedure inforce.
3. Detect undesirable shortcuts, irregularities or unsafe practices being resorted to by the staff, taking remedial action which may be:
   (a) Educative, in case these are resorted to out of ignorance.
   (b) Corrective, if there is something wrong in the working conditions or there are system deficiencies.
   (c) Punitive, if resorted to wilfully or negligently and persisting even after repeated guidance and counselling.
4. Observe the conditions actually prevailing at the work spots to understand the difficulties experienced by staff, including their personal grievances and seeking on the spot redressal.
5. Ensure that full complement of staff and equipment is available and staff have knowledge of its operation.
6. Ascertain that registers, documents and other records are being maintained and preserved according to instructions.
7. Monitor the behavior of staff towards customers, particularly promptness of response and willingness to help.
8. Assess as far as possible that the interest of the public and the Railways are kept in view and safe guarded.
9. Inculcate discipline and build up the moral of the workers.
10. Check the compliance of previous inspection reports.

11. Analyse efficiency targets vis-à-vis performance.

Thus, inspections provide the means to achieve efficiency and effectiveness through spot checks and personal contact with the staff on line. In order to accomplish these objectives, inspections have to be carried out at officer's and Supervisor's level. The inspecting official has to command the respect and obedience of staff, for his inspection to be effective and beneficial and as such, his conduct should be exemplary.

Types of Inspections

The following inspections have to be carried out by operating and safety officials:

6002: Regular Inspection (three monthly):

Each station on the division must be inspected in detail at least once in every three months i.e. January to March, April to June, July to September and October to December, covering the various aspects of safety, operations and allied matters, including staff matters. The inspection shall be carried out by the Sr DOM/Sr DOM(G)/DOM/Sr DSO/DSO/AOM/ARM/SS/SM/ DTI/TI etc. While minor stations are inspected by the TI concerned, the DRM will nominate important stations (including all such stations which do not fall within the jurisdiction of TI, that is those which have SS/SM in grade equivalent to or higher than those of TI of the section) to be inspected by the nominated officers. Each officer will be allotted at least two such stations. The officials concerned shall also spend the night at the station. Regular inspections have to be comprehensive in nature.

6003: Safety Inspections (monthly):

Safety inspections are basically meant to be preventive by detecting short cut methods and unsafe practices resorted to by train passing, running and maintenance staff. The irregularities noticed must be personally brought to the notice of the Station Master and remedial measures initiated promptly. In case of any serious irregularity, the inspecting officials must at once inform Sr.DOM/Sr.DOM(G)/DOM/DOM(G) or Sr.DSO/DSO concerned personally or telephonically beside making a written report.

6004: Surprise Inspection (Monthly):

Such inspections must have an element of surprise. Officers and Inspectors may inspect a station either while passing through it or during the short time at their disposal or when they want to check some aspect at the station without prior notice. Apart from any special aspect they intend to check, they must also observe and take note of the irregularities/ deficiencies or good work being done which may come to their notice. They may check as many items as possible as time permits. Minimum 6 such inspections in a month shall be conducted by the sectional TI.

In the automatic signalling territory, besides surprise inspections, ambush checks should also be conducted to check whether the Loco pilots/ Motormen are observing the rules regarding passing of automatic signal at 'ON' position etc.

Similarly Loco Pilots whistling at whistle boards on approach of LC gates also needs to be checked.

6005: Night Inspection (fortnightly):

Night inspection must be carried out by the Officers and Supervisors frequently to appreciate the working conditions as well as to detect the irregularities.

Surprise night inspection may be carried out between 00 hrs. to 04 hrs. Because during this period, the staff is likely to be lethargic and negligent in duties. Similarly, instances of staff sleeping on duty, dim signal lamps and indicators, unauthorized absence from duty and many other irregularities, unsafe and undesirable practices may come to notice between 00 hrs. to 04 hrs. Frequent night inspections are a must and SS/ SM must conduct surprise night inspections fortnightly of their station between 00 to 04 hrs. and take remedial measures to rectify the irregularities and deficiencies noticed.

6006: Level Crossing Inspections:

Level crossing gates should be inspected in detail with a view to ensure safety of rail and road traffic, availability of safety equipments, knowledge of Gatemen regarding rules pertaining to his duties and loco pilot's whistling while passing the LC gates.

6007: Surprise Inspection by Road:

These inspections have an element of surprise in them. In order to create a sense of alertness amongst the staff, the road inspection should be carried out without informing anybody.

6008: Footplate Inspections:

Footplate Inspections are carried out by travelling on the engine of running trains. These afford an opportunity to the inspecting official to observe and check certain aspect of working on the engine, along the track and at the stations which cannot be checked otherwise. To achieve the purpose for which footplate inspections are carried out, it is essential that these are done by day and by night, in clear weather and when the visibility is poor due to thick, foggy or tempestuous weather.

6009: Joint Footplate Inspections:

These are carried out jointly by officials of Traffic, Mechanical, Electrical (Running), Permanent Way and Signaling branches for checking the visibility of the signals, their locations, operations, lighting up, speed restrictions and

caution boards, rail wheel interaction and loco pilots & assistant loco pilots operating behaviour.

6010: Surprise Speed checks:

In order to ensure the maximum permissible speed are not exceeded, permanent and temporary speed restrictions are correctly observed and limits of speed over turnouts and facing points are observed, surprise speed checks should be conducted as per schedule.

6011: Running Rooms Inspections:

During regular, safety, surprise and night inspections, opportunity should also be taken to inspect running rooms to ensure that running staff are able to get proper food and resting facilities. Running rooms should also be jointly inspected by the team of officers as nominated and prescribed.

6012: Ambush checks:

It is essential to ensure rigid observation of rules when automatic stop signals are passed in 'ON' position. The inspecting officials should carry out ambush checks with the help of signalling officials, who will arrange to put an automatic stop signal to 'ON' position. Such checks should be arranged in consultation with Sr. DOM/ DOM.

6013: Running Trains Inspections:

Whenever an operating officer or an inspector is travelling by a train on duty, he must pay special attention to observing the performance of duties by Guards, Loco pilots, Station staff, Gatemen and others.

6014: Loco shed inspections:

One loco shed shall be inspected once in 3 months individually as well as jointly.

6015: C & W Depots inspections:

Each C & W depot shall be inspected once in 3 months individually as well as jointly.

6016: Accident Relief Train (ART)/Accident Relief Medical Equipment Van Scale-I (ARME):

Each Medical Van shall be inspected once in 3 months (see Accident Manual). Accident Relief Train (ART) - Each Break down train shall be inspected once in 3 months (see Accident Manual).

6017: Inspection records and statement:

a. Every station shall maintain an inspection register which shall remain in the custody of the Station Master on duty.

b. A record of the progress of such inspections shall be maintained in the Divisional Office in the shape of a register so that individual as well as overall performance can be checked from time to time. For this purpose

an index of inspections carried out (station-wise) and foot-plate inspection (section-wise) should also be maintained.

c. The subject of inspections, their progress and follow up action shall be a standing item for discussion at Divisional Operating and Safety Meetings and Divisional Railway Managers shall personally watch this vital item of work from time to time.

d. Divisions shall submit statements to the Headquarters Office on the prescribed proforma showing the number of detailed, casual and night inspections carried out by Officers of the Transportation Branch.

6018: Inspection Quotas:

The minimum number of regular, surprise, safety and night inspections will be carried out by officers and inspectors as per quota fixed from time to time. The tentative schedule of inspections is attached.

Schedule of Inspections by Operating/Safety Officers and Transportation Inspectors.

Sl. No.	**Type/nature of inspections**	**Sr DOM /DOM incharge**	**Sr Scale Optg. Officers**	**Junior Scale Optg. Officers**	**Sr DOM(G)/ DOM(G)/ Sr DSO/DSO**	**AOM(G)**	**TI**
1	Regular Inspection – Half Yearly	2 important stations as Nominated by the DRM	2 important stations as Nominated by the DRM	2 important stations as Nominated by the DRM	2 important stations as Nominated by the DRM	2 important stations as Nominated by the DRM	All Stations in their Jurisdiction once in 3months
2	Safety inspections	Minimum 4 inspections including 1 night inspection	Minimum 5 inspections including 2 night inspections	Minimum 5 inspections including 2 night inspections	4 stations every month	4 stations every month	All Stations in their Jurisdictio n once in a month
3	Surprise inspections	No quota	No quota	Maximum 2 stations per month	As often as possible (minimum 2 every month)	As often as possible (minimum 3 every month)	As often as possible (minimum 4 every month)
4	Night Inspections- i) Level Crossing ii) Station iii) Foot-plate on Goods	1 per month 1 per month 1 per month	1 per month 1 per month 1 per month	1 per month 1 per month 1 per month	2 per month 2 per month 2 per month	2 per month 2 per month 2 per month	3 per month 3 per month 3 per month

	Train						
5	Level Crossing During Day time	1 per month	1 per month	1 per month	2per month	2per month	3 per month
6	Surprise road inspections	1 per month	1 per month	--	1 per month	1 per month	1 per month
7	Individual Foot-plate Inspections	1 section per month by both i) M/Exp./ Pass ii) Goods Train	1 section per month by both i) M/Exp./ Pass ii)Goods Train	1 section per month by both i) M/Exp / Pass ii) Goods Train	1 section per month by both i) M/Exp./ Pass ii) 2 Goods Train	1 section per month by both i) M/Exp./ Pass ii) 2 Goods Train	1 section per month by both i) M/Exp./ Pass ii) 3 Goods Train
8	Joint Foot-plate Inspection	--	--	--	One section every quarter covering the entire division once a year, Up & Dn separately by day & night	One section once a month covering the entire division once a year, Up & Dn separately by day & night	One section once a month covering the entire jurisdiction once in 6 months including Up/ Dn day/night separately.
9	Surprise speed checks	No quota	No quota	No quota	3 per month	3 per month	5 per month
10	Running Rooms Regular inspections	1 major running room as identified by DRM-once a year (along with Sr DEN & Sr DME/ Sr DEE)	1 major running room as identified by DRM-once a year (along with Sr DEN & Sr DME/ Sr DEE)	All running rooms under Sr DME charge of Mechanical & Electrical dept. (along with AEN & AEE/AME)	All running rooms under Sr DME charge of Mechanical & Electrical dept. (along with Sr DEN & Sr DME/ Sr DEE	All running rooms under Sr DME charge once a year (along with AEN and AEE)	Each running room under their jurisdiction once in a month.

11	Ambush Checks in Automatic signalling Territories	--	One during day & one during night in a month	One in a month	One during day & one during night in a month	One during day & one during night in a month	One during day & one during night in a month
12	Running Trains Inspections	As often as possible	As often as possible	As often as possible	As often as possible	As often as possible	As often as possible
13	Loco Shed Inspections	--	--	--	1 shed every 3 months	1 shed every 3 months	--
14	Depots Inspections	--	--	--	1Depot Every 3 Months	1 Depot Every 2 Months	--
15	Accident Relief Medical equipment Scale -1 (ARMEs)	--	--	--	1 medical van every quarter	1 medical van every quarter	--
16	Accident Relief Trains (ARTs)	--	--	--	1 ART every quarter.	1 ART every quarter.	--

Note: For S.No. 10,11 & 13 – all loco sheds, C&W Depots and medical vans are to be covered in a year either by Sr. DSO/DSO/Sr.DOM(G)/ DOM(G)/AOM(G). The Quotas shown above indicate the minimum inspections. Inspections in respect of above items and other items should be carried out as frequently as possible.

6019: General Guidelines for Inspecting Official:

1. Before commencing the inspection all inspection books should be called for and the notes made by other inspecting official should be carefully perused to check whether the staff have complied with their instructions. If any of these instructions have not been carried out, written explanation of the Station Master should be obtained.
2. It shall not be enough merely to point out the irregularity of the staff; matters must be put right personally while at the station to the extent possible.
3. All books and registers inspected must be initialled and dated.

6020: Technique of Inspections:

It requires both expertise and experience to carry out intelligent inspections. To evolve a sound technique of inspections, an inspecting official should:

1. Have a clear understanding of the station lay out, its signalling, special features of working and the instructions in regard to reception, dispatch, crossing, shunting and running through of trains. For this, he should have a good knowledge of not only General & Subsidiary Rules but also of Station Working Rules.
2. Select the feature of working, which he intends to check during his inspection and should have a clear conception about them in his mind. For instance, he may like to emphasise on the correct reception and dispatch of trains and observance of safety rules by the staff or on utilisation of stock, detention to passenger or goods train, knowledge of staff etc.
3. Inspect the aspect of working by thorough inspection of books, registers, forms and equipments used for operations and secondly by means of personal observation of actual operations.

1. Be selective in choosing:

(a) The time and operations of personal observation.

(b) The documents, registers and forms for checks and cross checks.

(c) The equipments for checking, their availability, adequacy, maintenance and use.

2. Select specific periods for checking registers, books and forms keeping in view the purpose and time of inspection. These documents should be subjected to concentrated, minute and probing checks and cross checks. It may be worthwhile to select two or more separate periods, one of these being that immediately preceding the day of inspection. This will help in not only detecting the irregularities being committed but also whether these have been continuing for some time in the past.
3. Discuss the irregularities or lapses noticed during inspection with the staff actually doing the work, as well as those supervising their work. Such a discussion will prove to be educative and produce useful results.
4. Discuss, as far as possible, the points common to two or more branches, like the Signalling and Interlocking branch or Loco and Train Examining, Civil Engineering and Commercial Branches jointly for objectivity and acceptable solutions. This will help in not only arriving at correct conclusions and forming sound views but also in avoiding unnecessary correspondence.

6021: Guide to inspection- Given below is a list of questions and items incorporated in the "Standard Form of Transportation Inspection of station". The list is intended to serve as a guide to the inspecting official in his inspections, and is not exhaustive.

(a) Control Operation:

(i) If the station is on the control telephone, call up the Controller and ask him his opinion of the working of the station. Put right any matter, which is represented, indicating what has been done.

(ii) Ask the Station Master if he has anything to say regarding general working of the Controllers. Discuss this with Control, if necessary.

(iii) Examine orally, the Station Master and Assistant Station Masters in regard to their responsibility towards Control and ask, if they have any suggestion. Summarize the result.

(b) System of working between stations:

(i) Examine Station Master, Assistant Station Masters and Cabinmen in their knowledge of the system on which trains are worked between stations and their knowledge of block and other instruments provided.

(ii) Examine equipment of the Station Master, e.g. signals, red flags, H.S. lamps, rule books, first aid boxes or medical chest etc.

(iii) Test the staff in rules of abnormal working, single line working on double line, failure of communications etc. and also reception on blocked line, non-running line, Trains working during disconnection of points and signals etc.

(iv) Cross-check private numbers exchanged with block stations on either side.

(c) General & Subsidiary Rules, Station Working Rules, Station Books and other records.

(i) Has every employee, who should be in possession of a copy of General and Subsidiary Rules book, been supplied with a copy and is he able to produce the same on inspection? Are the books pasted with correction slips up to date?

(ii) Are the Station and Yard working rules and diagrams up to date and workable? What is the number of correction slips? Ask for dates of issue of working rules and the last correction slips. Check, if the number of correction slips justifies a reissue of the working rules from the Divisional Office.

(iii) Are Accident Bulletins, Safety circulars, fortnightly circulars, fortnightly Gazettes being read and receiving attention of the staff?

(iv) Where are the keys kept?

(v) Ask Station master if he has any amendment to suggest to the Station Working Rules.

(vi) Are there any special rules governing shunting at the station and are they being obeyed?

(vii) Can you suggest any improvements in the layout or interlocking of the station yard to improve the safety of working or to minimize detentions? Will the expenditure be justified?

(viii) Check, if the station staff duly sign the assurance register before taking over "Independent" duties and whether they give assurance for each correction slip to the SWR The assurance register should be cross-checked with the attendance register.

(ix) Are the General and Subsidiary Rules, Accident Manual, Working Time table, Priority Register, Line Clear Books and other books and divisional circulars kept handy? Are they kept in a tidy manner? Are they up to date?

(x) Are the roster of staff, payment of Wages Act, list of hospitals, the calendar of Returns and other important circulars available and displayed? Are they being followed?

(xi) Examine the register of fog signals and test staff in regard to the rules for the use of fog signals.

(xii) Are the current North Central Railway time tables exhibited at the station in English and the regional languages?

(xiii) Inspect stationery on hand, see that it is properly preserved and report if it can be reduced or if there is any apparent waste.

(d) Train working and working of Station:

(i) Give the number of trains you saw dealt with and state whether the station working rules were obeyed.

(ii) Give the number of line clear books checked with regard to correct entries, legibility, stamping of station name etc.

(iii) Check the forms of authority to pass defective signal during the last two months. Were they issued correctly? Cross-check against signal failure register. What action has the Signal Branch taken to rectify any chronic defects?

(iv) For what trains and on what date was "Permission to Proceed without Line Clear" issued during the last 2 months and why? Cross-check against Signal Failure register.

(v) Check Caution Order book and cross-check with Line Clear book and caution register. Is caution register correctly maintained? Check authority of engineering officials.

(vi) Check train signal register. Cross-check timings with cabins and adjacent block stations. Is the movement completed before an Assistant Station Master goes off duty? Is the staff in the habit of making frequent corrections or rewriting in the Train signal Register? If so, give his name.

(vii) Is shunting Order/work order book correctly maintained? Are

shunting orders correctly issued for shunting movements and are the signatures of Loco Pilots and Guards, Shunting Masters always obtained?

(viii) Check Priority Register and see if there is any infringement of priority. Check if wagons are also dispatched in order of priority.

(ix) Does Station Master carry out his periodical night inspections? The Register kept for this purpose should be checked.

(x) Check the timing given by the station clocks. Are they in good condition? Does the Station Master check the timings with the 16 hours time signal? Does he maintain properly the register showing deviations in the clock timings day-to-day?

(xi) Examine the Station Inspection Book. Have inspections been carried out regularly by the inspecting officials? Give dates of last 3 inspections. Have staff taken action on the inspection Notes recorded during the last three inspections?

(xii) Are any passenger trains being detained frequently at this station? Give particulars with reasons and suggestions to mend matters.

(xiii) Is the name of the Station called out by the staff on arrival of passenger trains? Is the ringing of the bell properly carried out in accordance with rules.

(xiv) Are Station Working Rules practicable?

(xv) Are Station Working Rules being actually followed specially in regard to :

Manning of facing and trailing points	During non-interlocked working
Use of the Line Admission Book	At Junction Stations

Any special rules applicable to the station regarding shunting or lowering of signals/Taking 'OFF' of signals.

Whether the Shunting Masters sign the book before a movement is allowed or they sign for a number of transactions at a time of their convenience? If so, state specific cases.

(xvi) Enquire from the SM and ASMs if they are experiencing any difficulty when two or three trains have to be dealt with at the same time, e.g. during a crossing.

(xvii) Is any staff in the habit of making frequent corrections or over writing in the line clear books? If so, give his name.

(e) Signals and other station Equipment :

(i) Give the time of your day and your night inspections of signals and signal lamps. Are signal lamps correctly focussed?

(ii) Ask staff, if they know the visibility test object.

(iii) Check the stock of fog signals. Cross-check against fog signal register. Test staff in their knowledge of fog signalling procedure.

(iv) Check the stock of kerosene oil, padlocks, flags, chains etc. Are they kept in proper and safe custody? Is proper economy being exercised in the consumption of oil? Is the oil allowance sufficient or capable of reduction?

(v) Are signals clearly visible from the station?

(vi) At non-interlocked stations, check points indicators, their working and glasses, clamps and padlocks at the points.

(vii) At interlocked stations, are there sufficient locking bolts or switch clamps to be used in case of the station having to be worked as a non-interlocked station?

(viii) Are these locks available on all the scotch blocks to lock on and off the rail and are they used in accordance with rules? Are all scotch blocks examined, correctly fitted and in good working order.

(f) Detention to Stock and water Failures:

(i) Examine the Wagon Exchange Register or Wagon Card Index and see if it is being properly maintained and kept up to date.

(ii) Take up and comment on detentions exceeding 24 hours.

(iii) In case of watering station, examine the Water Failure Register and comment on any failure during the last 6 months.

(iv) Examine the detentions to through goods trains.

(v) Examine the detentions to shunting and Van trains. Do you have any suggestions to reduce these detentions?

(vi) Are any wagons being detained for want of room in the Goods/ Parcels/Transit siding, platform or sheds? If so, give reasons as also your suggestions for eliminating these detentions. Is night working in force?

(vii) Is nominated loading in force? Please examine the possibility of introducing direct vans to selected destinations on nominated days.

(viii) Comment on the detentions to wagons loaded with departmental goods such as (i) loco coal (ii) Permanent Way Material.

(ix) If empties are supplied to the Station for loading, check whether there are any cases of cross running of empties of the same type.

1. What is the average detention to local stock for the period

checked by you in the wagon exchange register?

2. The detention should be checked separately for Arrival to placement, placement to Release, Release to replacement for back loading and Reloading to dispatch.
3. At transshipment points the following detentions, in addition to those mentioned above shall also be checked: Placement to commencement of work, Loading to dispatch.
4. Also check the detention to through loaded stock.
5. What action has been taken to reduce the detention to unconnected wagons at the station, if any?
6. Check register maintained regarding the detention to all goods trains at the fuelling station.

(x) What marshalling is done at this station? Is it in accordance with orders? Is the yard suitably laid out for facilitating the required marshalling or shunting; if not, give your suggestions for improvements to the yard, justifying the extra expense, if any.

(xi) What is the average load put into a vehicle at this station and can it be improved? Such information should be given separately for heavy & light merchandise and should cover all the principal commodities loaded at the station.

(xii) Give any suggestions you have to make for quicker and more economical handling of stock at this station.

(xiii) What is the detention to stock damaged and detached at this station?

(xiv) State, if a large number of empties are being rejected for loading? If so, what steps are being taken by you?

(g) Train equipment:

(i) Check the equipment of Guards on at least two passing trains and note results.

(ii) Check head-lights, buffer lights, tail-lamps and side lights on passing trains and note result.

(iii) Check couplings of passing passenger and goods trains and report cases of loose couplings.

(iv) The filling of water in lower class carriages as well as the sanitation of lavatories etc., in passing trains should be checked up.

(v) If it is a train cleaning station, do staff attend the trains properly and with full equipment.

(vi) Check first aid box on at least one of the stopping passenger trains.

(vii) If any mail or express trains stop at the station, see if they have

the Field telephone equipment and examine the guard in the use of the telephone.

(h) Personnel:

(i) State result of mustering the staff actually on duty and the result of inspection of the attendance register and duty list.

(ii) Deal with the staff appearing in an untidy manner on duty and in dirty uniform or without uniform or proper badges.

(iii) Do all the train passing staff, including Cabinmen, possess valid competency certificates?

(iv) When did the train passing staff, who are required to pass periodical vision test, pass it last? Do those who passed it with glasses have glasses with them while on duty? Are any staff overdue vision test?

(v) Are there any vacancies to fill for which no arrangement has been made by the office?

(vi) Inspect running rooms and state the result of your inquiries from the running staff regarding the comfort of the running room (if any).

(vii) See that the Station buildings, yards, quarters and surroundings are clean and tidy. Also see that unauthorised structures are not erected in the staff Quarters.

(viii) State if the number of staff employed is in excess or short of actual requirements.

(ix) Is the station staff properly housed? Mention number and particulars of staff, both essential and non-essential not provided with quarters.

(x) Hold a meeting with the staff, who can be easily assembled and give them a patient hearing, if some suggestions are made to improve working at that station. Any reasonable personal requests may also be recorded.

(xi) Note down complaints from staff, if any. If any of them can be remedied on the spot, this may please be done.

(i) Cabins:

(i) Ensure that prescribed equipment is available in the cabin and is contained in good working order.

(ii) State what keys and levers you tested for correct setting and locking of points.

(iii) Check the private numbers exchanged between the cabin and ASM on duty as well as with other cabins.

(iv) Are the slotting arrangements satisfactory?

(v) Examine the Cabinmen in their knowledge of General and Subsidiary Rules, Station Working Rules and other instructions in so far as they pertain to the duty of Cabinmen and record the results. In this connection, please use 'Questionnaire for Cabinmen Signals" which contains salient points on which Cabinmen can be questioned.

(vi) Ensure that the cabins are kept neat and clean and no unauthorised person is permitted to enter it.

(j) Level Crossings :

(i) Check equipment at gate lodge.

(ii) Examine Gatemen/Pointsmen in their knowledge of rules regarding level crossing and use of fog signals. Record results.

(iii) Check complaint book at level crossings and action taken. Are detentions to road traffic heavy and are they avoidable?

(iv) Do you recommend that the gate should be interlocked with the cabin, if so, give justification.

(k) General :

(i) State briefly your opinion of the condition of affairs at and the general appearance of this station, its buildings, offices and approaches.

(ii) Check the record of accidents at the station and issue suitable instructions to the staff.

(iii) Are monthly safety meetings being held regularly? What is the response?

(iv) Give details of any proposals for bringing an increase of traffic to the railway at this station or in its vicinity or any step which you think will increase the sectional capacity generally.

(v) Are water supply arrangements in the waiting halls adequate? Comment on the water supply arrangement to passengers in trains and on platforms.

(vi) Make any recommendation you consider feasible for increasing efficiency in working or comfort of the staff.

(vii) State your opinion on the proficiency or inefficiency of any of the staff you may wish to bring to notice.

(viii) Record your opinion on the behaviour of staff in their dealing with public. Deal with instances of inattention or discourtesy on the part of the staff.

(ix) Any other general remarks.

(l) Additional question applicable to Marshalling yards and Junction station.

(i) Are trains detained outside signals? Check position for the last 3 months. Indicate briefly the main reasons.

(ii) What is the percentage of right time starts of goods trains? It is possible, if goods train time table is given. Examine reasons for late starts for the last month. In particular, watch the operations in this respect on the day of the inspection.

(iii) What is the average load of trains - incoming and out-going? What is the maximum prescribed? Examine the position in detail of out-going loads for the last 3 days and see, if better loads could have been provided.

1. Are any definite marshalling orders laid down for the yard? Are they adequate?
2. Are the Marshalling orders in force being followed by the staff? Check both incoming and out-going loads on the day of the inspection. Also check vehicle guidance of the last one week and indicate results.

(iv) Is the yard working out its prescribed quota of pure empty loads and intensively examined loads? Examine performance of the last one month and indicate results. In case there is short fall in quota, question Yard Master and find out if there is any difficulty.

(v) Are facilities for simultaneous reception from and dispatch of trains to all directions available? What are the movements in the yard itself, which can take place simultaneously? Can a train be received when another is leaving in the same direction or in opposite direction? Is there any other suggestion for augmenting these facilities with the approximate cost involved?

(vi) What are the number and lengths of shunting necks? Are they adequate for the present traffic and for the expected future increase in traffic?

(vii) Indicate the number of reception lines. In how many groups are they divided? Is the division of lines into groups balanced? Any suggestions?

(viii) What is the average occupation of reception lines and the average time taken in breaking up a load? Can they be reduced and if so, how? Study performance for 3 months.

(ix) Did you come across any cases of loose or rough shunting or of any stock which is prohibited from being humped, having been passed over the humps? Speak to staff of the dangers involved

and indicate their reactions.

(x) What is the cost of repairs to damages caused in the Yard? Study the figures for the last 12 months.

(xi) Examine preplacement detention to stock earmarked for sick line for the last one month. How can this detention be reduced? Are there any cases of wrong placement? Are any light repairs to stock undertaken on running lines and can this facility be increased? What is the average detention to stock after repairs before withdrawal from sick line?

(xii) What is the average detention to through trains- Up, Down and branch lines? Examine position for the last three months.

(xiii) What is the average time taken before a terminating load is tackled- Up, Down and branch lines? Examine position for the last 3 months.

(xiv) What is the average detention to through loaded stock and to through empties? Examine each case of heavy detention for the last one month. Any suggestions for reducing such detention?

(xv) What is the average detention to local stock? Examine separately for inward goods, sick wagons, other departmental wagons, etc. Examine position for the last one month.

(xvi) What was the yard balance for the last 3 consecutive days? Were there any wagons which should not have been there? Is there an accumulation of any particular category of wagons?

(xvii) Are the communications and lighting facilities in the yard adequate? Any suggestions?

(xviii) How many yard pilots/shunting engines work in the yard during a 24-hour period? Have the traffic staff got any complaints against the yard pilot? Are the pilots of adequate power and are the facilities for taking their loco requirements adequate? Examine the possibility of reducing shunting engine hours.

(xix) What is the strength of skid porters employed in the yard? Check up the number of skids available. Is the number adequate and are they in a serviceable condition?

(m) Additional instructions applicable to inspection of control offices:

(i) Test audibility of Control phone on all control boards.

(ii) Check the frequency of control failures. Speak to Station Masters on sections where failure is most frequent to find out if they have anything to say.

(iii) Ask Controllers if they have any comments to make on the working of any particular Station Master. Speak to the concerned Station Master.

(iv) Check control records, particularly :

1. Check Dy. Controllers' diaries - whether entries are carried forward and suitable action is taken.
2. Receipts of special type stocks being maintained.
3. Records of interchange at foreign railway junctions. Are messages from interchange points regularly received?
4. Register of damaged wagons detached at road side stations. Whether suitable action is taken by Controllers for expeditious clearance of such wagons.
5. Register with regard to detention to trains at watering stations. Whether at any watering station there is recurring detention to trains taking more than the required time. whether this matter has been reported to the concerned Headquarter. Speak to such watering stations and find out the nature of difficulty.
6. Checkup if Power Controller is maintaining the engine turn round register properly. Discuss with Power Controller if heavy terminal detentions to engines occur in any traffic yard specially.

(v) Checkup train arrangements for the last two or three days and see if the train arrangements once made are altered frequently.

(vi) Checkup Control charts for the last few days and see if detentions and cases of bad controlling have been taken up.

(vii) Ask Controllers if any special facility like crossing stations, additional loops etc. on any section or station will improve operations and speeds of trains.

(viii) Ask Control staff if they have any difficulties regarding leave, rest, etc.

CHAPTER-7
WORKING OF TRAINS (GENERAL) AND MARSHALLING

7001: No person shall drive a train unless he is in possession of a valid certificate of competency issued by an authorized officer.

No Loco Pilot, Assistant Loco Pilot or loco pilot of any self-propelled vehicle shall be booked to work a train or to drive a vehicle until he has learnt the road and given a declaration that he is fully acquainted with it.

For this purpose, he will be booked to work three round trips on each section, including one during night, before being put to work the train/ vehicle independently.

7002: Learning road by Loco Pilot/Assistant Loco Pilot - (S.R. 3.78/5)

No Loco Pilot or shunter passed Loco Pilot and/or Asstt. Loco pilot and in the case of electric traction only, an Asstt. Loco Pilot as well, may be sent out working a train until he has thoroughly learnt the road and signed a certificate that he is fully acquainted with it. For this purpose they should be given three round trips before they are put to work independently.

A Loco Pilot or a shunter passed Loco Pilot or an Assistant Loco Pilot or leading Asstt. Loco pilot, who has become unfamiliar with the road due to an absence of over 3 months or more from the section concerned, should not be allowed to work a train until he has again learnt the road and furnished a certificate that he is fully acquainted with the same. For this purpose he should be given road learning trips as per schedule given below to refresh his knowledge of the road.

Duration of Absence	**No. of trips**	
Over 3 months	During Day	During Night
Over 1 year	1	1
	2	1

If a Loco Pilot reports to Sr Loco Inspector/Loco Foreman 4rth trip may be allowed by Traction Foreman for not learning the road fully.

In case of Loco Pilots only, the SSE Loco/SSE Loco Shed/SSE Traction of the Section/Shed will test their knowledge and sign on the certificate confirming that the Loco Pilot is fully acquainted with all the signals and terrain of the section on which he is required to work.

Note: The road learning trips should include at least one round trip in the night hours between 22.00 and 06.00 hours. When only one round trip is permitted, then road learning trip on at least one side must be made in night hours between 22.00 and 06.00 hours.

7003: Brake System: To control speed of trains, four types of braking systems are in use-

1 Mechanical as Handbrake
2 Hydraulic, which is used in Automobile Engines (DSL Engine)
3 Electric, as Dynamic braking system (Electric Engine)
4 Pneumatic, which is of two types
   (a) Vacuum Brake System
   (b) Air Brake System

1. Automatic Vacuum Brake:

Principles:

(a) This brake obtains its power from atmospheric pressure, which is the pressure exerted by air against a body from one side of which air has been withdrawn either in part or in whole.

(b) Atmospheric pressure, which is 14.7 lbs.per square inch at sea level, progressively decreases on higher altitudes for the purpose of the Automatic Vacuum Brake, however, atmospheric pressure is roughly taken as 15 lbs. per square inch.

(c) This brake stops the train by the application of the brake blocks to the wheels tyre just as is done with the ordinary hand brake, but the power which operates the brake is derived from the pressure of the atmosphere acting on one side of a piston in a cylinder, against a partial vacuum on the other.

2. Description of air-brake system:

(A) General:

(i) Diesel/Electric locos equipped with pure air brake or dual brake system shall be used for operation of air braked passenger/goods train. The coaching stock is fitted with graduated release twin pipe air brake system, while goods stock is worked on single pipe (Brake pipe) system. BCNHL wagons have, however, been provided with twin pipe arrangements.

(ii) The main equipments fitted in this system are :
Distributor valve, Brake cylinders, Check valve, Dirt collector, Isolating and Angle cocks, Auxiliary and Control Reservoirs and Passenger Emergency Alarm Valve. Except for the passenger emergency alarm signal device, all other items are mounted on the under frame. The brake pipe and feed pipe are painted in green and white colour, respectively. While the brake pipe controls the application and release of Brakes, the feed pipe continuously refills the auxiliary reservoirs with charged air, which makes it possible to obtain shorter release timing and complete inexhaustibility of the brake system.

(B) Working of the air-Brake system:

(i) **Charging:**

The brake pipe is charged to 5 kg. /Cm^2 by the Loco Pilot's automatic brake valve (A-9) in the locomotive. The auxiliary reservoir is charged by the Feed pipe, which is set at 6 kg. /Cm^2 through a check valve. The Brake cylinder is connected through an exhaust port in the Distributor valve when Brakes are in the released condition.

(ii) **Application**:

To apply Brakes, the Loco Pilot moves the automatic Brake Valve (A-9) handle which causes reduction in Brake pipe pressure. Since the movement of the Brake valve handle is for graduated applications (or in one stroke for emergency application), the intensity of the braking is in proportion to the degree of movement of the valve. The brake pipe pressure is reduced and the pressure differential is sensed by the distributor valve. Air from the auxiliary reservoir flows into the Brake cylinder and Brakes get applied.

(iii) **Release:**

At the time of release, the air in the Brake cylinder is vented progressively depending upon the increase in Brake pipe pressure. When the Brake pipe pressure reaches 4.8 kg./Cm^2 the Brake cylinder is completely exhausted and the Brakes are fully released.

(iv) **Automatic air Brake valve (A-9):** This valve is self-tapping valve with five positions:

(a) **Release**: In this position, the brake pipe is fully charged to 5Kg. /Cm^2 and the train brakes are released.

(b) **Minimum Application:** This position provides a reduction of Brake pipe pressure by 0.22kg/Cm^2 to 0.50Kg./Cm^2.

(c) **Full service application:** In this position the Brake pipe pressure is reduced by 1.6 Kg. / Cm^2 to 1.8 Kg./ Cm^2.

(d) **Over-reduction:** In this position, the brake pipe pressure is reduced by 2.5 to 2.6 Kg/ Cm^2.

(e) **Emergency application:** In this position, the brake pipe pressure is discharged/ reduced abruptly to zero.

(C) Twin-pipe colour coding:

Feed pipe (FP) - Painted white

Brake pipe (BP) - Painted Green

(D) Continuity of Brake pipe pressure:

BP and FP hoses of locomotive are to be coupled to BP and FP hoses of the train load. Any misconnection of BP and FP anywhere on the rake can lead to Brake failure. It should be clearly understood that the coaches/wagons are provided with air brakes and there may not be any vacuum pipes running along the length of the train.

The angle cocks in the BP and FP of all the coaches or, in case of goods trains, that of BP (except those at the trailing end of the last vehicle) should be kept in the open position i.e. parallel to FP/BP pipe to ensure continuity from the Locomotive to the last vehicle. Closure i.e. perpendicular to FP/BP pipe of any BP angle cock would result in Zero Brake power in the rear of it. Closed angle cock of the BP would, therefore, result in a disastrous situation during operation of the train and utmost care is, therefore, required to be exercised to ensure continuity of the Brake pipe pressure.

7004: INSTRUCTIONS FOR OPERATING STAFF AND LOCO PILOTS:

(i) Operating staff shall follow the instructions covered in operating instructions for Loco Pilots issued for different types of diesel and Electric locomotives. In addition, the following instructions should be given wide publicity amongst the Loco Pilots operating these trains. It must be ensured that these instructions have been clearly understood by the Loco Pilots.

(ii) Crew specially trained for handling air-braked trains should only operate single/double headed air-braked trains. The crew should be thoroughly drilled on the precautions required to be taken by them.

(iii) During the initial 3 to 6 months period of running the single/ double headed air-braked trains, the Loco Pilot's performance should be continuously monitored either at the senior inspectorial level or at the officers level in order to ensure that Loco Pilots have been properly educated and that they are following strictly all the instructions laid down for them.

(iv) The instructions required to be followed by the Loco Pilot should be suitably stencilled in the locomotive cabin and the Loco Pilots should be asked to sign a register in token of having understood these instructions before being allowed to drive the single/double headed air braked trains.

(v) The load/Amp meter of diesel and electric locomotives shall be marked with a red line at a particular reading on the scale, depending upon the type of the loco and the number of locos used for hauling such trains to indicate that the Loco Pilot shall not exceed the current valves while operating the air brake trains.

(vi) On locos equipped with dynamic brakes, it shall be kept in good working

order and should be used for controlling train speed.

(vii) It would also be necessary to ensure that the proportionate air brake for the locomotives are in good working order so that whenever the automatic brake application is made, the locomotives are braked proportionately to the air brakes applied on the train. This would avoid any severe jerks on the coupling of the vehicles.

(viii) During full service/emergency brake application, high coupler forces have been observed, if Loco Pilot puts the SA-9/A-9 valve in release position before the train has actually come to a stop.

These forces are particularly higher when this valve is put to release position while the train still has a speed of 15 kmph and above. This occurs because the locomotive brakes get released before the release of train brakes. This results in a situation when the unbraked mass of the loco(s) is pulling the trains ahead and the braked mass of the full train is pulling the locomotive. In order to avoid such a situation and to reduce draw bar forces during breaking, it is necessary that the locomotive brakes are in applied position when the train comes to a halt. To achieve this, the Loco Pilot should apply the locomotive independent brakes after having moved the automatic brake application valve to release position before the train comes to a halt.

(ix) The operating staff/Loco Pilot should be drilled towards ensuring that the loco Transition couplings are fully tightened before train departure. Also it should be ensured that before tightening the coupling, the rotating handle is in the central position so as to take full advantage of the designed travel of the coupling. These precautions would obviate the problems of gap between side buffers of the loco and the adjacent coaching stock.

(x) It may be ensured that the Brake pipe and Feed Pipe pressures in the locomotives are 5+0.1Kg./ Cm^2 and 6+0.1 kg/Cm^2, respectively, before BP and FP are connected to the corresponding pipes of the train. After coupling BP and FP of the locomotive with respective pipes of the first vehicle, the angle cocks of these two pipes of the locomotive and the first vehicle should be opened.

(xi) After emergency application, if the driver wants to restart the train he must wait for at least one minute after moving his brake valve handle to release position to permit full release of brakes. This would avoid high stresses being developed in front couplings during restarting.

(xii) Loco Pilot should keep close watch on the Air-flow indicator gauge and set the fixed needle on the indicator coinciding with the movable needle after the air-brake system on the train is fully charged. In case during the run or at halts, the movable needle shows a higher reading than the

pre-set fixed needle, it would indicate either alarm chain pulling or train parting or Guard van valve operation or the train brake not fully released or heavy leakage in the Brake pipe. In case the movable needle shows lower reading than the preset fixed needle, there are chances of any of the brake pipe angle cocks in the train either not in fully open position or in closed position. In case of parting of locos and train or alarm chain pulling, indication light through the flow indicator would also come ON.

(xiii) In case of parting between locomotives or train parting, driver should move his automatic brake valve handle to emergency position after ensuring stoppage of rear position to stop further depletion of main reservoir air through the open brake pipe.

(xiv) Loco Pilot shall ensure that the Audio visual system provided in the locomotive is in good working order.

(xv) After the locomotive is attached to the train and before the issue of brake power certificate (MV- 5), the functioning of the alarm chain equipment on a few coaches must be checked and necessary endorsement made in the MV-5 signed jointly by the JE/SE (C&W), Loco Pilot and Guard.

(xvi) Revised MV-5 certificate applicable to the air-braked stock is detailed in further paras.

7005: Loco failure:

(i) In case of failure of locomotive (Diesel or Electric) or OHE Tripping in Electrified route on a gradient section, the Loco Pilot must apply train and locomotive brakes immediately to avoid rolling back of train. Since the main reservoir pressure can discharge at the rate of 0.6 kg./Cm2 per minute, a little delay in application of brakes may cause a serious accident due to rolling down.

(ii) During double headed operation, if the rear loco fails, the train is to be worked by the leading loco and the Block section cleared. If the load can't be cleared by one loco, assistance is to be given by any loco, preferably from rear, only for the purpose of clearing the Block section. But when the block section is being cleared by a vacuum braked loco, the Driver has to be extra cautious to stop the train at the stop signal.

(iii) During double headed operation, if the leading loco fails, the train must be stopped. The isolating cock in the BP charging line and MU-2B valve of the rear loco are to be put in normal position in order to feed the BP pressure to the load and for the application of brakes from the rear loco to clear the Block section.

(iv) In the event of non-availability of a loco fitted with air brakes, the brakes of the entire rake have to be released and a vacuum braked loco can be attached to clear the block section at a restricted speed not exceeding 15 kmph.

7006: SPECIAL INSTRUCTIONS FOR GUARDS:

(i) Before the Guard gives the green signal to start to the Loco Pilot , he should ensure that the gauges in his Brake van show a pressure of not less than 4.8 kg./ Cm^2 and not more than 5.0 kg/ Cm^2 of Brake Pipe and not less than 5.8 kg/ Cm^2 and not more than 6.0 kg/ Cm^2 in the Feed Pipe.

(ii) Before commencement of train journey, the Guard should conduct a check by operating the van-valve provided in the Brake van and confirm with Loco Pilot that operation of the Guard's van valve gives the Loco Pilot an indication on the flow meter. He should also sign MV-5 as mentioned in para 7004 (xv).

(iii) He should ensure that the angle cocks of feed and brake pipes of the trailing end of the last vehicle are in closed position and hose couplings are kept on the dummy carrier.

(iv) The Guard should normally not use his van valve for stopping the train except in emergency. He should make use of the telephone equipment, if provided between him and the Loco Pilot or available means of communication with him. In case the same is not provided, Guard shall apply brakes through van valve when required.

7007: Attaching of vehicles not fitted with Air Brake to Coaching trains:

(a) Mail/Express and passenger trains on this Railway are being worked with vacuum as well as air brake systems. In case trains are fitted with air brakes, not more than one brake piped vehicles (vehicles fitted with only brake pipe and not with Distributor valve, Brake cylinder, Brake rigging etc.) may be attached in a passenger train duly protected by one or more vehicles fitted with working air brakes attached in rear of it.

(b) No goods vehicle fitted with brake pipe only is permitted to be attached to a coaching train.

7008: Blanking off Air Brake Distributor valve:

When an air brake distributor valve or its brake cylinder on a vehicle is out of order, the distributor valve and brake cylinder must be put out of action. The brakes of individual wagons can be isolated by shutting off the isolating cock. This isolating cock is fitted either with distributor valve itself or on the branch pipe connecting from brake pipe to the distributor valve.

7009: The gauges on the engine and in the Guard's van, when the train pipe is continuous, should indicate the air pressure available, by reduction of which the train can be stopped. The brake pipe gauges should not indicate less than the following pressures.

	Engine Gauge	**Brake van Gauge**
Mail/Exp/Pass trains.	5kg. / Cm^2	4.9 kg./ Cm^2
Good strains	5kg. / Cm^2	4.8 kg./ Cm^2

Air pressure of 5kg./ Cm^2 is not necessary as such but the Air Brake combination in the engine (A-9 valve) should be so adjusted that the pressure charged in the brake pipes is not more than 5kg./ Cm^2 as otherwise the brake binding trouble is likely to be experienced.

Note: Above readings hold good for Ghat sections as well.

7010: Air pressure for Ghat section:

(i) In addition to the specification on air pressure requirements and all other instructions laid down for goods train in the foregoing paras, it should be further ensured that a minimum of 90% of total number of cylinders are fully operative on a train on ghat section.

(ii) If the requisite brake power as explained in the preceding para is not available or if the Loco Pilot has any doubt as to the availability of sufficient brake power, adequate number of hand brakes should be pinned down to ensure effective control on a train on a falling gradient.

NORTH CENTRAL RAILWAY

Annexure-I

MV-5

BRAKE POWER CERTIFICATE OF AIR BRAKED STOCK

Train No. Dated:
Loco No.
Time loco on load…….
Load….
Time air pressure ready
No. of brake cylinders ……..
Operative (to be checked after locomotive is attached).

	Loco	B/Van
BP Pressure	……	……
FP pressure	……	……

BP pressure after emergency application from loco

(i) We jointly certify that pressure in BP gauge in B/Van after emergency application dropped below 1 kg/Sq.cm. and came up to the initial pressure after……..seconds when brakes were released.

(ii) We also certify that the angle cocks of the brake pipe and feed pipes connecting the locomotive trailing end to the last vehicle are in the open condition.

(iii) Incase of passenger trains, the Alarm chain was tested from Coach No …….. The Audio visual indication of the loco motive was in working order.

(iv) We certify that the BP and FP leakage rate of the train has been checked and is within 0.25 kg/ Cm^2 per minute.

Sig.of Guard Sig. of Loco Pilot Sig. of JE/SE/SSE/(C&W)

N.B.: 1. This certificate is required to be issued by the JE/SE/SSE (C&W) at the starting station and also en-route in the event of any attachment/ detachment.

In case JE/SE/SSE (C&W) is not available at the station where attachment/detachment has been done, the Guard should prepare fresh certificate as per SR 4.31/1 and sign jointly with the Loco Pilot. Loco Pilot should retain one copy of the certificate.

2. The certificate should be made in 3 copies. One copy to be retained by the JE/SE/SSE (C&W) and others given to the Loco Pilot and Guard.

EXAMINATION AND CARE OF STOCK

7011: Examination of Trains:

Each train shall be examined by a competent person from the C&W/ electrical maintenance department before being offered for passenger, goods or any other service.

The purpose of the examination is to ensure that all functions of the train and its constituent carriages/wagons etc are working correctly, particularly safety devices including brake systems, passenger alarm etc to be listed by competent authority.

The competent staff shall sign a certificate of safety test indicating duration of its validity.

7012: PRIMARY AND SECONDARY MAINTENANCE OF PASSENGER RAKES:

(a) POH and other scheduled maintenance of coaches has to be undertaken by the Owning Railways. While POH is carried out in Workshop, other scheduled repairs are carried out at Primary Maintenance Depots, which are located near important Passenger Terminals. The Rakes of Mail, Express and Passenger trains are accordingly allotted to Railways concerned for such scheduled maintenance. Primary Maintenance of a rake is thus undertaken by the Railway to which that rake belongs. During the Primary Maintenance, all scheduled repairs like repacking of axle boxes, cylinder overhauling, elapsed valve tasting, Water Tank washout etc. are carried out on periodic basis. Other necessary repairs and normal 'safe to run' examinations are also carried out during the Primary Maintenance. Deficiencies in various internal fitting and Train Lighting Equipment etc. are made good and the rake is properly washed and cleaned. The test of the coaches having been attended properly during the primary maintenance is that no coach should be marked sick before it comes back to the Primary Maintenance Depot after having made a complete round trip.

(b) Secondary maintenance is undertaken at the terminal other than the Primary Maintenance one. Only minor repairs, safe to run examination and cleaning of rake is undertaken during the Secondary Maintenance. Only about one third staff is required for Secondary maintenance as compared to Primary Maintenance.

7013: Examination of trains before starting:

(a) The station or Yard Master at all coaching and goods primary maintenance stations must not give permission to start any train originating from and marshalled at those stations until they have received report on Form T/431 (Part-C) from the Train Examiner to the effect that the train is fit to proceed. In order to obtain this certificate

from the Train Examiner, SM/YM will issue Part-'B' & 'C' of Form T/431 to the Train Examiner, who will, after examining the train, return Part-C to the Station Master/YM. He will retain Part-B of the form as his record. The SM will attach Part-C of the form to the corresponding counter foil Part-A.

7014: Cleaning of passenger carriages:

(a) The cleaning and washing of carriages is normally done at train examining stations.

(b) At stations where no train examining staff is provided, it shall be the duty of the Station Master or any other official specifically nominated by the Divisional Railway Manager to examine, at least once daily, the passenger vehicles in the yard and see that they are swept and dusted, that wash-basins and commodes are cleaned, that all fittings are intact and in working order and that doors, windows and shutters are closed.

(c) Head Train Examiners are responsible to see that all coaching vehicles attached to trains from their respective stations, are properly cleaned. In the event of any vehicle being attached from a station where no train examiner is posted, it shall be the duty of the Station Master to see that the carriages have been properly cleaned.

(d) Special cleaning service staff provided at important junction stations should attend to all stopping trains in their uniforms and clean all compartments of all the carriages. Train duty train Examiners must ensure that all carriages receive proper attention. At station where there is no Train Examiner, the Station Master shall be responsible to see to this work.

(e) At all train starting stations, the Train Examiner on train duty shall be responsible to ensure that carriages are fit for occupation in all respects.

7015: Protection of train examining staff when examining a train:

(a) The train examining staff, while examining a train, must protect themselves by red flags in the day time and red lights at night. These signals may only be removed by the train examining staff themselves and their removal will indicate that the examination of the train is complete. The train examiner will then report the condition of the train to the Station Master.

(b) Wherever conditions rendered, in such a case, the Divisional Railway Managers shall issue standing instructions (to be also included in Station Working Rules) for points to be clamped & locked against a line which is occupied by a train undergoing examination by staff of the carriage and wagon department. This rule has particular references to Goods Yards where points are worked independently.

(c) The clamping and locking of points shall be done by the Yard staff and

when sending out intimation to the train examiner concerned, the fact that this has been done, shall be stated on the relevant foil of this form (T/431) and the key (or keys) shall be made over to the train examiner who shall retain it (or them) till the examination is completed.

(d) At train originating stations where box wagons are examined by the train examining staff, the train Examiner on duty should personally ensure that the empty/loaded boxes are correctly set according to whether the wagon is empty or loaded. At other stations commercial staff/guard will ensure regarding this.

(e) Protection of Platform lines where passenger trains are attended during Train passing:

(i) As soon as a train arrives at a platform, one red warning board of mild steel shall be placed on the platform by the side of the locomotive as well as the Guards.

(ii) These boards shall indicate that the C&W staff is on work on the particular train. These boards shall be removed only after the C&W staff has completed the work.

(iii) The time of placement and removal of these boards shall be recorded in a register maintained for this purpose. Reasons for delayed removal shall be specifically recorded.

(iv) Both the boards should be placed in such a position that these are clearly visible to the Guard and Loco Pilot of the train.

7016: EXAMINATION OF HIGH OFFICIAL'S CARRIAGES:

(a) Before any carriages, which are to be used by any high official, are dispatched from their headquarters station, they must be jointly inspected by the Station Master and the SSE (C&W), who shall be held personally responsible for their conditions.

(b) If these carriages are to be handed over unoccupied to a foreign line, they must be examined jointly by the Station Master and the SSE (C&W) of the station at which they are handed over, in order to ensure that all the fittings are intact and the carriages are perfectly clean.

7017: Examination of military and special trains: These must be examined before starting as well as after arrival. The Train Examiner of the starting station or of the nearest train examining station must, on receiving a request from the Station Master of the starting station, prepare a list of deficiencies and damages in quadruplicate. One copy of this is to be given to the Guard-in-charge and another to the Officer-in-charge of the Military train or to the person who ordered the special, as the case may be. Similar examination must be carried out at the terminal station and the deficiencies or damages compared with those entered in the original list should be recorded. If any new deficiencies or damages are found, these shall be listed separately by

the Train Examiner and countersigned by the Station Master. The cost of these additional deficiencies and damages shall be assessed according to the schedule of charges given in Appendix 'D' of the Rules and Rates for the Carriage of Government Traffic and recovered on the spot from the Officer Commanding of the Military train or the person who ordered the special as the case may be.

7018: Care of stabled carriages:

(a) Train Examiners are responsible to ensure that doors, windows, and water tank covers of unoccupied carriages are closed and the train lighting staff must ensure that the lights and fans of such stock are switched off.

(b) Train Examiners are responsible to see that the shutters and windows of all carriages are, on their arrival at terminating station or after maintenance attention has been given to them, fastened from inside and their doors locked. At stations where no train examining staff is provided, it shall be the duty of the Station Master to see that this is done. R.P.F. staff must keep a regular watch on all stock stabled in the Yard.

7019: Leaky Wagons:

(a) Leaky wagons should not be loaded with goods damageable by water. If goods that can be loaded without risk in a leaky wagon are not available, the wagon must be worked empty to the nearest train-examining station for repairs, and a suitable remark endorsed against the entry of the wagon in the relevant vehicle guidance.

(b) In case goods not damageable by water are available for loading into a leaky wagon, the wagon should be loaded and dispatched to its destination in the normal way but the vehicle guidance of the train by which the wagon is dispatched must bear a remark to the effect that the wagon must be sent for repairs after being unloaded.

7020: Periodical Overhaul:

(a) It shall consist of thorough examination of all parts of a wagon and its gear and the execution of such repairs as may be necessary to enable the wagon to run for the full period until the next periodical overhaul with full painting and lettering.

(b) "Return" - All wagons are stencilled with the word "Return' followed by the month and year. It indicates that the wagon is required by the owning railway during the month of the year stencilled on the sides of the wagon for periodical overhaul (POH) in order to keep it fit for moving and in good condition.

(c) "Due Overhaul" – The wagon becomes due overhaul during the month of the year indicated by date of return.

(d) "Overdue overhaul" or "Time-expired"– The wagon becomes overdue or time-expired after the expiry of the last date of the month of the year shown in the "Return' date.

(e) Disposal of due overhaul and Overdue overhaul wagons. The following instructions should be observed:

(i) Local - If load offers, these must be loaded to or in the direction of workshops. If no load offers, these must be sent empty to workshops.

(ii) Foreign - If load offers, due overhaul wagons should preferably be loaded to or in the direction of the owning railway. Time-expired wagons when loaded, subject to the exemptions as shown in sub-para (f) below, are not accepted in interchange. Non- observance of this restriction involves transshipment at the point of interchange or elsewhere.

(f) The month and year in which the owning railway requires a wagon to be returned to it for periodical examination are stencilled in 102 mm (4") letters on the side panel. Thus, if a wagon is stencilled 'Return 10/2020' it becomes due overhaul on 01.11.2020 and should be returned by the end of October 2020 to its parent railway.

(g) **Fruit vans and Parcel Van:** No fruit van/parcel van overdue periodical overhaul is allowed to run by mail/express train. These should be sent to shops as per "Return" marked on the coach.

7021: SUMO Rakes:

The carrying capacity of BOXN wagons on Coal and Iron Ore Circuits is increased to CC+6 and CC+8, respectively, with additional tolerances of 2 tones per wagon. Also, it has been decided to permit running of BCN, BCNA, BCNAHS and BOST wagons with CC+6 tones. General Operating Instructions subject to local conditions are as under:

- Hence forth these rakes with nomenclature as SUMO, as a thumb rule all Coal, Iron ore, Dolomite, Lime stone, Gypsum carrying trains will be treated as Heavy trains on notified routes.
- Originating Station Master shall designate the train accordingly and all concerned, like section controller, next notified stations shall be intimated.
- A memo to be served to guard and loco pilot by the originating station manager to be tagged to Brake Power Certificate & Vehicle Guidance (BPC & VG), about higher pay load, advising them to be vigilant about special Cautions to be observed enroute in view of higher payload.
- Such rakes shall have specific colour vehicle guidance.
- Simultaneously, the section controller shall make identifiable/ specific entry in the Chart.

- Caution boards shall be displayed at crew lobbies as well as notified stations, prominently depicting caution orders based on rail densities as under for these heavy trains :
  30 KMPH on 90R Track
  60 KMPH on 52 Kg and 72 UTS Track
  75 KMPH on 52 Kg and 90 UTS Track
  No speed restriction on 60 Kg UTS Track
  (Accordingly, in consultation with Engineering Department, sectional speeds shall be notified to all concerned through Working Time Table as permanent Caution.)
- Train ordering shall be done for SUMO with advance notice to crew as a precaution.
- Based on higher carrying capacity, special colour code will be followed in FOIS for such trains, preferably green colour. A separate field with flag will be created for further statistical data retrievement.
- Based on the above general instructions, local specific guidelines shall be given by Zonal Railways.
- Care shall be taken in exigencies when these trains are diverted on alternate routes, to follow above general guidelines as well as Zone specific operating instructions.

7022: Premium Rakes:

1. Premium rakes will be formed out of air brake stock open wagons (BOXN, BOXNHA BOXNHS) or covered wagons (BCN, BCNA & BCNAHS)
2. Premium rakes will be intensively examined in empty condition and certified by examination points nominated by PCOM & PCME. Such premium examination points should either be 'A' category already or should be upgraded to 'A' category on priority. If any of the conditions i.e. examination in empty condition or examination at nominated points is not satisfied, the rake will not be certified as Premium rake and will operate as normal end to end rake.
3. Brake power certificate validity for such Premium rakes will be valid for 12+3 days from the date of issue. During this validity of 12 days period, the rakes will be allowed multiple loading/ unloading. Rakes will be turned out with minimum 95% brake power.
4. After each loading/unloading the rake will be examined by loco pilot & guard before commencement of journey and observations will be recorded under the relevant columns of the brake power certificate.
5. After the lapse of 12 days' validity, the rake should be offered for next premium examination point in the direction of movement. To avoid examination in loading condition, a grace period of 3 days be permitted, however, after expiry of the grace period i.e. after a lapse of 15 days from

the issue of BPC, even a loaded premium rake shall be offered for examination at the first Train examination point in the direction of movement. Further, in no case, premium rake shall be offered for loading through bypass routes or through yards which are not nominated for premium examination. After examination the rake will be certified as premium rake subject to fulfillment of the above mentioned conditions, otherwise it will be run as conventional end to end rake.

6. Movement of end to end rakes will be monitored through FOIS by Traffic and Mechanical departments.

Examination Points already nominated & Additional Points nominated for Premium End To End Rake Examination.

Sl.	**Rly**	**Points already nominated**		**Additional Points nominated**	
		By Board	**By Zonal Railways**	**From 20.4.2007**	**From 1.6.2007**
1.	CR	BSL,DD		WADI	AQ
2.	ECoR	OEC,RMUY	R&D VSKP	R-Yd VSKP, D-Yd VSKP PRDP,TIG,FPY-VSKP	KUR
3.	ECR	MGS, NRPA			
4.	ER	UDL, NH	MLDT, PKR, DSEY,CP		
5.	NCR	JHS,GMC			
6.	NE	GD			
7.	NF	NJP,NGC	NTSK, NBQ		
8.	NR	UMB,KJGY, TKD		BTI,LDH, JUC, LKO, GZB	
9.	NWR	MD			
10.	SC	GY,RDM,BZA		BPA	SNF, COA
11.	SE	NMP, BNDM, BKSC, ADTP		BNDM Dep-Yd	PDPK,HLZ, BJE, ADRA, DPS
12.	SECR	BIA Ex Yd, BIAPP Yd, BSP, KRBA	DGG, BMY		NAV,MNGT, Arsikere
13.	SR	JTJ,TNPM, ED		MVN,TEN	PTJ,KNKD
14.	SWR	HPT,BYPL	SGT		

15.	WCR	NKJ,KTT	STA	ET	
16.	WR	BRC,GIM, HXP, RTM, SBI	KRCA		
IR		40	12	25	14

7023: TERMINAL / SAFE TO RUN EXAMINATION:

- Terminal/Safe to Run Examination is conducted Post loading/ after unloading.
- No detachment of wagons is permitted during such examination unless safety is adversely affected.
- Terminal/Safe to Run Examination shall comprise of the following activities:
  - Ensuring Integrity/Completeness of Rake.
  - Brake Continuity test.
  - Securing Brake / Buffing / Draft / Suspension Gears.
  - Ensuring Adequate Brake Power.
  - Revalidation of Brake Power Certificate.

7024: STANDARDISATION OF BRAKE POWER CERTIFICATE:

Railway Board has modified the existing BPC format. The divisions of NCR must ensure that BPCs are issued as per modified formats on specified Proforma printed on papers of specified colour codes: Pink for vacuum, Green for air brake, end to end/ Premium and Yellow for close circuit rakes. If integrity/Completeness of rake is found broken (when ten or more four wheeler units/four bogie wagons are changed from the composition of the rake)

(a) If the empty examined rake (other than AB stock) does not reach the loading point within 4 days of the issue of BPC.
(b) If the destination point is not mentioned on the BPC of the loaded rake.
(c) If the Closed Circuit Rake is not running in the pre-defined close circuit as mentioned on the BPC.
(d) If the Closed Circuit Rake is running beyond 6000 Kms.
(e) After 15 days from the date of issue of BPC of a close circuit rake, if correct logging of kilometrage has not been done on the BPC.

7025: Classification of Trains:

Trains are either scheduled as shown in the Working Time Table or nonscheduled trains and are run on the following account:

Traffic Account:

(a) Mail/Express/Passenger Trains
(b) Commuter trains EMU/DMU/for Suburban, regional passengers.

(c) Military Specials including troop trains.
(d) Parcel trains for carriage of coaching traffic only.
(e) Goods trains for movement of conventional freight cargo
(f) Container Trains.
(g) Mixed trains carrying both passengers and goods
(h) Other trains to include Exhibition Trains, Mobile Hospital on wheels etc.

(i) **Engineering Account**
  (a) Ultrasonic and other track testing trains:
  (b) Material trains.
  (c) Track maintenance trains like Tie Tamping Machines, Rail grinding trains PQRS, BCM, DGS etc.
  (d) Wiring Special / Tower wagons.

(j) **Miscellaneous Account:**
  (a) Staff shuttles.
  (b) Water specials.
  (c) Workmen's specials.
  (d) Accident Relief Train (ARTs)
  (e) Accident Relief Medical Equipment (ARMEs).
  (f) Crane Specials.

7026: Train Ordering: Scheduled passenger trains do not require train ordering. Train advice is necessary only when these are required to be cancelled, put back or there is any change in the schedule shown in the Public/Working Time Table.

In case of unscheduled trains, train advice should be issued.

Trains are ordered by Chief Controller (CHC) in coordination with the Power Control/Traction Control and/or Lobby Supervisor.

7027: Train Preparation:

The time at which a train is required to be in readiness in all respects for departure from the starting station will be laid down by the Divisional Railway Manager/Sr. DOM.

In case of passenger trains, the rake duly examined and fit in all respects with full complement of coaches (at least to meet reservation requirements fully) should be placed on the platform well in time to allow all pre departure functions to be completed.

These include-

- Loading of mails, booked luggage and parcels
- Loading of linen
- Pantry car provisions
- Watering
- Cooling of AC coaches

- Display of reservation charts
- Deployment of train staff
- Attaching of locomotive

In order to facilitate boarding of passengers, generally an important long distance passenger train should be placed on the platform 30 minutes/15 minutes before its scheduled departure, depending upon the terminal layout. Every Loco pilot of a train while starting from the starting station must verify adequacy of brake power, as certified in the train examination document. In addition, he must conduct a "feel test" to ensure that train brakes respond to brake application. In case of failure, he will report to the control and bring his train to a stop as directed by the Control. The train shall move only after the defect has been rectified.

7028: Details of Brake Power:

S NO	Type of train	Validity	Brake power %		Conditions for invalid BPC & other instruction
			Originating station	En-route station	
1	Ordinary end to end rakes, vacuum brake rake, Air brake rake other than Premium	Examination-loading-unloading -Examination i.e., one time loading	85-Vacuum brake stock; 90-Air Brake stock	75	The BPC will become invalid, if- 1) No destination is mentioned on the BPC of loaded train 2) Empty rake does not reach loading point within 04 days (for vacuum brake stock) 3) Train composition is changed by 10FWUs or four08 wheeled wagons or more 4) Train is stabled more than 24 hours in examination yard.
2	Premium rakes BOXN, BCN, BRN, BOBRN, etc.	12 days for multiple loading. i.e. loading to be done within 12 days +3 days grace period in loaded condition.	Minimum 95	Not mentioned	The BPC will become invalid , if- 1. Rake integrity is disturbed by more than four 08 wheeled wagons 2. Train is stabled more than 24 hours in examination yard Instructions for Premium End to End rakes; 1. After lapse of 12 days, rake to be offered for examination at the first nominated intensive examination point in the direction of movement. 2. After lapse of 15 days, rake, either empty or loaded, shall be offered for examination at the first examination point in the direction of movement. 3. Premium BPC shall be issued from the nominated "A" category depot.

					4. Normal End to End BPC shall be issued if the rake is not offered for examination in empty condition or at nominated "A" category examination point. 5. After each loading/unloading, the rake shall be subjected to GDR check
3	Closed circuit rakes only air brake stock	Premium CC rake - 7500 kms /35 days, whichever is earlier, or 6000 kms /30 days, whichever is earlier (some railways have CC rakes of 6000 kms/ 30 days. C Rly does not have such rakes)	100	90	The BPC will become invalid , if- 1) Rake is not running in nominated circuit. 2) Rake is stabled more than 4 hours at examination Stn. 3) Rake has completed either stipulated kms or days. 4) More than 4 wagons are replaced between two periodical maintenance examinations ie. PME Instructions for Premium CC Rake; 5) Rake shall be offered at its nominated "A" category base depot. 6) Rake shall be formed off POH/ROH wagons only. 7) After each loading/unloading, the rake shall be subjected to GDR CHECK. 8) BPC shall be revalidated by C&W staff wherever TXR staff is provided. 9) Wagons to be attached shall be good examined wagons.
4	Container rakes BLCA+BLCB	6000 kms./30 days Circuits- TKD-JNPT-DADRI/TKD-JNPT/TKD/ AQ depot run on free circuit basis	100	90	The BPC will become invalid if: Rake has completed either Stipulated Kms. Or days. 2) Rake is not running in nominated circuit Instructions for Container rakes: Rake integrity is to be maintained Revalidation of BPC by TXR staff after every unloading/loading. Rake shall be formed from New wagons or Off POH/ROH wagons. Utilisation of wagons in 6000 kms. Rake – New wagons up to 12 months/Off POH/ROH wagons up to 09 months.

MARSHALLING

7029: Marshalling:

Marshalling is attaching of vehicles on a train in a predetermined manner to ensure train safety, provide operational expediency and to maximize customer's convenience.

7030: Marshalling of Mail/ Express/ Passenger Trains: The general principles kept in view while marshalling are:

(i) Position of upper class coaches, ladies compartment, dining car, in respect of easy accessibility.

(ii) Normally the dining cars or the catering compartments, air-conditioned and upper class coaches, shall be marshalled in the middle of the train or as near to it as possible and ladies compartment will be near Guard's SLR.

(iii) Non-passenger carrying stock shall preferably be marshalled next to the engine or in the rear of the train, defining the area for stacking, loading and unloading of parcel packages and mails on platforms.

The Marshalling of SLRs and Anti-Telescopic/Steel- Bodied Coaches on Passenger Carrying Trains:

(a) Marshalling of Mail and Express trains :

(i) In case of SLRs which have passenger portion on one side, luggage-cum-brake portion on the other, the SLR should be marshalled in such a way that the luggage and brake portion is trailing outermost or next to engine.

(ii) In case of new design of SLRs with Passenger portion in the middle, these can be positioned in either way.

(iii) In case, anti-telescopic/steel-bodied SLR is marshalled with passenger portion next to the engine or rear SLR with the passenger portion towards the end of the train, the passenger portion of SLR should be locked.

(iv) In case of shortage of SLRs, any other suitable coaching vehicle or a VPU may be provided, and in case a coaching vehicle is attached, its doors should be locked to ensure that passengers cannot occupy it.

(v) However, on the M.G., if it is not feasible to position the SLR as mentioned in Item (a) (ii) above due to coupler arrangements, then marshalling may be allowed, as operationally convenient.

(vi) Two anti-telescopic or steel-bodied coaches should be marshalled inside the anti- telescopic or steel-bodied SLRs at both ends.

(vii) After providing anti-telescopic or steel bodied SLRs for Mail/ Express trains, all the available anti-telescopic or steel-bodied SLRs should be used on main line passenger trains and after meeting this requirement,

the rest should be used on Branch Line Passenger trains. Anti-telescopic or steel-bodied SLRs should be marshalled in the same way as in the case of Mail/ Express trains.

(b) Marshalling of Short Service trains:

The Railway Board has permitted marshalling of three coaches in front and rear of the SLR on short trains, provided they have working brakes and subject to the condition that two end coaches at either side are anti- telescopic. An Inspection Carriage may be attached as fourth trailer coach on such trains.

(c) Non-Passenger Coaches:

VPs, LRs, WLRRMs and other coaching vehicles, which do not carry passengers, may be marshalled as operationally convenient. Inspection carriage, whether anti-telescopic/Steel- bodied or not and occupied or being worked empty, may be marshalled as operationally convenient.

(d) Reserved Bogies and Saloons Occupied by VIP:

Reserved bogies occupied by passengers and Inspection Carriages/ Saloons occupied by VIPs should be treated as passenger coaches and marshalled accordingly.

If they are anti-telescopic or steel-bodied, they can be marshalled anywhere as operationally convenient. If they are wooden-bodied, they should be marshalled inside the required number of anti-telescopic/steel-bodied coaches.

(e) Sectional/Through Service Coaches:

Sectional/Through service coaches, if they are anti-telescopic or steel-bodied, may be marshalled as operationally convenient.

(f) POH/Sick coaches returning to Shops:

(i) In the case of POH/sick coaches, which are returned to shops for major repairs and are attached to passenger trains, such coaches should be properly locked and windows secured, so as to prevent entry of any passenger into these coaches. In that case, it is not necessary to attach these coaches according to safety marshalling instructions and can be attached next to the train engine or rearmost as convenient. If, for any reason, it is not possible to lock up these coaches, such coaches should be treated like other passenger coaches in the train formation and should, therefore be marshalled inside the required number of anti-telescopic/steel bodied coaches.

(ii) It is also desired that the above instruction on safety marshalling of passenger carrying trains should be made known to all the staff and officers concerned and these should be followed strictly.

7031: Block Rake Composition:

For block rake composition and marshalling order, instructions regarding 'Normal composition and marshalling order and rake link of passenger trains' are issued by PCOMs of respective railways from time to time.

Mixed Trains:

Classifying a passenger carrying train as a mixed train needs authorization by PCOM.

On such a train, coaching and goods stock shall normally, remain in one block (except where a deviation is permitted) and their marshalling will also be laid down by the PCOM.

Normally goods stock should be attached next to engine and coaching stock inside the rear brake van.

Attaching of Four Wheelers on Passenger and Mixed Trains:

1. Rules on the subject contained in GR 4.23 and SRs their under and in the current Working Time Table should be followed.
2. On MG and NG, the single empty or loaded 4 wheeler must not be marshalled between an engine and bogie vehicle/wagon or between two bogies/wagons.
3. However, on BG, the above restrictions do not apply to match trucks along with Break Down trains and whenever under special instructions four-wheeled brake-van is attached next to engine it should be ensured, that such stock is fitted with center buffer couplers.

7032: Attaching of Vehicles outside the Rear Brake van:

Vehicles outside the rear Brake van can be attached in accordance with the provision of GR 4.24 and SRs their under in the following conditions:

Attaching of vehicles in rear of Brake van in fully vacuum train

Attaching of power plant bogies

Attaching of damaged vehicles

7033: Marshalling Chart for Passenger/Mixed/Goods Trains:

S.No	Type of Stock	Marshalling order
1	Empty coaching stock, covered motor trucks etc.	As operationally convenient but preferably marshalled as outer most vehicle at either end.
2	Motor car etc. loaded in open wagons covered with wagon sheets.	In the rear of the Train either as a last vehicle or inside the rear brake van

3	Banking Engine	On ascending gradients in rear of train. On descending grades infront. Both gradients in quick succession, if any, then in front.

7034: ATTACHMENT OF DEAD LOCOMOTIVES:

(Railway Board's letter: (1) No. 99/Safety (A&R)/19/10, dated 10.12.2001 and (2) No.2000/M(L)/466/803, dated- 1/9th March 2004)

I. Conditions for attachment of dead locomotive:

(i) Certificate for 'Fit to run' is issued by Section Engineer/Loco Inspector/Power Controller for Passenger/ Goods train.

(ii) Maximum permissible speed of the train shall not be more than maximum permissible speed of the dead locomotive.

(iii) Arrangements have been made to ensure that brakes can be applied on dead locomotives in synchronization with working locomotives.

(iv) Running of double/triple headed locos is permissible on the section over which the dead locomotive is to be hauled.

(v) When a dead electric locomotive has to be moved on a non-electrified section, special check shall be made regarding its infringement to the schedule of maximum moving dimensions. In the case of any infringement, the dead locomotive shall be treated as an ODC.

(vi) As a final check, the coupled locos should be run for about 500 meters. The Loco Pilot shall check for any abnormal rise in the temperature of the wheels of the dead locomotive and shall also check it at subsequent stops during the journey.

(vii) In addition to Freight/Passenger trains, a dead locomotive can also be attached to Mail/Express trains, including Superfast trains but excluding Rajdhani and Shatabdi, if the locomotive brakes, including proportionate brakes are operational and maximum permissible speed of the locomotive is not less than the booked speed of the train to which it is being attached. Locos with inoperative brakes can be attached, subject to the brake power of the train being within the permissible limits. Locomotive with defects in under gear equipment can be attached only in freight trains.

II. Attaching/hauling of dead locomotives by Mail/Express/Super-fast/Passenger trains:

(i) Only one dead locomotive (diesel/electric) can be attached.

(ii) Brake power of the train should be 100%, excluding dead locomotive.

(iii) As far as possible, brake should work on dead locomotive. However, if it is not possible, then in the case of air-braked train, brake pipe and feed

pipe of working locomotive shall be connected to brake pipe and feed pipe of trailing stock and dead locomotive will work as piped vehicle.

(iv) In the case of vacuum braked train, vacuum pipe of locomotive shall be connected with vacuum train pipe of trailing stock and the dead locomotive shall be treated as a piped vehicle. If the locomotive is fitted with pure air braked system and vacuum pipe is not provided on locomotive, then it should be attached with air braked trains only.

III. Attaching/Hauling of dead locomotives by goods trains:

Movement of maximum three locomotives (2 working+1 dead) with load is permissible, subject to observations of all restrictions on operation of double/triple headed working locomotives in the section provided that brakes in dead locomotives are operational.

The above instructions should be strictly followed and it is, therefore, advised that these guidelines be supplemented in the respective Subsidiary Rules also.

IV. Escorting of dead Locomotives:

Escorting of locomotives (diesel as well as electric) attached to freight and passenger carrying trains is not necessary if the brakes, including proportionate brakes are fully operational and the dead locomotive is attached next to the train engine. The dead locomotive will continue to be escorted if attached in the rear of brake van or has defect in under gear equipment.

V. Medical Relief Van:

Can be run without brake van (Local SR should be followed for Ghat Section)

VI. Attachment of Inspection Carriages:

(a) Attached to Light Engine: Maximum three inspection carriages occupied by the officers can be attached. In case more than 3 Inspection carriages are attached, rules regarding running of goods trains without brake van will apply.

(b) Attached to Mail/Express and Passenger Trains: Maximum one inspection carriage shall be attached with Mail/Express and Passenger trains at a time subject to availability of room and observance of other restrictions laid down in North Central Railway rake links.

VII. Attaching of Travelling Cranes:

Provisions of G&SR 4.27 should be followed.

7035: COACHING STOCK:

(a) Definition of coaching Stock - Coaching Stock means all coaching vehicles including postal mails and coaching traffic vans, railway service vehicles, horse boxes, military car and temporary coaching vehicles,

irrespective of contents and whether attached to passenger or goods trains. Goods wagons intended for coaching traffic should be marked as prescribed and used for coaching traffic only. They will be treated as coaching vehicles for interchange purposes only. A detail of the coaching stock in use along with codes is given in Annexure 'B'.

(b) Rake Links: Block rakes are run according to links framed by the Divisional Railway Manager in the case of trains running locally over the Division and by the Headquarters Office in the case of trains running over more than one Division. These links are framed with the object of making the maximum use of passenger stock consistent with proper maintenance.

7036: Coaching Stock Reports:

(a) Every station, where coaching stock is stabled, shall prepare a stock report at 8.00 hrs. Daily detailing the coaching stock at the Station at that time. This report shall indicate as follows:

(b) The number of vehicles of each description available for service specifying how many are engaged. Block rake vehicles on their own rakes shall not be included in the report.

(c) The individual number and description of every vehicle lying damaged.

(d) The individual number of inspection carriages.

(e) Any other particulars asked for by the Divisional Railway Manager.

(f) On Controlled section, coaching stock reports must be transmitted on the Control phone and on non-controlled sections they must be sent by wire to the Divisional Railway Manager.

(g) The Divisional Office shall compile a consolidated statement showing the disposition of coaching stock on the whole Division and forward a copy by e-mail to the Headquarters Office.

Chapter-8
TIME TABLE AND PUNCTUALITY

8001: Passenger trains:

Considerations governing passenger train time-tables: The general principles underlying the preparation of passenger trains time table are as below:

(a) The timing of passenger trains must be subordinated to the requirements of travelling public so that the timings may be most convenient to their needs. For instance:
   (i) Trains should suit the litigants enabling them to attend courts and return in the evening;
   (ii) Train services serving commercial centers should enable businessmen to have a full day for work at such places before returning to their home stations;
   (iii) Trains should be suitable for staff going to attend offices, students attending colleges/ schools and workmen going to places of work;
   (iv) In case of big cities, dwellers should be encouraged to live in suburbs by the suitability of trains services;
   (v) Trains carrying postal mails should reach important trading centers in morning and leave in the evening.
   (vi) Long distance night trains are desirable so that the busy individual can have a full night's sleep during journey and utilize the day for attending to his work.

(b) The other phase of passenger services is the interdependence of the different sorts of services to which attention must always be paid, i.e. :
   (i) Important through trains must have a number of connecting trains servicing branch lines;
   (ii) Where intermediate branch services form connections with mail and express trains, reasonable margins at connecting points should be provided;
   (iii) In case of suburban services, the chief consideration is of clearing of traffic during peak hours.

(c) The operating needs can be summarized as below :
   (i) Availability of coaching stock;
   (ii) Composition and loads of trains;
   (iii) Adequacy of locomotives with suitable tractive effort;
   (iv) Availability of adequate line capacity;
   (v) Formation of rake and engine links;
   (vi) Mechanical care and maintenance of engines and vehicles;

(vii) Berthing facilities at stations;
(viii) Crossing and precedence facilities at stations en-route;
(ix) Allowance for engineering restrictions on the section;

(d) The other considerations to which attention has to be duly paid are:
(i) Passenger trains, specially suburban services which have been running satisfactorily over a number of years, should be interfered with as little as possible, except when they are to be speeded up;
(ii) Timings of passenger trains should neither be too tight nor too liberal;
(iii) Stations at which through or sectional carriages are to be attached or detached, should have sufficient halts to enable the work to be done in time;
(iv) Time-tables should give due consideration to the clearance of luggage, parcels; newspapers, etc.

8002: A considerable variation in traffic occurs due to holidays, during which an increase in the volume of passenger traffic is registered and this aspect must receive due consideration at the time of preparation of time-tables. Moreover, there is seasonal variation in traffic during summer holidays, when there is an increased movement of tourists and parties of students to historical and tourist centers of attraction. At such times the trains become over crowded. An important point to be decided in connection with running of through trains is the advisability of duplicating them or strengthening their rakes by attaching additional carriages**.**

8003: Consideration affecting passenger train timings:

The primary considerations are the needs of the travelling public. However, in meeting these needs, consideration has to be paid to the following factors:

(a) The facilities available at the terminal stations,
(b) Maintenance of connections with other trains,
(c) Rake links,
(d) Engine links.

Terminal stations should be able to berth trains at the proposed timings; bunching of traffic at terminal stations should be avoided.

As per the passenger demands, connections with other trains need to be maintained.

Every rake has a fixed link designed to make the best use of the stock and to cater to the time required for the maintenance of the rake at its home station. Any change in passenger train timings should not, normally, affect the rake links adversely.

Train engines also have their links based on the same principles as of rake links and should be given due consideration when modifying passenger train timings.

8004: Time tables:

Public time tables showing the timings of passenger trains are prepared in the operating branch of the headquarters office on the basis of suggestions received from the railway user's consultative committees, the postal department, the divisions and from the public. There is one issue of time tables per year which generally takes effect from the 1st of July. This issue contains, apart from the timings of passenger trains, a variety of general information relating to passengers, luggage and parcel traffic. The public time tables are printed in English and Hindi, languages.

8005: Detaining passenger trains for connections:

(a) Subject to exceptions contained in the working time tables, passenger trains shall wait for connections as follows :

(b) Connecting main line trains. 15 minutes;

(c) Connecting main line trains for branch line trains. 10 minutes;

(d) Connecting branch line trains for main and branch line trains. 30 minutes;

(e) In cases where through coaches or reserved carriages have to be transferred from a train running late and misconnection would mean considerable delay and inconvenience to through booked passengers; connecting trains may be detained longer than the limits laid down above. Every such detention must be reported in the daily detention statement for the information of the Divisional Railway Manager.

(f) Intimation regarding late running of passenger trains: on non-controlled sections, Divisional Railway Managers shall nominate certain stations to inform the junctions situated enroute as well as the next engine changing station or terminal station, as the case may be, of the late running of passenger trains. On controlled sections such advice shall be given by the controllers.

(g) Arrival before time: No passenger train should arrive at a station more than five minutes before time.

8006: Destination Boards:

(a) Destination boards must be provided for brake vans, upper class carriages and sectional and through service coaches. They must be fixed in the centre of the coach at the edge of the roof along the top moulding with the name of the destination station written in English and the regional language. In the case of sectional and through service coaches, the names of the station between which they run must be shown on the destination boards.

(b) The responsibility for fixing destination boards rests with the train examiners of the starting station; at stations where there are no train examiners, this responsibility devolves on the Station Master.

(c) Train examiners or station masters, as the case may be, must remove destination boards from block vehicles going to shops and fix them on vehicles temporarily used instead till the block vehicles are received from shops.

(d) Destination boards must be kept in the custody of the station master or train examiners, as the case may be.

(e) Destination boards of EMU/MEMU must be changed by motorman and guard.

8007: Working time-tables:

The divisional working time tables are issued every year generally in July. These time-tables are meant for the use of Railway staff only and embody not only the timings of all the trains but a variety of miscellaneous information regarding train running.

(a) Object of revision :

1. To suit the growing needs of population and industries,
2. Due to technological change and development in speed potential,
3. To eliminate time tabling draw backs,
4. To resolve the constraints of regular late running trains,
5. Due to introduction of new trains, extended trips and runs etc.

(b) Revision schedule of time table :

1. Time table enforced w.e.f. – 1st July
2. Inviting suggestions for next time table from Public, Govt., MP'S & MLA'S, RMS & other organizations – July & August
3. Divisional time table meeting with TI'S, DCI'S & Station Superintendents of important stations- September
4. Headquarter meetings with divisions- October
5. Headquarter meeting with other depts.:
   (a) Engineering, Signal, C&W, Mechanical loco,
   (b) CAO (construction), RMS authorities & military-November,
   (c) Headquarter agenda with details of proposals,
   (d) Prescribed format to Board with requirement,
   (e) Rolling stock & proposed link –**December**
6. IRTTCC Meeting with Railway Board – December last or January beginning
7. Final approval to proposals by Board – February /March
8. Time table charting at Headquarter- April & May
9. Time table to press for printing – May last.
10. Time table publication – 1st June
11. Rake link, engine link, crew links are also published in the Middle of June.

(c) Indian Railway Time Table Coordination Committee (IRTTCC):

1. Member Traffic- Chairman
2. Exe. Director Coaching – Secretary
3. Members-
   - (a) CPTMs of all Zonal Railways.
   - (b) Representative from KONKAN RAILWAY.
   - (c) Representative from MILRAIL.
   - (d) Exe. Director Mechanical Engineering.
   - (e) IRCA- General Secretary.

PUNCTUALITY

8008: Measures to improve punctuality -

(a) It is of utmost importance to run trains according to their scheduled timings. Station master must ensure that :

(i) Trains are not held up on account of such avoidable delays as signals extinguished, drooping or lowered late, shunting in the yard, reception of a train at the other end, absence of a railway servant at the foot of a defective approach signal to pilot the train, non-availability of a clear reception line or delay in obtaining "permission to approach" or giving "permission to start";

(ii) There is no delay in making over the correct "authority to proceed" to the Loco Pilot;

(iii) Packages and mails for loading are promptly loaded and those for unloading promptly unloaded;

(iv) The run through signals are to be lowered (according to rules) for run through trains and the trains are not allowed normally to pass through loop line.

(v) Shunting is completed as expeditiously as possible;

(vi) All passengers are accommodated within the scheduled stoppage of the train;

(vii) The station clocks are synchronized with control and the watches of running staff with the ASM's clock, so that, there is no difference in time;

(viii) Connecting trains are not put on distant platform; and

(ix) When a train is running late, as much time is made up as possible as by curtailing the authorised stoppage at stations, provided the train does not leave before the departure time shown in the public time table.

(b) **Guards must** (i) attend their trains in time in accordance with GR 4.04 and SR 4.04/1 and start them at the right time; (ii) exchange "all right" signal with the loco pilot after the train starts from any station, failing

which the Loco Pilot is likely to come to a stop; (iii) make over packages and take over packages and cash bags promptly at stations; and (iv) wherever necessary, seek the cooperation of control to ensure that their trains are not detained avoidably.

(c) **Loco pilots must also** (i) attend their duties in time according to rules; (ii) see that tokens are not missed; (iii) ensure that there is no time loss or engine failure due to the faulty operation of the engine crew; (iv) see that extra time is not taken at stations for loco requirements and (v) try to make up the lost time on the run without disregarding any of the speed restrictions or exceeding the maximum permissible speed of the section.

(d) **The control must** (i) arrange crossings, precedence and connections in such a way as to cause minimum delay to the trains involved; (ii) warn stations ahead in respect of loading and unloading, attaching and detaching, and special occurrence and late running of the train so that the stations concerned may take necessary steps in advance to push on the train after minimum stoppage and (iii) see that the powers to work the trains are requisitioned in time.

(e) **The section engineer (loco) or the shed in charge should see** (i) that engines are properly maintained and are turned out in time, (ii) the pilots/shunting engines are in perfect working order and their shunters do not waste time in unnecessary loco requirements or while shunting.

(f) Carriage and wagon staff have to see that (i) stock is efficiently maintained, so that frequent attendance on the run is not required (ii) brake power of the trains is sufficient and according to rules, and (iii) axles do not run hot necessitating detaching of vehicles on the run.

(g) The engineering department must not generally impose too many restrictions in a single section and those imposed must generally be widely spaced.

The signal and telecommunication staff must not allow block or electric speaking instruments, signals or interlocking gear to fail.

8009: Other measures: The following other measures to improve punctuality may be utilized to advantage:

(a) Sense of Punctuality should be developed among staff and punctuality drives should be launched periodically. During these drives, officers and inspectors should accompany bad trains in the brake vans and on the footplates of engines to improve their running, to ascertain major causes for such bad running and to suggest remedial measures.

(b) All officers and inspectors should see that, whenever they are in a train on duty, the same is not allowed to get late. Similarly, if an

officer or inspector happens to be on duty at a station, he should see that all trains arriving or leaving the station keep to their schedules and if a train is already running late, that it makes up as much time as is possible. If this be not possible, the factors responsible for the detention should be taken note of and promptly reported to the Sr. Divisional Operations Manager concerned.

(c) If the bad running of a train can be ascribed to faulty time tabling, such as insufficient halts at stations, insufficient recovery time, tight timings or unsuitable paths, suggestions for improvement in this direction should be sent to the Principal Chief Operations Manager, through Divisional Railway Manager, so that necessary easing be effected when the next time table is drawn up.

(d) If it is observed that certain important stations become bottle necks during peak periods affecting punctuality of trains, necessary steps to space the trains should be taken.

(e) On certain sections, it may be observed that, although the engines normally are able to haul the loads, they are unable to make up time in case the trains run late. The headquarters office should be approached in this regard.

(f) If certain rake links are found to be very tight, they should, as far as possible, be adjusted to ease the position.

(g) Divisional Railway Manager/Sr. DOM should keep a close watch on trains and sections which are notorious for mischievous use of the means of communication and should take steps to disconnect the same from all compartments except on those exclusively reserved for women. Prior permission of PCOM should be taken, so that the matter is given due publicity in the press. This expedient should, however, be used very judiciously and for as short a period as is absolutely necessary.

(h) If it is observed that a train is losing time, because it is not able to keep to its booked speed due to certain limitations, steps should be taken to remove these causes, failing which arrangements should be made, in consultation with the Principal Chief Operations Manager, to reduce the booked speed.

(i) Requests by high officials to detain trains beyond their scheduled stoppages should not, ordinarily, be complied with.

(j) Running of trains beyond the capacity of the section should be avoided.

(k) A special watch should be kept on surprise or special ticket checks or out of course stoppages by railway police, excise or other authorities and it should be ensured that trains are not detained

unnecessarily on these accounts. The permission of the Sr. Divisional Operations Manager should, normally, be obtained before resorting to such checks or out of course stoppages etc.

8010: Guard and Station Masters to Report to Divisions –

(a) The guard shall note down, in full, the cause of each detention on his journal and shall make over a summary of the same along with his load report to the Assistant Station Master on duty at the end of his run. The Assistant Station Master on duty shall, in turn, relay the same to the section controller.

(b) The Assistant Station Master on duty shall note down all detentions at his station with detailed reasons in a register specially maintained for the purpose. The Station Master concerned shall check this register daily and take such action as is necessary to remove the recurring causes of detentions at his station. Certain important stations, specially nominated for the purpose by the Divisional Railway Manager, shall send copies of these detention statements to the Sr Divisional Operations Manager/Divisional Operations Manager.

(c) The section controller shall note all detentions on his Control Chart.

8011: Divisional Report to Headquarters:

(a) In order to enable exercising of necessary check on the punctual running of trains, every division should convey to the headquarters office on phone early every morning a detailed statement of punctuality of all mail and express and other passenger trains. This position should show whether these trains were taken over and made over right time or late at the contiguous divisional or other railway junctions. The extent of late running with detailed reasons for the same must also be given.

(b) In addition to the morning position, Divisional Railway Managers are also required to send periodical and monthly statements reflecting the punctuality performance of trains on their divisions.

(c) The headquarters office, in its turn, forwards similar daily morning position and periodical and monthly positions to the Railway Board.

Transmission of load reports to control: (a) on the departure of a train from the starting station, the load of a train should be relayed to control on controlled sections and Faxed/Messaged to the Divisional Railway Manager, engine changing and terminal stations on non-controlled sections. The load report should be in the marshalling order from engine to brake van.

CHAPTER-9
CUSTOMER INTERFACE AND ROLE OF VARIOUS STAFF

9001: The physical movement of both passengers and freight cargo is handled by operating staff and commercial staff, who interact with customers.

9002: Passenger:

Platform Ticket checking staff: (a) Their foremost duty is to enforce rigid access control in the station area to prevent ticket less travel and entry of undesirable elements in station premises.

1. Occupation of waiting rooms and waiting sheds:

(a) Except under special orders from the Divisional Railway Manager, passengers must not be allowed to use the waiting rooms at stations as rest houses, but passengers arriving at Road side stations at night may be allowed to occupy the waiting rooms or waiting halls between trains or until the morning. At junction stations, passengers may use waiting rooms and waiting halls when waiting for connecting trains.

(b) To ensure that bonafide use of waiting rooms is being made, they shall be checked by a ticket checking staff every eight hours.

2. Duties of booking staff:

(a) To issue tickets, release and display reservation charts in time to avoid detention of trains in boarding of passengers.

(b) To advise all commercial figures and occupation report of trains to Divisional office and SM on duty as required.

(c) Station Master or Parcel Clerk shall ensure: Parcel, luggage, goods and vendors' trays and barrows shall not be placed on passenger platforms within 3 meters of the edge of the platform. When parcels or luggage are loaded on the platform, the barrows must be kept outside this distance at a point opposite where the vehicle, into which they are to be loaded, is likely to stop. Packages unloaded from a train must be removed as quickly as possible to the usual place of stacking outside this distance, if they are not taken away into luggage and parcel offices or the goods shed. Under no circumstances should drums and barrels be left on the platform in such a position that they may roll into the track.

3. Precautions before starting a train carrying passengers:

(a) Control of electric lights and fans in coaches: Switching 'ON' and 'OFF' of lights and fans circuits in a rake is effected by operating rotary switches or MCBs in the Junction box provided inside individual

coaches. Operation of these circuits is the duty of train- lighting staff deputed at important stations. Individual switches, regulators of lights and fans are to be operated by passengers themselves.

(b) Conductor or TTEs are responsible for ensuring that the electrical equipments and fittings of all coaches are functioning satisfactorily. Where any defect or deficiency is noticed, they should inform the electric staff on duty of AC coaches or advise through control to the next station where electrical staff is provided.

(c) Conductor or TTE shall, before the train leaves the starting station, request the occupants of those compartments to test, if the locking devices on doors and windows are in working order. In case of any defect, they shall arrange to have the defects put right by the C & W staff under advice to SM either at the starting station or at the next train examining station.

(d) Travelling Ticket Examiners are to ensure that doors on both sides of carriages on a train carrying passengers shall never remain locked at the same time, except in the case of compartments reserved for ladies which may be locked at the request of the occupants.

(e) Conductor and TTEs must see that passengers are not getting in and out of carriage when trains are about to start and that no one is travelling on the roofs of carriage.

(f) Segregation of passengers suffering from infections or contagious diseases: For greater safety of the travelling public, passengers suffering from infections or contagious diseases should be segregated from other passengers by TTE with the help of security forces.

(g) All passengers, irrespective of the class of tickets they hold, shall be courteously treated and all possible assistance and protection afforded to them while on Railway Premises.

(h) Female passengers, particularly when unaccompanied by males, friends or relatives shall be given special attention at all times.

(i) Each member of staff who has to deal with passengers must be acquainted with the time of arrival and departure from their stations of all trains carrying passengers to answer in a prompt and civil manner any question put to them by the public.

4. Precautions during journey:

(a) In cases of long distance through trains coming from or going to other railways, which have yet to commence journey through the following night, the guard or conductor or TTE shall, at a convenient station some time during the day, approach the occupants of upper class and second class ladies compartments and request them to check up, if the door latches and window catches are in good working order; when

the train arrives at a station where the C & W staff is required to attend to the safety catches, the C & W staff should be ready with the necessary material and should themselves checkup the locking devices and put right any deficiencies detected by them or reported to them by passengers.

(b) The Conductor or TTE should also make it a point to warn the passengers at convenient stations between 21 and 22 hrs to apply the locking devices, if not already done.

(c) If, it would be found that the alarm chain has been pulled mischievously or for an unjustifiable cause or the hose pipe has been disconnected by some miscreants, the Conductor or TTE in charge must ascertain the name of the person who pulled the chain or disconnected the hose pipe. His name and address with those of other occupants must be obtained and the Conductor or TTE should make a report regarding the alarm chain pulling or the hose pipe disconnection incident and hand over the same to SM/ASM of the station at which the incident occurs, if time permits, or at the next stopping station. The SM/ASM will take action in lodging the report with the GRP of the station in whose jurisdiction the incident has occurred.

(d) Calling out name of station - Travelling Ticket Examiners where employed and, at Ticket Checking stations, the Ticket Examiners are required to give this information to passengers as they go from compartment to compartment checking tickets and at junction stations they shall advise passengers to change, if necessary.

5. Waking up passengers:

(a) Passengers of all classes occupying reserved accommodation shall not be roused for tickets to be rechecked between the hours 22 and 6 except when there are reasons to believe that a certain passenger is travelling without a ticket or otherwise irregularly.

(b) TTE's of Mail Express and passenger trains are to arouse Air Conditioned and First Class Passengers at night at any station when requested by the passengers to do so and will be assisted by the coach attendant. The Ticket Checking staff to whom such a request is made by a passenger shall enter in the "wake up memo" the name of the passengers, the number and the class of the carriage occupied and the name of station at which the passenger is to be called.

(c) The Ticket Checking staff, when intimating the arrival of the train at a station, where a passenger has been noted to alight, shall take care, that other passengers are not unnecessarily disturbed.

(d) Passengers shall not be placed in carriages of a higher class, than that

for which tickets are held, except on payment of additional fares as per extant rules or on automatic upgradation.

6. Ladies travelling alone at night:

(a) In no case, whatever, shall a male passenger (except a boy under twelve years of age) be allowed to travel in a compartment reserved for Ladies in any train.

(b) A lady travelling alone or with children under 12 years of age at night in a first class compartment reserved for ladies may take with her, in the same compartment in which she is travelling, one woman attendant holding a second class ticket for that portion of the journey which is performed between the hours 8 p.m. and 6 a.m. This rule may also apply when two or more ladies are travelling in the same compartment without any objection and any inconvenience to others.

(c) A lady travelling alone or with children under 12 years of age in a first class compartment may take with her in the compartment, one dog on payment of the dog-box rate, provided that if another lady enters the compartment, the dog shall only be allowed to remain in the compartment with the permission of the other passenger.

7. Medical Aid:

(a) It will be the duty of the train or station staff to render first aid to any injured person within Railway premises immediately.

(b) If the case is serious, the senior most official available on the spot must arrange to summon medical aid from the nearest available source, whether Railway, Civil, Military or private.

(i) If necessary, arrangements must be made to transport the patient at the earliest opportunity to the nearest hospital. Normally the patient should be taken to the nearest Railway, Military, Municipal or Civil Hospital; in the following cases, however, the patient may be taken to any private hospital nearby :

(ii) When there is no Railway, Civil, Municipal or Military Hospital available within a radius of, say 8 kms of the site of the accident.

(iii) If a doctor is in the train or has been summoned under the existing orders from the nearest source available, whether Railway, Civil, Military or private and has treated the patient, the patient may be taken to a private hospital, if the attending doctor certifies that treatment in hospital is so immediately necessary in the interest of the patient, that above must be disregarded. For this purpose a certificate should be signed by the doctor.

(c) Where a private hospital to which a patient is taken in term of (i) or (ii) above has different scales of charges for different kinds of accommodation/diet, the injured person should normally be admitted

to the lowest class of accommodation/diet available. However, the Railway Medical Officer, if he happens to be present or otherwise, doctor in charge of the hospital should be allowed discretion, depending upon the severity of the injury, to admit the injured person to a suitable class of accommodation/ diet, if it is considered essential for the recovery, or for the prevention of serious deterioration in the condition of the injured person. Where the above mentioned conditions are not satisfied but the patient, or any adult member of his family, who happens to be along with him, desires that the patient should be provided with the higher class of accommodation/ diet, there would be no objection to this being done; provided the patient or adult member of the family agrees (in writing) to bear the extra cost involved therein, directly to the hospital authorities and the hospital authorities are agreeable to that arrangement.

(d) In addition to this, the railway staff are authorized to call outside medical aid under the following conditions :

(i) Labour confinements in trains.

(ii) Any surgical emergency like heart attack, Colic, Strangulated hernia etc.

(e) The Medical attendance will be gratuitous for the patient who has sustained injury, where Railway is responsible. In such cases the fee of the doctor will be paid by the Administration on receipt of bill from the Doctor concerned. In all other cases, the fee will have to be paid directly by the patient to the Doctor. There is no scale of fee fixed. It will depend on the mutual agreement between the patient and the doctor.

(f) All sick passengers, passengers who have sustained injuries for which the Railway is not responsible and are unable to proceed with their journey shall be made over to the Police for conveyance to the nearest Public Hospital or dispensary at stations, where Railway medical aid is not available.

(g) Should the passenger desire medical attendance by a Railway doctor, the Guard of the train or the Station Master, may inform the Railway doctor of the nearest Health Unit to attend the passenger. The passenger should, however, be explained, that medical attendance by a Railway doctor is not gratuitous and he will have to pay the fees of Railway Doctor as prescribed from time to time, unless the injury caused is such where Railway is responsible.

(h) In cases, where neither Rly. Medical Staff nor Govt. Railway police staff is available, the Station staff shall make over the passenger to the nearest hospital or dispensary but shall at the same time inform the

authorities thereof that the Railway shall not be liable for any expenses incurred by the passengers.

(i) The Police and Medical Officer shall be advised at once, so as to be in readiness to attend the train conveying such passengers.

8. Murder or serious Assaults: – If a crime of serious nature such as a murder or a serious assault be committed in a Railway carriage on a running train, the following action shall be taken by the staff with a view to helping the Police Officials in their investigation:–

1. The Guard/TTE/Conductor of the train shall have the compartment emptied and locked up after all shutters have been raised from outside immediately as the commission of such an Offence is known, so that, the blood strains, marks of struggle, foot prints, finger impressions etc. may remain undisturbed.
2. If the crime took place in a second class compartment, the carriage shall be detached, at the station where the crime was detected, and kept under watch till the police arrive to take over the case.
3. If the crime took place in an upper class compartment, the compartment shall immediately be locked up and the carriage allowed to proceed to the nearest station where it can be replaced. If no Government Railway Police staff are located at this station, a member of the Railway staff will watch it until the Police Officer comes upon the scene.
4. No one, whether Railway employee or outsider, shall be allowed to enter the compartment until the police arrive, except in so far as is necessary to attend to injured persons unable to leave the compartment without assistance.
5. The Railway Police station concerned shall be advised at what station the carriage has been or will be detached. After the carriage is taken over by the police, it shall not be removed or otherwise utilized without the written authority of the Police conducting the investigation. If an abnormal delay takes place on the part of the police in releasing the carriage, the matter shall be reported to the Divisional Railway Manager concerned.

9. Disposal of body of person found run over :–When the body of a person who has been run over is found between stations, the following procedure as regards to its disposal shall be adopted:–

(a) If life is clearly extinct, the body shall not be moved not more than is necessary to clear the line, until the arrival of the police. The body shall be left in charge of a lineman, gateman or village chowkidar. If no responsible person, to leave the body in charge of him, is available at the site where found, it shall be removed to the nearest gate-lodge,

Gang-hut or station. In all cases, written memo, giving the following particulars shall be made out by the Guard, or if there be no Guard, by the Loco Pilot of the train, or other person finding the body and the memo be made over to the man placed in charge of the same to be given by him to the Police Officer when one arrives :–

(i) Position of body on the line.

(ii) Blood-stains on ballast or engine, extent of injuries, and whether seemingly inflicted by a train or otherwise.

(iii) Position of clothing etc., found on or near the rails.

(b) If life is not extinct, the person shall be conveyed to the next station as promptly as practicable where medical aid shall be arranged for by the Station Master.

(c) After disposing of the body, or person, as directed, an immediate report shall be made to the nearest Station Master.

(d) Proforma for reporting of untoward incident-

FORM - 1

REPORT OF UNTOWARD INCIDENT

1. Unique Identification Number of the Untoward Incidents:
2. Kilometer at which untoward incident occurred:
3. Name of Loco Pilot of the train with Headquarter:
4. Name of the Guard of the train with Headquarter:
5. Name of the Train Ticket Examiner of train, if posted, with Headquarter:
6. Nature of the untoward incident:
    (a) Accident fall
    (b) Bomb blast
    (c) Rioting
    (d) Shootout
    (e) Arson
    (f) Dacoity/Robbery
    (g) Violent attack
    (h) Terrorist act/attact
    (i) Run over/trespassing
    (j) Suicide
    (k) Others
7. Train No., Name, Date and Time of occurrence:
8. Position of the injured dead body in relation to the tracks along with photographs:
9. Whether medical help was given to the injured/victim:
10. Whether train stopped or not:
11. Condition of doors and occupation of coach:
12. Other details and Remarks.

Signature

Name and designation

DEATHS

10. Disposal of Corpses:–

(a) In all cases of passengers dying at stations or corpses being taken out of train or Railway servants and others being killed on railway premises, Station Masters shall make over the body and all effects of the deceased to the Government Railway Police, who are responsible for the prompt disposal of such bodies.

(b) At stations where there is no Government Railway police, the Station Master shall see that corpses are, in all cases, promptly removed from public view.

11. Conveyance of Corpses:– Corpses being conveyed for postmortem examination or any other purpose by train, shall be put into an empty wagon if there is one on the train, otherwise in the rear brake-van if there is room or in the front brake-van but not in a passenger vehicle unless it is quite empty.

12. Passenger trains overshooting Platform:

When any portion of a passenger train over shoots a platform or when a platform is too short to accommodate a full train at night, passengers who are obliged to alight on ballast should be told that they should alight carefully as there is no platform. If a carriage at the end of a train is off the platform, the Guard should also call out a similar caution to the passengers.

13. Duties of Conductor:

(i) He shall report to the train guard for his appearance and the time of his appearance shall be noted down by the train guard in the Constitution Report. The Conductors shall sign this entry and the train guard shall countersign it.

(ii) See that the window catches and other safety devices fitted in II Class compartments reserved for ladies are in perfect working order and get the deficiencies repaired.

(iii) See that the passenger carriages are thoroughly cleaned and filled with water.

(iv) Look after the safety and comfort of passengers of all classes and more particularly of women and children, attend to complaints of passengers regarding cleanliness of carriages, water supply in lavatories, lights and fans or any other complaints and have them promptly attended to.

(v) Make it a practice to walk along his train at stations to see, if passengers want any assistance or information and keep a careful look out for irregularities of any kind, especially at night.

(vi) Before a train begins a night journey, ensure that the safety bolts

provided on the inside of windows and doors of Upper Class carriages and ladies compartment are in working order.

(vii) Arrange for the meals of passengers when requested for it.

(viii) Wake up upper class passengers alighting at night, if requested.

(ix) See, in so far as is possible that there is no irregular or unauthorized travel by trains in contravention of any rules in force. All infringement of rules by passengers should be brought to the notice of the station master on duty.

(x) Note the Coach, if any, which is to be detached short of the destination of the train, must see that such carriages are not occupied by passengers who have tickets for beyond the station to which they are booked. He must arrange that, if any passengers are allowed to ride in such coaches they are warned before starting that they shall have to vacate the coaches on arrival at the station at which they are to be detached.

(xi) Conductor must see that passengers are not getting in and out of carriages when the train is about to start and that no one is travelling on the roof of carriages.

9003: Duties and Responsibilities of TTEs:

(i) He shall see that all doors, bolts, windows and catches etc. of all the coaches particularly upper class and ladies compartments are in perfect working order and also that all through and sectional coaches are provided with proper destination boards.

(ii) If there are defects in the working of any of the fans and lights, he shall get them rectified by the train lighting staff.

(iii) He shall see that, where arrangements exist, the compartments are properly cleaned, dusted and watered and shall make necessary enquiries from passengers in this connection.

(iv) He shall see that lights, fans, other fittings and water in the carriages are not misused.

(v) He shall check Attendant compartments and ensures that only bonafide attendants of upper class passengers occupy them.

(vi) He shall check Vendors and GRP/RPF compartments to ensure their correct use.

(vii) He shall receive reservation charts well in time before the departure of the train, see that the same are completed in all respects and that the reservation labels are intact so that there is no hitch in providing berths to passengers.

(viii) He shall look after the safety and comforts of passengers in general and of upper class and women passengers in particular.

(ix) He shall assist all classes of passengers in securing accommodation

either reserved or available for them.

(x) During the course of the journey, he shall keep special watch on compartments occupied by women passengers without causing any annoyance to occupants. He shall, where halt permits, walk on platforms to see that in ladies compartment everything is well. While inspecting a train in this manner, he should be ready to answer queries and receive complaints from all classes of passengers. Complaints of special nature and action taken by him should be recorded.

(xi) During night, he shall awake upper class passengers who express their desire to be called at a particular station and in the event of his change of duty en route, ask his reliever to do so.

(xii) He shall ascertain from Passengers their meal requirements and arrange it either from the Dining Cars running with the train or the next Refreshment Room station.

(xiii) He shall assist Refreshment Room bearers in finding out space for return of empty meals crockery, trays or thalis.

(xiv) He shall see that no suspicious characters attempt to enter upper class compartments and compartments reserved for women.

(xv) He shall not interfere with or annoy passengers by talking, smoking or slamming doors while entering or leaving compartments.

(xvi) He shall keep an eye on vendors and licensed porters charging passengers excessively and promptly intervene where necessary. All such cases must be reported to the Divisional Commercial Manager concerned under intimation to the Station Master concerned.

(xvii) He shall see that vendors do not shout their wares at station during night.

(xviii) In the event of any passenger being found molested, a passenger's property being stolen or tempered with, he shall promptly take action in conjunction with the guard in-charge of the train or the station master as the case may be and see that police is advised immediately. The passenger's name, address and ticket numbers of those who are allegedly responsible for the trouble and also the same particulars of some respectable witnesses should be taken and full report submitted to the Divisional Commercial Manager concerned.

(xix) When alarm chain is pulled or hose pipe is disconnected, the disc at the end of the reserved coach should be returned to normal position (thereby closing the Clappet Valve) and FIR to be lodged to GRP under advice to Guard/Station Master.

(xx) Similarly hosepipe disconnected should be reconnected by Asstt. Loco Pilot.

9004: Duties of Guards:

Guards must also inform the Armed Police Escorts in the train about the train number, date and the number or numbers of carriages in which accommodation is reserved for women. Guards and the Armed Police Escorts shall be jointly responsible for carrying out this order.

9005: Additional duties for Guards while Working Trains: - Passenger Trains:

(a) In addition to such items as are given under sub-paras (a) and (b) of para 9002 (7) above which may apply to passenger trains also, the guard while working a passenger train shall also:

(i) See that the brake van equipment is complete and that each brake van of his train is provided with two Fire Extinguishers, that none of these is empty or with plunger driven in and that the test date marked on the Fire Extinguishers is not more than one year old;

(ii) Ensure that train brake van lights and fans are in working order;

(iii) When taking charge of his train, must carefully check all way-bills, luggage, parcels, dispatch and cash bags etc. He shall be held personally responsible for the safe custody of all packages from the time he takes them over till the time he makes them over under clear signatures;

(iv) Assist the station staff in arranging room for luggage and parcel that are to be loaded in luggage and brake vans;

(v) See that parrots, other birds and small animals in Baskets and cages are not overcrowded and that food and water for their use are supplied. He shall see that other packages are not put on top of such baskets, crates or cages;

(vi) Ensure that arrangement for food and water is also made for dogs carried in dog- boxes;

(vii) See that the window catches and other safety devices fitted in II Class compartments reserved for ladies are in perfect working order and get the deficiencies repaired reporting the matter in the joint Train Report;

(viii) See that the passenger carriages are thoroughly cleaned and filled with water;

(ix) Look after the safety and comfort of passengers of all classes and more particularly, of women and children. (See also G.Rs. 4.54 and 2.10 (d))

(x) Attend to complaints of passengers regarding cleanliness of carriages, water supply in lavatories, lights, fans, any other complaints and have them promptly attended to;

(xi) Perform generally the duties of Conductors where they are not provided;

(xii) Make it a practice to walk along his train at stations to see if passengers want any assistance or information and keep a careful look out for irregularities of any kind, specially at night;

(xiii) Keep the windows and ventilations of all carriages running empty on his trains closed and doors key locked;

(xiv) See, in so far as is possible that there is no irregular or unauthorized travel by trains in contravention of any rules in force. All infringement of rules by passengers should be brought to the notice of the station master on duty and reported in the Joint Train Report.

CHAPTER-10
CONTROL ORGANIZATION

10001: Definition: The Control Organization of Indian Railways is the nerve centre of train operations. It controls the asset management of the Railways, in a dynamic situation, round the clock incessantly moving trains on its entire network.

It has come a long way from being an exclusively telephone based system emerging in the form of an Information Technology enabled organization.

This basic structure of Operating Control on Indian Railways exists at the Divisional Level, which has also been extended to Area Control levels. In addition, Central Control Office is situated in the Headquarters office and one at Railway Board.

The area spread of a division is divided into control sections, normally between two crew changing points, each section having a given number of stations.

The two-way telephone system, also called an omnibus circuit, permits all stations to have direct communication with Section Controller, who is responsible for train regulation in his area. The section Controller can speak to all stations at the same time or to one station selectively, using individual numbers/buttons. Movement of trains is plotted on a time distance graph to record their actual progress. These records, called control charts are analyzed later.

There are shift Deputy Chief Controllers to guide and assist the section controller.

All technical disciplines involved in train movement have representatives in the Control office to provide the required support from their departments. These include-

Locomotive Power Controller, Traction Power Controller, Signalling and Tele-Communication Controller, Commercial Controller, Security Controller, C&W Controller, Engineering Controller and Electric Control.

The entire organization works round the clock, all days of the year, without any interruption to monitor actual movement of trains on the entire rail network.

The detailed organization of the control selected and duties assigned to employees depends on the demands of the transport task appropriate to each grade of employee or to diversity in the transport task. The Chief Controller is the head of Divisional Control Organization.

10002: Basic Functions of Control:

1. **Train Control:** Supervising & regulating movement of trains from station to station on the section to avoid delay to trains and to maximize utilisation of the capacity of the section by:-
   (a) Monitoring movement of trains from station to station and recording paths and detention on charts.
   (b) Arranging crossing and precedence of trains judiciously.
   (c) Arranging working of departmental and material trains.
   (d) Giving time signal to all stations on the section daily at appointed time.
   (e) Fulfilling interchange commitment.
   (f) Arranging proper movement of assisting/banking/light engines.
   (g) Clearance of sick wagons from Roadside stations.
   (h) Arrangement of relief for 10 hrs duty staff.
   (i) Incident management on the rail network & at stations.
   (j) Arranging Engineering and/or power blocks in such a way as to involve minimum disturbance to train running.
   (k) Maintaining fluidity of yards by controlling the flow of stock in and out of yards.
   (l) Arranging Speedy relief in case of accidents.
2. **Traffic Control:** is the general and over-riding control for supervision of the movement of goods and coaching traffic on the section. It is exercised by:
   (a) Collecting information from the various stations on the section in respect of –
      (i) Registration of wagons outstanding at stations and arrangements for supply of wagons.
      (ii) Number of wagons loaded and empty wagons/rakes awaiting dispatch.
   (b) Arranging running, regulation, putting back and cancellation of trains (both freight & coaching).
   (c) Ensuring maximum loads for trains.
   (d) Collecting stock position from the different stations, marshalling and terminal yards.
   (e) Arrangement of Crew & Guards for freight trains.
   (f) To keep liaison with adjoining Railways and Divisions for interchange commitments.
   (g) Monitoring and coordinating working of yards, goods sheds, sidings, loco-shed, TXR depots etc.
   (h) Supervising stock control.
   (i) Arranging supply of wagons against pending registration.

(j) Ensuring optimum utilisation of stock with minimum detention.
(k) To ensure optimum utilisation of loco and staff.
(l) To arrange ART & Crane from adjoining Railway/Division in case of accidents and other coordination.

3. **Power Control -** is responsible for provision of motive power to all trains by maintaining position of locomotives and:
   (a) Requisitioning engines from loco sheds for all operating requirements, i.e. Train working, Shunting and Banking.
   (b) Ensuring most economical use of engines by close supervision both in Traffic Yards and sheds.
   (c) Ensuring the return of engines to "Home Sheds" at regular intervals for servicing and maintenance.
   (d) Ensuring an even balance of engines and crews between running sheds for meeting demands of traffic.
   (e) Ensuring that light engine kilometres is kept to the minimum.
   (f) Providing guidance to running staff for troubleshooting.

4. **Carriage and Wagon Control-** is responsible for assisting the train and traffic control:
   (a) Ensuring timely examination and fitness of all trains.
   (b) Keeping a watch over the detachment of sick wagons/coaches and arranging for their early repair and fitness.
   (c) Keeping a watch over availability of vital C&W components, like Air Hoses, Washers, Clamps etc… and efficient working of equipments & machines in the C&W depot to avoid detention to trains.
   (d) Keeping a watch over placement of wagons/coaches in sick line and their release.
   (e) Keeping account of detention to trains on C&W account and taking remedial action.
   (f) Providing guidance to running staff for trouble shooting (For Electrical Multiple Units, this function is performed by the EMU controller).
   (g) Monitoring the movement of POH due stock to workshops.

5. **Commercial Control assists the Traffic and Train Control:**
   (a) To expeditiously dispose off unclaimed and unconnected wagons, parcel consignments.
   (b) To keep a watch on detention to trains on Commercial account like Alarm Chain Pulling, Carriage watering, Parcel working etc. and take remedial measures.
   (c) To ensure quick transshipment of sick wagons by arranging matching stock and labour.

(d) To keep a watch over submission of station returns.
(e) To monitor public complaints lodged at the stations.
(f) To ensure proper maintenance of public amenities available at stations.
(g) To carry out any other job entrusted by Sr. DCM/DCM.

6. **Traction Power Control is provided to assist in Traffic and Train Control for:**
   (a) Arranging maintenance blocks for OHE.
   (b) Arranging alternative power supply in case of tripping etc., through remote control.
   (c) Monitoring OHE failures and taking remedial action.
   (d) Monitoring detention of trains on OHE account.
   (e) Guiding running/station staff in trouble shooting.

7. **Engineering Control :** Monitors-
   (a) imposition & cancellation of Engineering Restrictions.
   (b) working of track machines.
   (c) integrated maintenance blocks.
   (d) Co-ordinates works during maintenance blocks and monitors Running of Material trains.

8. **Signal Control -** assists Traffic and Train Control and is responsible**:**
   (a) To keep a watch over the S&T failures and take remedial action.
   (b) To ensure efficient working of communication channels.

9. **Security Control** is responsible for prevention of theft of property and assists passengers in trains/at stations.

10003: Functions of Control:

The main functions of Traffic Control are:

(a) Continuous supervision of the movement of all traffic in the controlled area with a view to achieve the maximum possible operating efficiency.
(b) Systematic maintenance of accurate charts of train movements and the arrangements of crossing and precedence to the greatest advantage.
(c) Analysis of detentions to trains.
(d) Planning, ordering and running of goods trains to the best possible paths.
(e) Maintaining the fluidity of marshalling yards/freight terminals.
(f) Taking remedial action in the event of yard/terminal congestion.
(g) Elimination of avoidable detentions to goods stock at loading and unloading points and at transshipment stations.
(h) Allotment and distribution of goods stock to stations,
(i) Supply of information to adjoining controls, terminals and engine

changing stations regarding the movements of trains to enable adequate timely arrangements for their reception and onward dispatch.

(j) Arranging of engineering and other departmental blocks with minimum detention to traffic.

(k) Running of material trains and other track machines, tower wagons etc.

(l) Arranging relief for engine crew and Guards.

(m) Ensuring maximum utilisation of locomotives.

(n) Issuing instructions for train working in case of equipment failures and whenever abnormal methods of working have to be resorted to.

(o) Speedy arrangements for relief, rescue and restoration in the event of accident.

(p) To assist in the realistic planning of time tables and punctual running of passenger trains in co- ordination with various departments, other divisions and other railways.

(q) To keep a watch over damaged stock at road side stations, yards and sick lines and to ensure that they are promptly attended to.

(r) To rectify immediately the irregularities on the part of line staff and provide them necessary guidance.

(s) To provide operations management information.

(t) To ensure smooth functioning of FOIS and other IT applications.

10004: Telecommunication Facilities in Control:

An extensive, efficient and reliable communication network is necessary for the efficient functioning of the Control organisation. The following telecommunication network is available in control offices:

1. FOIS Network

2. Hot lines are provided between :

(a) Headquarter and Divisions

(b) Adjoining Divisions and Railways

In addition, intercom facility has been provided to various Officers and other functionaries concerned with the control. They are also connected with important work centers with STD or Trunk Exchanges.

3. Deputy Control Lines :

This circuit is provided among various functionaries in the control office, stations and important work centres like yards, loco sheds, crew booking lobbies.

4. Section control circuit:

This circuit is connected to all the stations and the section controller, Chief

controller etc.

5. Traction Power Control circuit:

This additional telephone circuit is available on the electrified sections; this is connected to TPC in OHE remote control centre, all stations, control-offices and selected work places. The section controller or TPC can also be contacted from the emergency socket provided over the sections along track with indication on the electric mast, direction wise, to the nearest circuit, by means of portable telephone.

6. Section Control Board:

The Section Controller of each section is provided with a control board, with Telecommunication facilities for coaching stations, certain important cabins, big freight terminals, loco shed etc. over a section. For the guidance of section controller, the layout of all the stations and sidings is painted on a large board.

The station lay out diagram is also provided with details of holding capacity of each of the running & non-running lines, gradients and signals. In electrified area, OHE sectioning diagram is provided. This depicts elementary sections in different colours & other details of sectioning post (SP) and Sub-sectioning post (SSP).

7. Graphs and Plotting:

(i) Trains are plotted on control graphs which consist of horizontal and vertical lines, representing distance and time, respectively. Alongside the vertical lines, stations are spaced to a uniform scale. Each one hour is first divided into 6 units of 10 minutes each and each unit is further sub-divided into 5 smaller units of 2 minutes each.

(ii) Each control graph at the end of the shift may have the following information on it:

- (a) Name and total distance of the section in Kilometres.
- (b) Distance in Kms. between each station on the section.
- (c) State of weather in each shift.
- (d) Engineering restrictions on the section.
- (e) Code names of each station of the section.
- (f) Time lost by each train on loco, traffic or engineering account at or between stations.
- (g) Section Controller's remarks against item (d).
- (h) Time made up by each train on loco, traffic or engineering account.
- (i) Guard's record of time lost on loco, traffic or engineering account at or between stations and remarks.
- (j) General remarks.

(k) Signal failures

(iii) In plotting various types of trains, coloured pencils shall be used as per extant convention as below :-

(a) Chocolate –Super Fast trains

(b) Red-Mail, Expresses and other trains requiring top priority as well as Military special during emergency.

(c) Black- Light Engine, M/Trolley, Tower Wagon, Pilots etc.

(d) Green-Military specials in normal course, Fast Express Goods, and any other important Goods trains, shunting train.

(e) Green & Yellow double color- Agni, Rocket, Cracks, Container trains etc.

(f) Blue-Passengers.

(g) All up trains are plotted from the bottom of the chart upwards and from the left diagonally towards the right; and all down trains are plotted from the top of the chart downwards and also diagonally from the left towards the right.

(iv) For judicious crossing and precedence, it is necessary to have plotting of passenger trains at least one hour in advance depending on traffic density in easily erasable lines. Now through computerized charting this is automated. On certain selected controls, this function has been automated.

8. Master Charts:

For every section, Master Charts indicating trains run in 24 hours are prepared which show the running of each Mail, Express or passenger train over the sections according to its scheduled running. In between the running of trains carrying passengers, paths for goods trains are worked out and plotted. They are helpful in revision of time tables, planning the running of any extra train and for guidance of section controllers and should be displayed on the boards to which they refer.

10005: Duties of Control Staff: The main duties of control staff are as under:

1. Duties of Controllers:

These are only guidelines for their day to day working and are not exhaustive.

(a) Chief Controller (In-charge):

The Chief controller is overall in-charge of control office and is responsible for the total transportation of the Division on day to day basis. His duties include-

(i) A review of previous day's performance to confirm that all forecasts made have been fully met. For shortfalls, cogent reasons have to be pinpointed to prevent recurrence.

(ii) Prepare current forecast, indicating assistance needed from Headquarters, adjoining Divisions, Railways. These will generally relate to interchange, loading and locomotive utilization.

(iii) Checking control charts and bringing to the notice of the Senior Divisional Operations Manager/Divisional Operations Manager all avoidable detention to trains.

(iv) Punctuality performance with particular reference to trains which lost punctuality.

(v) Maintaining statistics regarding the punctuality of passenger trains.

(vi) Scrutiny of stock papers, Monitoring interchange obligations.

(vii) Watching detention to stock at stations and terminals.

(viii) Watching the work of marshalling yards/freight terminals.

(ix) Maintaining liaison with neighboring Divisions.

(x) Watching utilisation of locos and their terminal detention.

(xi) Checking duty hours of running staff and balancing of crews.

(xii) Granting engineering blocks, power blocks etc..

(xiii) Attending control office in cases of accident.

(xiv) Establishment work of control office.

(b) Chief controller (Movement)/Dy. Chief Controller (Freight Operation) Shift duty:

He is responsible for:

(i) Running of goods trains, preparing interchange forecast, and monitoring the same, loco utilisation and passenger and goods train operations in general.

(ii) Allotting empty stock/rakes to loading stations in accordance with current priority regulations along with Dy. Chief Controller (Stock), maintaining constant touch with adjacent divisions through regular conference to facilitate the smooth flow of traffic.

(iii) Dealing immediately with significant detentions or transport bottlenecks and other unusuals.

(iv) Keeping in constant touch with the working of major terminals & Marshalling yards and taking timely action to deal with congestion.

(v) Giving advice of serious accidents to all concerned and taking, charge of the affected sections.

(vi) Arranging ART/ARME/Crane, Loco and Crew/Guard.

(vii) Supervising the running of oversized consignments.

(viii) Maintaining liaison with the Power Controller.

(ix) Co-ordinating the work of various Section Controllers.
(x) Maintaining discipline among control staff in the absence of Chief Controller.
(xi) Maintaining co-ordination and liaison with various functionaries involved in train running.

(c) Chief Controller (stock)/Dy. Chief Controller:

He is responsible for:

(i) Scrutinising the indent register in detail with regard to the oldest date of registration, nature of goods and type of stock required for lifting goods as per the oldest date of registration.
(ii) Checking Divisional stock report and position of empties.
(iii) Checking of different stock reports received from the various points and planning in advance the supply of stock, loading and clearance, keeping in view interchange obligation and orders received.
(iv) Checking transshipment activity.
(v) Chasing movements of stock as per supply order issued on the previous day.
(vi) Keeping a close watch over hot axle, special type and unconnected wagons.
(vii) Cross checking the daily Restriction Bulletin with Restriction Messages received from HQ office and issuing the same.
(viii) Assisting the Sr. DOM/DOM in allotments.
(ix) Keeping a close watch over the movements of seasonal perishable traffic and supply of suitable stock for its clearance.
(x) Watching movements of damaged loaded stock in sick line and yards on their division.
(xi) Informing all major customers about their inward trains expected arrival based on FOIS pipe line, Optimising loading, unloading, transshipment etc.

(d) Duties of Deputy Chief Controller (Punctuality)/Deputy Chief Controller (Chg.):

(i) Ensuring punctuality of passenger trains in the system.
(ii) Ensuring punctuality at the start of all outgoing passenger trains.
(iii) Maintaining Detention Reports of Coaching trains.
(iv) Ensuring that late running trains make up time.
(v) Supervising running of M/Exp. and passenger trains.
(vi) To arrange movement of Medical Van/ARME in case of Accident and advice to all concerned Officers as well as Emergency Control/Head Quarter.

(vii) To arrange Logging of all information related to Accident till nomination of any WMI/Competent person.

(viii) To maintain record of Coaching Stock available on the Division and movement thereof.

(e) Section Controller:

The Section Controller shall be responsible for:

(i) Reporting for duty at the prescribed time and ascertaining the position of the section from his reliever.

(ii) Recording the movement of trains on the 'Control' graph including crossing, connections and shunting, reasons for detentions, etc.

(iii) Arranging for the supply and clearance of stock as ordered by Dy. Chief Controller.

(iv) Advising stations in advance of the work to be done on trains on move.

(v) Informing sheds and stations about the late running of trains to avoid the calling of Crew and Guards earlier than necessary or to put back trains, wherever advisable.

(vi) Informing major stations and concerned Section Controller about the current running of trains on the section and their anticipated arrivals well in time.

(vii) Keeping in close touch with Engineering regarding blocks and working of material trains, so as to give the maximum possible time for the same, with least detention to other traffic.

(viii) Incident management, to include adjusting movements of trains in view of the likely impact of the incident and informing all concerned in control office.

(ix) Keeping a watch over damaged vehicles detached at road side stations, arranging repairs or transshipment of their contents and ensuring proper attention on the part of the train examining staff.

(x) Arrangement of ART & M/Van in case of accident and give top priority to ART & M/Van to reach at site.

(xi) Eliminating all possible detention to train and stock.

(xii) Watching the working of marshalling yards & major terminals.

(xiii) Making timely arrangements for the relief of Guards/loco pilots whose duty hours are likely to exceed enroute.

(xiv) Recording stock report (where stock clerks/GA are not posted)

(xv) Ensure issuence of emergent caution orders by concerned Station Masters.

(f) Power Controller/Traction Loco Controller:

(i) Planning and directing engine movements so as to ensure efficient engine utilization and maintaining the prescribed charts and regular statistics.

(ii) Co-ordination with sheds and Dy. Chief Controllers (movement) for sending overdue engines and obtaining time of engines coming out of shed.

(iii) Making timely arrangement for the relief of crew whose duty hours are likely to be exceeded enroute

(iv) Taking timely action to balance crew so as to prevent cancellation or putting back of trains on account of shortage of crew.

(v) Arranging Crew and Medical Van / Accident Relief Train / Crane in case of accidents as per chapters IV of Accident Manual.

(vi) Maintaining charts indicating engine position/utilisation.

(vii) Rendering advice and assistance to locomotive running staff regarding trouble shooting.

(viii) Carrying out any other duties allotted to him by the Sr.DME/DME or Sr.DEE/DEE from time to time.

(ix) Monitoring day-to-day stock position of diesel fuel at RDIs (Railway Diesel Installations) and watching movement of diesel fuel tank wagons (for power controllers only).

(g) Traction Power Controller:

Traction Power Controller shall be responsible for:

(i) Acquainting himself, while taking over shift duty, with the prevailing position of the entire section, including the working of the Remote Control equipment position of all transformers, current breaker's interrupters and isolators, sections under power block, position of tower wagons and break down vehicle etc.

(ii) Maintaining continuous contact with the Traffic Section Controllers in regard to power supply affecting train movements, imposing power blocks etc.

(iii) Taking prompt action for restoration of supply in the event of power supply interruptions or other failures.

(iv) Imposing and removing power blocks in consultation with Traffic Section Controller.

(v) Advising promptly the concerned officials in case of accidents, OHE breakdown, failure of power supply and keeping them posted with all important developments.

10006: Operating Discipline:

(i) **Line Staff to obey orders of control:**

Station staff, Shed staff, Crew and Guards etc must obey orders issued by the Control as long as these orders are consistent with the General and Subsidiary Rules, extant instructions and the instructions contained in this Manual.

(ii) **Control order register:**

Important instructions from control will first be recorded in a register maintained in the control office and serially numbered, commencing with number 1 after midnight each day. These will be issued as messages indicating the time of issue. All such orders received by the Station Masters or Running staff and Guards' lobby from Control should be entered in the control order register by the staff. Each entry must be initialled with time.

At the end of each turn of duty the relieved as well as the relieving Station Master/Guard's lobby in charge or Crew Controller must sign their name in full below the last entry in the register. On days when no orders are received from control, "Nil" entry must be recorded and signed as prescribed above. When a Station Master or Crew Controller has received an order from the control and entered it in his register, he may repeat it to the control in order to satisfy himself and the control that he has understood it correctly.

(iii) Terminal Station should not start a goods or unscheduled train or block the section without the permission of the Controller.

(iv) Every Station on the section must report the movement of every train-passenger, goods, special, departmental, light engines, TTMs, Tower Wagons, trolleys etc. to the controller.

(v) When the control is in function, Line Clear must be asked from the station ahead for every train unless orders to stop it are given by the Controller.

(vi) The Controller's permission must be obtained before stopping a train that should run through except to avert an accident or dangerous condition.

(vii) No station should allow a train, which has been stopped out of course, to proceed, without first informing the controller that the train has been so stopped and on receiving his further orders.

(viii) Station Master must advise the controller of any unauthorised or undue detention to trains at their stations with full explanation.

(ix) Whenever a train, either passenger or goods, is detained at a station for longer than the booked halt without the orders of the Controller, on its departure, the Station Master must immediately inform the

brief cause of the detention to the Controller.

(x) Whenever any damaged wagon is detached out of course at a station, the Station Master on duty should inform the Controller.

(xi) Station Master must promptly advise the Controller of any defects of signals, points, interlocking apparatus and line clear instruments at their stations. Information should also be given of any defects in any other station machinery such as cranes, wagon weigh bridges, turn tables, water columns, hydrants etc.

(xii) **Starting stations to report particulars of outgoing train:–** As soon as a train leaves a train starting station, the Station Master must intimate the following particulars to the control office: Number and description of train, Engine number and class, Loco pilot's name, Guard's name, load of the train (in tones and vehicles), particulars of shunting to be done on the journey, time of departure, brief reasons of late start, time of Signing "ON" of crew, fuel balance and details of OPRS-22/MV-5 etc.

(xiii) **Intermediate stations to report arrival and departure time of trains:–** Station Master of intermediate station must communicate to the Control as early as possible, the following information in regard to every train dealt with:

(a) In case the train has run through, the time it passed the station.

(b) If it is a stopping train, the time of arrival and departure along with the explanation for every detention beyond the scheduled stoppage.

(c) If any shunting has been performed, the number of vehicles attached and detached.

(d) If any extra time has been taken in loading and unloading of packages, the number of such packages and name of the loading station.

(xiv) **Terminating stations to report the particulars of incoming trains:–** Station Masters of terminal and engine changing station must, as soon as possible, after the arrival of a train, communicate to the control the time of arrival and the load of the train, particulars of loco detached/attached.

(xv) **Engine Movements to and from sheds to be reported: –** Loco foreman must communicate to control the time at which train engine leaves from or returns to the shed 'Bar line'. This, in no way, relieves the Station Master of the responsibility for issuing necessary 'all concerned' messages regarding engine failures and engine trouble enroute. The Controller shall record the duration of such defects in his chart, diary and registers.

(xvi) **Time to be checked with control**: – Station Masters, Crew Controllers and Lobbies must check their time with control at the appointed hour every day when control gives a general ring for setting their watches/clocks at 16:00 hrs. Staff must obtain Station Master's permission before speaking to the Controller.

(xvii) **Mode of using the control phone: –** The Control telephone is to be used for operational purposes. The field staff wanting to talk to control will give their identity and wait for their turn to communicate. As this network is intensively used, the conversation should be brief, meaningful and polite. Discussions, disputes and arguments must be avoided.

(a) Station Master and others must not start speaking to control unless they have ascertained by lifting the receiver and listening in, that the line is free. They must then announce the name of the station, shed, lobby or site from where they are speaking and wait for its being repeated by the controller before beginning the conversation.

(b) When, however, an urgent message has to be conveyed and the line happens to be engaged, the station name must be called indicating Emergency. The Controller will immediately attend to the Station having an emergency. Station Masters must attend 'Control Call' promptly.

10007: Co-ordination between Control and Stations:

a. **Asking line clear:** In order to avoid the detention to passenger trains for crossing/ precedence over a less important train, line clear enquiry for the less important train must not be asked until the train is ready to leave and until the Section Controller's permission has been obtained. The Station Master receiving the line clear enquiry must immediately ask the Controller's permission to give line clear before giving the reply. The Station Master on duty is entirely responsible for seeing that the necessary General and Subsidiary rules and Station Working Rules are observed before giving Line Clear.

b. When a Station Master for any reason finds it difficult to carry out Controller's arrangement to receive the train in yard/station due to yard/station constraints, he must explain his reasons clearly and fully to the Controller.

c. **Work at stations:** The permission of the Controller must be obtained before the performance of any shunting; Controller must be informed of the likely duration of shunting to enable him to arrange crossing and precedence of trains. In the event of Station Master being unable to start a train on receipt of line clear, he must at once report the circumstances to the Controller.

d. **Control order regarding crossings etc.:** The Section Controller will give definite instruction for crossing or precedence and will not change them except under unavoidable circumstance because last minute change of order will result in confusion and unsafe operation. The Station Master is entirely responsible for seeing that the crossing / precedence is effected safely and strictly in accordance with the rules. The Controller must see that sufficient time is available for the necessary operations to be carried out. If the Controller fails to do so, the Station Master should represent that delay may occur, but it does not allow him to disregard any rules in order to avoid such delay.

10008: General Order of Precedence of Trains:

Unless specific orders to the contrary are issued by the PCOM or by those acting on his behalf, the following general orders of precedence shall be observed by control and stations:

1. ARME, ART proceeding to the site of accident.
2. President's and VVIP's specials (Unless otherwise specified in the Time Table).
3. Suburban train in peak rush direction.
4. Super-fast trains like Shatabdi, Rajdhani etc.
5. Mail/Express trains.
6. Military personnel special, if instructed by emergency control/DOM.
7. Fast Passenger train
8. Special engaged by the public. (Precedence order may be revised)
9. Passenger trains.
10. Mixed trains.
11. Military stores special.
12. Express or special good strain.
13. Through good strain.
14. Accident relief train returning from the site of accident (unless otherwise ordered).
15. Shunting and van good strain.
16. Departmental trains.
17. Light Engine

Note: The following general principles are mentioned for the guidance of Controllers but it must be distinctly understood that nothing in these instructions modifies the safety precautions laid down in the rules (General and Subsidiary Rules, Station Working Rules etc.):

(i) A Passenger train nearing the end of its run should not normally be detained in preference to a train which has a longer run before it, as

the latter train is more likely to make up time and reach its destination punctually than the former.

(ii) A train running to time should not be detained more than 30 minutes to effect crossing on single line. (This should be decided by the Division based on actual condition.)

(iii) A train running late due to defective engine or defect in rolling stock or any other cause which is likely to continue to operate against it and prevent it from making up time, should generally give way to a train running properly.

10009: Accidents:

Controllers and other staff should thoroughly understand and act on the guidelines contained in G & SR and Accident Manual. Saving of lives, rescue of injured and mitigating hardship to passengers must be given the topmost priority.

Working of Trains when Control is interrupted:

When the control is interrupted and no communication with the Controller is possible, Station Masters will be responsible for the working and regulating of trains, keeping in view the instructions issued by the railway administration.

10010: Books/Documents and basic records to be kept in Control Office:

1. Station Working Rules of all stations.
2. Working facilities available on the transshipment sheds.
3. Schedule of shunting engines in the various yards.
4. Link diagrams of rakes and engines working the passenger services and also of goods trains, where laid down.
5. Crew link diagram of the various services, for the running staff.
6. Details of maximum moving dimensions permitted on the various sections of the railway.
7. Map showing the maximum permissible axle load on all the railways with which traffic is interchanged.
8. Charts showing line capacity of the various sections.
9. Index of sections and plans of the various sections of the jurisdiction and details of train watering, Engine fueling etc.
10. Master charts depicting all trains indicated in the working time table in force.
11. Charts showing jurisdiction of the various officials with details of :
    (a) The maintenance branch of the Post and Telegraph department responsible for maintaining control circuit wires in good condition.

(b) The various departments of the railways.

(c) Juridiction and telephone numbers of Civil, Police, Military authorities.

(d) List of various hospitals with Telephone Numbers.

(e) List of stations (Civil, district-wise).

(f) OHE Sectioning diagram.

12. Diagrams showing the layout of line wires of the Control Circuit.
13. Line patrol chart
14. A calendar of returns
15. Cranes and Wagon weigh bridges.
16. Turn tables and Triangles.
17. List of spare coaches based in the division as well as slip coaches running on and across the division.
18. List of coaching Rakes allotted to the division and those passing over the division.

10011: Registers generally maintained in Control:

1. By the Section controller:

(a) Section controller's diary and charge book.

(b) Inward message book.

(c) Sick wagon register.

(d) Yard report registers.

(e) In-coming and out-going trains RD (Running Diary) (other than passenger).

(f) Train Advice (T. A Book).

(g) Caution Order Register.

(h) Caution Order Message Book.

(i) Morning (6 O' clock) Position Register

(j) Engine Book.

(k) Interchange Register.

(l) Load Register.

(m) Incoming and Outgoing passenger Train Running Diary.

(n) Points and S & T Failure Register.

(o) Important Yard Balance Register.

(p) Control Failure Register.

2. By the Chief Controller (Movement), (Coaching)/ Dy.Chief Controller :

(a) Yard Running Balance Register.
(b) Dy. Chief Controller's Diary & Charge Book.
(c) Train Advise Book.
(d) Forecast and Acceptance Book.
(e) Train Ordering Book.
(f) Punctuality Register.
(g) Accident Register.
(h) HQ's Conference Register.
(i) Goods Train Performance Register.
(j) GM's Unusual Occurrence Register.
(k) CTNL (Movement)/(Coaching)/Dy CTNL's Order Book.
(l) ODC Register.
(m) Rajdhani Express (and similar trains) Caution Order Register.
(n) Emergency and General Control Office Message Register (Inward).
(o) Engine Book.
(p) Emergency and General Control Office Message Register (Outward.)
(q) Interchange Register.
(r) Engine Balancing Register.
(s) Accident Log Register.

3. By the Power Controller:

(a) Power Position Book.
(b) Out Station Loco Pilot Register.
(c) Power Controller's Diary.
(d) Engine Link.
(e) Crew Link.
(f) Crew Position Register.
(g) Register of Movement and Diversion of departmental/Diesel/ Lube oil Fuel Tank Wagons.
(h) Register showing Undue and Abnormal Detention.
(i) Shed Conference Register.
(j) Fuel Balance Register.
(k) Schedule Dates of Locos
(l) Running Crew Report Register

Additional Guidelines:

Additional information and guidelines regarding control are given in various other chapters of the Manual, particularly the chapters on goods train and passenger train operation.

CHAPTER-11
MARSHALLING YARDS AND FREIGHT TERMINALS

11001: Introduction and Definition:

A Yard can be defined by the functions it performs. It is the place or the activity center on a Railway system, where the trains or group of rolling stocks are received, reformed into trains or loads after marshalling and are dispatched to their destinations. A Yard is, thus, a classifying and distributing machine with facilities for receiving, sorting and dispatching the wagons to their various destinations, after the prescribed attention. This necessarily involves detention to trains and wagons but it is inherent in railway working to have Marshalling Yards.

A Yard is a specified area laid out with a network of tracks divided into several grids for receiving, sorting, forming and dispatching of trains.

11002: Necessity and Significance of Marshalling Yards:

Though Yards perform very important functions, yet the work done in a Marshalling Yard is only indirectly productive. Yards are operational necessities and are even considered as necessary evils. The ingenuity of the operating man consists in putting in the minimum number of the wagons into the minimum possible number of Marshalling Yards by forming trains for the farthest common points subject to rules and regulations. If the control is analogous to brain of the operating system, a large Marshalling Yard is akin to the heart and its working is to be planned and monitored with considerable care. Constant vigilance and intelligent and efficient work in day-to-day functions is required as it is one of the important factors governing the capacity and the output of a section. A Marshalling Yard affects not only the traffic it deals with but also the entire train running on the section, in particular and the working of Railway system in general. The Yard gets easily congested if treated as a holding Yard and if more trains are put in than taken out.

11003: Classification of Yards:

Yards can be classified as:

1. Terminal Yard
2. Marshalling Yard.

Terminal Yard: Terminal Yard means the Yard attached to terminal goods sheds where large number of wagons are loaded and/or unloaded. This term is also used for every goods Yard, where a goods train terminates.

Marshalling Yard: Yards are nominated as Marshalling Yards on the basis of the work done and wagons dealt with. The Yards which receive and dispatch trains without any shunting on them are classified Transit Yards. In such Yards generally change of Crew, Engine or C&W examination etc. only take place in addition to formations of a few loads. During the last 50 years such yards have become anachronistic and have given way to modern freight terminals the world over. Therefore, this description has value (1) as a historical document (2) as also as guidelines for efficient working of modern freight terminals, described at the end of this chapter.

11004: Objectives of Marshalling Yards:

1. Quick Transit

(a) Accepting trains without detention at adjacent station outside the Yard.

(b) Minimising the detention to wagons in the Yard.

(c) Timely supply and placement/removal of wagons to the goods shed, transshipment shed, repacking shed, sidings, carriage and wagons depots etc. served by the Yards.

(d) Forming block loads for the farthest destination.

(e) Ensuring convenient Marshalling of wagons from the operational efficiency point of view.

(f) Ensuring right time start of outgoing trains.

2. Economy:

(a) Maximising productivity of resources and minimising the detention to Train Engine/Light Engine, Shunting Engine, crew and other connected staff.

(b) Optimising the Trailing load of trains.

(c) Optimising shunting engine utility.

3. Safety:

(a) Ensuring minimum damage to wagons and consignments loaded on the wagons during the shunting operations.

(b) Ensuring safe Marshalling and C&W pattern of examination.

(c) Elimination of Yard accidents.

11005: Kinds of Yards:

Marshalling Yard can be classified under three groups on the basis of the method of sorting out trains:-

1. **Flat Yard:** Flat Yards are generally laid on flat or level land where shunting operations are carried out with the help of engine by push and pull method. Such a Yard is economical in space but slow in

working and wasteful in shunting engine hours.

2. **Hump Yard:** Hump Yards are constructed by providing gradients between reception and the sorting and dispatch lines and the grids. The gradients are created by constructing an artificial hump suitable for the purpose. The gradient of the hump is constructed in such a manner that the wagons roll down on their own to specified sorting lines from the summit (apex) of the hump after having been pushed up by the shunting engine. The load is pushed up by the engine towards the hump from one side of the hump so that the uncoupled portion of the load rolls away towards another side of the hump in sorting/dispatch line. There are generally two humps one for 'Down' and one for 'Up' Yard. These Yards are economical in shunting engine hours as compared to flat Yards.

3. **Gravity Yard:** Gravity Yards are constructed where the natural contour of land permits a suitable falling gradient stretched over a sufficient length. The falling gradient makes it possible to use the Yard to the fullest extent in Marshalling wagons/trains thus minimising the use of engine power. Therefore gravity Yards are more economical than flat Yards but their layout is dependent on the availability of plenty of land with the required topography which is seldom possible.

11006: Some Terms Concerning Marshalling Yards and its Components:

Some of the components of Marshalling Yards are explained below:

1. **Reception Yard:** Reception Yard comprises of the lines on which the incoming trains are received and stand clear of other running lines, while waiting for their turn to be dealt with. Incoming trains may be composed of wagons which are to go through after changing of power, Crew and Guard or of wagons requiring sorting and Marshalling. Separate grids may be provided in the reception Yard, one for through trains and another for terminating trains. Separate reception Yards may be provided for trains coming from different directions. The grid for through trains by passes the hump.

2. **Sorting Yards:** It is a Yard in which the trains are broken up on the different sorting lines for various directions or specified destinations, as per Marshalling order, so as to form them into trains and prepare them for correct Marshalling.

3. **Marshalling Lines:** The lines in which sorted wagons are separated first, if necessary, according to commodity, type of vehicle, Marshalling order, direction and secondly, reformed into trains in special order to meet the requirements of the section ahead or any other special transportation requirement.

4. **Departure Yard:** This is a Yard in which load can be held ready for departing trains. Separate departure Yards for trains for different directions are provided in large Marshalling Yards.
5. **Shunting Neck:** It is a line in a Yard leading to sorting lines on which the actual shunting of the trains may be done clear of any running lines.
6. **Gathering lines:** It is a line on which the turn outs to other lines are arranged.
7. **Transfer lines:** These lines are meant for transferring wagons, generally from up Yard to down Yard or vice versa, in case of two separate Marshalling or hump Yards.
8. **Bypass or avoiding lines:** It is a line, which skirts the hump and its object is to enable engines to avoid going over the hump. It joins the shunting neck at one end and the main hump line, short of the king point at the other. It is also used for vehicles, which cannot be passed over the hump into the sorting Yard due to various reasons.
9. **Engine Run Round Line:** It is the line reserved for movements of incoming and outgoing train engines to and from the Yard or the loco shed or for independent movement of shunting engines.
10. **Engine Escape Line:** It is the line meant for engine movements to and from the loco shed from and to the Yard so that engines returning to loco sheds do not interfere with engines going out of the loco shed or with any other movements in the Yard.
11. **King Points:** The first pair of points a wagon meets with after passing over the hump are called 'King Points'. They divide the sorting Yard into two portions.
12. **Queen Points:** The second pair of points a wagon meets with on its way downwards are called Queen Points, which further divide the sorting Yards into four portions.
13. **Jack Points:** The third pair of points a wagon meets are called the jack points and these serve to divert the rolling wagons into the different grids of the sorting Yard. Points beyond jack points are called 'Ten points'.

    Note: In a hump Yard there are usually a pair of 'king points', two pairs of 'Queen points' and four pairs of 'Jack points'.
14. **Retarders:** One of the main problems in the working of a hump Yard is to adjust suitably the speed of the humped wagons rolling down so that they may not cause damage by humping down against wagons already standing on the same line. The speed of the humped wagons varies according to the force of the push given by the engine, the height

of the hump, the weight and nature of the axle box (viz. roller bearing or plain bearing) as also on the weather prevailing.

15. In mechanised Yards, retarders or rail brakes are installed to reduce and keep the speed of the humped vehicles under control. The retarders may be automatic or manually operated.
16. **Skids:** At Yards, where mechanical retarders are not provided, skids are placed on the sorting lines to control the speed of the humped wagons. These skids are placed by skid porters and the skids automatically come out of runways, where provided or/and are removed after the wagon has come to stop.
17. **Brake van siding:** In this siding, brake vans of incoming terminating trains etc. may be detached for subsequent attachment to originating trains.
18. **Special stock siding:** These are provided for keeping special type stock, cattle etc. and wagons containing commodities like explosives which cannot be humped.
19. **Stabling Lines:** In large Yards, ballast, material or POH special, empty military special trains are sometimes required to be stabled. Moreover there are heavy accumulations of certain classes of stock for various reasons. The stabling accommodation in the Yard should therefore be ample so that the Yard may retain its mobility in spite of any accumulation of wagons or other setbacks.
20. **Sick lines:** Normally sick wagons are sorted out in the sorting Yard, then sent in the sick line. As the time taken in placing wagons into and withdrawing them from a sick line is usually several times the time spent in actual repairs, provisions should be made to carry out whatever repairs are possible in the sorting Yard itself by providing sick lines.

11007: Telecom Equipment of Marshalling Yards:

A Marshalling Yard should necessarily have the best possible telecom facility for proper functioning and efficient supervision of work:

1. Telecommunication arrangement: Since a Marshalling Yard covers a considerably big area, the distance between its different points and portions becomes naturally long. Therefore an extensive telecom network, through an electronic exchange and intercoms between all-important points in the Yard, is imperative so that instructions to the supervisory staff can be conveyed quickly over telephone. The Yard should also have direct dialing trunk facilities and Control Telephones, so that instructions to the supervisory staff can be communicated properly and promptly.
2. Paging and talk-back arrangement: Major Marshalling Yards are

provided with Paging and talk-back sets, through which orders and instructions are issued to the staff concerned, working in different spheres in the Yard, from one central point. Similarly, the staff can also convey any information to the central points. This helps co-ordination between different spheres of the Yard.

3. Loud speakers are also provided at convenient points so that instructions can be conveyed to different staff working in the same area. For example, loudspeakers are provided in the Sorting Yard, so that the in charge of the hump can convey instructions relating to Hump cabin and the skid Porters regarding the line on to which wagons are being shunted. Similarly, arrival and dispatch of trains can be monitored.
4. Extensive use of good walkie-talkies will also go a long way in improving the efficiency of the Yards.

11008: Yard Organisation:

Yard working is controlled by a Chief Yard Master, though small Yards may be controlled by Yard Masters. Bigger Yards may be under the control of Area Officer. The Yard in charge has two organisations under him.

1. **Field staff:** It includes the Chief Yard Masters, who is overall Incharge of the Yard and Yard Masters in each shift, who are responsible for operational work. In dual yard system, there may be more than one Yard Master, e.g. one for Down Yard and another for Up Yard; on the other hand, where the traffic is comparatively low, Yard Masters may be replaced by Assistant Yard Masters. The next level of supervision is generally related to the shunting engines. Each shunting engine may have an Assistant Yard Master/Shunting Master, attached to it, who controls the movements of the shunting engine. Shunting Jamadar may be included in the organisation to assist them for dealing with the shunting work allotted to each engine. Where the shunting work is not heavy or comparatively unimportant, the Shunting Jamadar may be in charge instead of Yard Master. Each shunting engine generally has a batch of three or four Pointsmen, whose duties are usually as under.
   (a) For Uncoupling the wagons
   (b) For Braking of wagons
   (c) For Relaying of signals
   (d) For operating the points.

   The above staff form the organisation for sorting work besides other staff are also required for various auxiliary functions - cabin staff, callmans, box porters (brake or skid porters in hump Yards) etc. apart from the staff of other departments.

2. **Trains Branch:** CTNC or Head TNC, has overall responsibility for the efficient working of the trains branch. Below them, there are Head TNCs/ Sr.TNCs/CTNCs, who may be on shift duties or during day duty only, depending on the work load of the Yard. These Trains Clerks are entrusted with comparatively important work in the trains branch like preparation of Marshalling Yard statistics, maintenance of the Yard Balance Register, Daily Stock Taking etc. The TNCs in shift duties take stock position of trains in Reception and Dispatching Yards. They also maintain Wagon Exchange Registers, Phase- wise Detention Register and stock on line position. The number of TNCs in a Yard will depend on the number of wagons and trains dealt with in a Yard.

3. **Yard Working Instructions:** For proper and efficient working of each Yard, general directions for working in each shift should be laid down in the Yard Working instructions. The instructions should deal with all important aspects of working in detail other than the procedure for reception and dispatch of trains etc., which are required to be given in the Station Working Rules to be useful for the general guidance of staff working in the Yard as well as to the new and the relieving staff. The Yard Working instructions should be prepared generally under the following heads:-
   a. Full description of the Yard including no. of lines with their holding capacity etc.
   b. Strength of the Yard Staff in each shift.
   c. Quantum of inward, outward and internal traffic required to be dealt with by the Yard and their timings.
   d. Marshalling Orders in force.
   e. Shunting engines available in each shift and their utilisation, generally.
   f. Procedure of work to be carried out, generally in each shift.
   g. Directions to Shunting Jamadars and Yard Masters on arrival on duty, in general, in regard to advance planning of the work during their shift.
   h. Directions to Shunting Jamadars and Yard Masters in regard to position of the Yard at the time of handing over the charge.
   i. Important Safety Precautions.
   j. Miscellaneous instructions.

4. Main Works required to be performed by Yards:

Generally a large Yard is required to perform the following work with due regard to efficiency, reliability, economy and safety:

   a. To pass through trains after changing of engine, carriage examination, detaching sick wagons, if any and adjusting load of

the train, if necessary.

b. To break up and sort out terminating trains and loads and the local loads originating in the Yard.
c. To form originating through trains for the farthest point possible in accordance with long distance Marshalling orders laid down by the HQ office.
d. To form shunting and van trains for the different sections served by the Yard.
e. To hold back trains and wagons until they are able to go out.
f. To keep wagon detention to the minimum while planning item No. (a) to (e).
g. To move train engines and pilots between the Yard/Loco Shed and sidings.
h. Placement and removal of inward loaded wagons for the goods shed, loco shed, private sidings etc. served by the Marshalling Yard.
i. Placement and removal of wagons from the repacking shed to the Yard.
j. Placement and removal of Sick/Fit wagons from the sick lines.
k. Assessment of room by the nominated shunting trains for roadside stations.
l. Arrangements for supply of stock as per Indent Register and ODR required by the road side station in accordance with the orders received from the Dy. CHC (Stock).
m. Weighment of wagons in certain nominated Yards as and when required.
n. Maintenance of the correct tally of the daily output of the Yard.
o. Maintenance of record of detentions to other kinds of stock such as local loaded, sick wagons, empties and special stock etc.

5. Some Factors Affecting Working of the Yards :

a. Lack of proper advance planning and co-ordination between the Control & the Yards and want of proper co-operation among the Yard staff, loco shed staff and carriage & wagon staff, affects Yard working adversely. For efficient Yard working it is necessary that the Yard staff must plan their work in advance in consultation with control and adjacent Yards, if necessary. The different members of the Yard staff should extend co-operation in the efficient working of the Yard as a matter of team spirit.
b. Sometimes, while breaking up the terminating trains, local wagons are not properly collected in specified lines and they remain scattered in the sorting and Marshalling lines or other

parts of the Yards thereby causing undue delay in the Yard operations. Endeavour should always be made to collect these wagons in lines specified for the purpose.

c. Late or irregular removal of loads from local areas affecting timely placement of wagons in their appropriate sidings is often a chronic cause of trouble in the working of the Yard. Therefore endeavour must always be made to adhere to the schedules for placement and removal of wagons in the different areas of the Yard in accordance with Yard working instructions.

d. Empty stock should not be allowed to lie scattered all over the Yard. As far as possible empties should be sorted out in the groups in which they are generally required to be worked out, keeping as far as possible special type of stock separately from general wagons. All empties stock so grouped preferably be kept separate in specified lines.

e. Sick wagons and wagons for adjustment of loads and transshipment of contents often lie scattered throughout the Yard thus hampering the Yard operations. Even if the number of sick wagons exceeds the repair capacity, these must invariably be kept collected in the specified lines and sick lines placement and removal should be done strictly according to the schedule. Wagons requiring adjustments of loads and transshipment or contents must always be placed in the appropriate line and attended to with the least possible delay. Where adjustment of loads can possibly be done in the Yard itself, this must be resorted to.

f. Any tendency on the part of shunting engine Loco pilots to waste time on loco requirements should be curbed. Shunting engine must not be allowed more than the specified time for loco requirements at fixed intervals.

g. Higher wagon balance in a Yard affects its mobility. It is, therefore, very necessary that proper analysis of the highest wagon balance beyond which mobility of the Yard is seriously affected, should be worked out and proper co-ordination among the Yard Master, Assistant Station Master, Control and adjacent Yard should be maintained all the time. To prevent excessive inflow of wagons, which seriously affects mobility of the Yard, an eternal watch should be kept on the Yard Balance and steps taken to keep it within the working capacity of the Yard.

h. Efficiency of the Yard shunting engine is one of the most important factors on which the working of the Yard depends.

Requirement of a better shunting engine or an additional shunting engine during the busy periods, may therefore be found necessary for better working of a Yard. In big Yards, efficiency and sufficiency of the Yard shunting engines should be periodically examined and if frequent engine trouble is reported, supervisors of loco should be posted temporarily with them until the cause of the trouble is removed.

i. Yard lay out: The shunting Jamadar and the Yard Master should carefully watch if any particular feature of the layout, such as wrongly placed cross over, a short shunting neck or isolation of two busy groups of lines, is a restrictive factor in the efficient working of the Yard and if any minor additions and alterations, such as providing an additional crossovers, positioning an existing cross-over correctly, lengthening of a particular line etc. are likely to improve the working of a Yard, necessary proposals should be forwarded to the DRM(O).

j. Sometimes delay in the release of wagons by public and departmental consignees causes heavy accumulation of local wagons, thus affecting the working of the Yard. Advance intimation given to rake handling parties on the telephone and the departmental supervisors in the local area about the number of wagons awaiting unloading would enable them to make necessary arrangements in time for releasing the wagons.

k. Sometimes identification of any particular traffic, which affects the mobility of the Yard, is required so as to advise the control to restrict the inflow.

l. In case of heavy congestions requiring block back on the neighbouring sections, neighbouring Yard should be called upon or directed by Sr.DOM/CHC Incharge by taking upon them some of the sorting and Marshalling work that the congested Yard would normally have done. If necessary a competent Officer or Inspector should sit in the Yard and direct operation until the congestion is cleared.

m. In the event of an accident temporarily reducing working capacity, steps should be taken to regulate the inflow of trains into the Yard for a day or two or such a long period as may be absolutely necessary until the emergency is over and the Yard has regained its normal working capacity. The work load on the Yard must be suitably reduced to avoid serious repercussions on the Yard itself and on the neighbouring sections. Accidents should preferably be attended to personally by officers, as far as possible, so that re-

railing/restoration and clearance work may be done in the best possible manner.

n. Late start of trains from the Yard: Whatever may be the cause of late start of trains from a Yard, this apart from reducing available capacity of the section, in turn, affects the working of the Yard itself by delaying subsequent formations of trains.

o. Yard facilities: Ordinarily a Yard should be adequate enough for its requirements of sorting, handling of local traffic, formation of trains and for holding back stock until it can go out on the sections or to various installations in the local area. If shunting or train movements in one part interferes with similar movement in the other parts or if simultaneous reception of trains from and dispatch to different directions is not possible or the Yard starting a train from or carrying on shunting in one group of lines while a train is being received in the other group of lines, is prevented, it requires careful attention of Supervisors, Inspectors and Divisional Officers for necessary remodelling.

p. If frequent congestion takes place in a Yard or a Yard shows poor performance, the entire working should be thoroughly examined to determine the root cause of congestion. The causes of strained working may be a general increase in traffic, large increase of traffic from one or two sections or stations, bad working of some installations served by the Yard, small or obsolete shunting engines or their inadequacy etc. All these call for suitable action.

q. Sometimes want of proper working facilities, such as adequate lighting, communication among the different key-points in the Yard, with the Yard Master and the Assistant Station Master requiring a number of messengers to run about in the Yard for this purpose, affects the working of the Yard adversely.

6. Some of the other factors affecting Yard working:

a. Non-rectification of hump gradients.

b. Hump shunting not useful enough for the loads which require pushing of loads.

c. Under load running of outward trains.

d. Trains received mismarshalled.

e. Congestion / Interruption on the section or in terminal Yards.

f. Heavy receipts of local wagons.

g. Shortage of engines.

h. Train Crew shortage.

i. Heavy shortage of Yard working staff including C&W staff.

7. Operating Considerations Governing Design of a Yard:

i. The lay-out of the Yard should be such that as far as possible movements of wagons in their several Marshalling operations would be continuous and progressive in the direction of the destination of the wagons because reverse or zig-zag movements reduce efficiency. The reception lines, sorting lines, shunting necks, Marshalling lines, departure lines should, wherever possible, be arranged with this object in view.

ii. The layout should also satisfy the basic principles of maximum flexibility in movements consistent with safety so that, as many as possible and different types of required movements can be carried out. At one and the same time, it should be possible to perform all the different movements which are to take place.

The following independent movements within one and the same area should be planned as far as possible:

(a) Simultaneous reception of trains from different directions.

(b) Simultaneous dispatch of trains to different directions.

(c) Two or more shunting engines working, not to interfere with one another by provision of separate shunting necks.

(d) Reception of one train not to interfere with the departure of another train and vice-versa.

(e) Reception of trains in one part of the Yard should not interfere with shunting in another part.

(f) In large Yards, there should be separate lines for Reception, Marshalling and Dispatch. Bye-Pass Running lines may be provided, if possible, when only crew change is required.

(g) There must be adequate facility of lighting and communication in different parts of the Yard. Yard should be so designed as to permit future extensions in each important section, like reception lines, sorting lines/Marshalling group etc. in the next 25 years though on consideration of economy, requirements of the next five years only may at the first instance be provided.

11009: Marshalling Yard Statistics: (Manual of Statistical Instructions Volume-I)

(Railway Board has decided that statistics shall be maintained in terms of 8-wheeler units. This should be incorporated by the Zonal Railways)

General Instructions:

(a) The Marshalling Yard statistics should be prepared for selected Yards generally dealing with 8000 eight-wheeler wagons and over per month in respect of BG Yards and 5000 eight-wheeler wagons and over per month in respect of MG Yards. Prior approval of the Railway

Board should, however, be obtained for addition or deletion of any Yard.

(b) Brake vans are to be included.

(c) The area of each Marshalling Yard is to be carefully defined and no extra allowance is to be made for any work done within that area. A diagram showing the Marshalling Yard area clearly demarcated should be prepared for the Yards for which statistics are required to be compiled by the Railway for the Board. This diagram should be readily available at the stations to enable any inspecting officer to obtain a clear indication of the extent of the Marshalling Yard.

(d) Sick lines and repacking sheds, transshipment points, goods sheds, departmental sidings and the industrial sidings etc. may, as a general rule, be treated as lying outside Marshalling Yards for the purpose of calculation of Marshalling Yard statistics.

(e) At places, where there are points like the Goods terminal station and/or Break-of gauge transshipment point etc., continuous to the Marshalling Yard and the detention statistics for each of these Yards are compiled separately either for submission to the Railway Board or for inclusion in the Railway's own Domestic Statistics, the sum total of detention in each Yard should accord with the total detention from arrival of a wagon till its final dispatch from that station. To ensure this, the supervisory staff in- charge should exercise a check, at least once in a month on a random sampling basis. This check should be broad based covering not only the important categories of wagons e.g. four wheelers, BOX wagons, oil tanks etc. but also the main stream of movement of wagons to and from different directions. This exercise should cover at least 10% of the total number of local wagons dealt with in the Marshalling Yard during the previous month and the records of such checks should be properly maintained to be available for scrutiny by inspecting personnel.

(f) In the case of wagons whose detention or dispatch particulars are not available, their detention should not be omitted but reckoned on the basis of the average detention during the month for similar type of stock while working out the average detention per wagon. The number of such wagons should be indicated separately under 'through loaded' and 'all wagons for each Yard' in a foot-note to the statement.

(g) Yards provided with humps are to be denoted by a star and terminal Yards should be specified by a note to that effect.

(h) Except where otherwise stated, all results are to be worked out correct to one place of decimal but those which are less than 10 should be worked out correct to two places of decimal.

MARSHALLING YARDSTATISTICS: Statement No.14

For the month of ----------

Item	**Name of Marshalling Yard stating broad guage or metre guage**	**Remarks**
1	Wagons dispatched -	
	1.01	Number of wagons dispatched – Dispatched by trains during the month
	1.02	Number of wagons placed from Marshalling Yard outside the Yard by pilots in goods, transshipment /repacking sheds, departmental sidings or Yards, military sidings, assisted sidings, etc.
	1.03	No. of wagons dealt with during the month
2	Daily average number of wagons dispatched.	
3	Number of trains received	
	3.01	a) Number of passing trains
		b) Number of terminating trains
		c) total (a+b)
	3.02	Average detention to by passing trains: Target-
	3.03	Number of wagons carried by – By passing trains included in item 3.01(a)
4	Number of trains dispatched-	

	4.1	No. of by passing trains
	4.2	No. of originating trains
	4.3	Total
5	No. of wagons dealt with per shunting engine hour-	
	5.1	No. of pilots working in the station
		(a) Number of pilots
		(b) Number of shifts per day
	5.2	Total shunting engine hours outside Marshalling Yards
	5.3	Total shunting engine hours of regular shunting engines employed for work inside Marshalling Yard.
	5.4	Total shunting hours by train engine employed for work in Marshalling Yard.
	5.5	Total time taken for locomotive duties and minor repairs
	5.6	No. of wagons dealt with per shunting engine hour
6	Average detention per wagon (Hours)	
	6.1	All Wagons- Target Actual
	6.2	Through loaded wagons- Target Actual
	6.3	Through empties
	6.4	Outward Local
	6.5	Inward Local
	6.6	Sick wagons

11010: Procedure for Working Out Marshalling Yard Statistics:

(i) Wagons dispatched: Items 1.01 and 1.02 are self-explanatory. A wagon should be included under item 1.02 as many times as it leaves the Marshalling Yard. Wagons on "by passing" trains (i.e. through goods trains, as defined in note under item 1 of statement) will not be included under item 1.01. Item No. 1.03 = Item 1.01 +1.02

(ii) Daily average number of wagons dispatched:

$$\text{Item 2} = \frac{\text{Item 1.03}}{\text{No. of days in the month}}$$

(iii & iv) Number of trains received and dispatched:

(a) A train for this purpose is a set of wagons or vehicles worked by locomotive or any other self-propelled unit or rail-motor vehicles, empty or conveying traffic when running, under a particular number or a distinct name, from a fixed point of departure to a fixed point of destination.

(b) All trains, both terminating and by-passing (i.e. through goods trains) are to be included. "By passing trains" should be accounted both under the number received and dispatched.

(iii) Number of wagons dealt with per shunting engine hour:

$$\text{Item 5.6} = \frac{\text{Item 1.03}}{\text{Items 5.3+5.4}}$$

Note :-(i) While compiling shunting engine hours under item 5.3 and 5.4, the following instructions should be kept in view :

(a) Shunting engine hours are to include the shunting hours of regular shunting engines and train engines before and after working a train or during its run when employed in shunting goods wagons only in the Marshalling Yard area. The shunting time within the Marshalling Yard area should only be taken into account and not the time spent outside its limits.

(b) Shunting engine hours are to be reckoned from the time of arrival of the shunting engines in the Marshalling Yard upto the time of their departure from the Yard on the basis of shunting vouchers. The time spent on locomotive duties whether in the Yard itself or outside the Yard is to be included. However, any extra time taken over the normal time prescribed for carrying out legitimate locomotive duties should be excluded, the normal time being determined by the individual railway taking into account the local conditions and indicated in the Operating Manuals.

(c) If shunting engine is required to be repaired in the Yard itself, the extra time beyond 30 minutes spent on such repairs in a shift should also be excluded.

(d) The time spent in the Marshalling Yard for change of crew and/or fuelling should be accounted for in the same manner as on locomotive duties referred to in Note (i)(b) above.

(e) Since shunting engines shunt both coaching and goods vehicles, the allocation of shunting engine hours to goods and coaching stock may be fixed for each Yard on a percentage basis after an examination of the work done. This percentage is to be rechecked at least once a year and also when any change occurs in the type of traffic passing through that Yard. Where daily records are kept of the working of shunting engines according to hours spent

(i) inside the Marshalling Yard
(ii) outside the Marshalling Yard and
(iii) in shunting coaching vehicles,

It will not be necessary to fix a percentage, as the actual hours spent in the Marshalling Yard in shunting goods vehicles will be available. Time taken by shunting engine in placing wagons in such lines is to be included in shunting hours when such lines form part of the Marshalling Yard area.

Note: (ii) Time spent for locomotive duties recorded separately under item 5.5 will be included under 5.3 also. Item 5.5 will include the time taken by shunting locomotive for locomotives duties and minor repairs up to 30 minutes per shift as per Note (i)(b) under item 5.

(iv) Average detention per wagon:

(a) The detention time should have reference only to the detention within the Marshalling Yard territory as defined in para (iv) of General Instructions and the incoming and outgoing wagons from and to the local outlying sheds, sidings etc. should be counted as many times as they enter the Yard. This will include detention to sick wagons in the Marshalling Yard although their detention is separately shown against item 6.6.

(b) The average detention is to be obtained by recording in the wagon exchange register or similar record, the hours of detention to each wagon that is the interval between its arrival and departure. At the end of the month all wagons of different types must be totaled. Total detentions and number of wagons of each type must be multiplied by the factor of equivalence to four wheeler and then consolidated to work out the average detention per wagon. Following example will illustrate the method of calculation of the average detention per wagon.

Example: Suppose Yard A has dispatched 100 four wheelers with a total detention of 400 hours, 20 bogie wagons (Equivalent to 40

four wheelers) with a total detention of 200 hours and 10 Box wagons (equivalent to twenty five four- wheelers) with a total detention of 150 hours. Average detention per wagon will be –

$$\frac{400 \times 1 + 200 \times 2 + 150 \times 2.5}{100 \times 1 + 20 \times 2 + 10 \times 2.5} = 7.1 \text{ hours}$$

The detention of wagons arriving in one month and dispatched in the next will be shown in the month in which they are dispatched, but the time must be reckoned from the date of arrival. Stations which maintain a wagon card index may obtain the figures therefrom instead of from the wagon exchange register. The number and detention of Brake vans will be excluded for the purpose of this item.

(c) The 'target' detention hours will be fixed by the Railway Board from time to time having regard to the past performance of each Yard and also materialisation of different streams of traffic, Marshalling commitments and the facilities available. A pointer to the correct level of a target would be the best result achieved in the past one or two years, assuming that there has been no noticeable improvement or deterioration in the operating conditions and methods. The target should be somewhat better than the actual recorded performance so that it may call for better effort on the part of the staff concerned to achieve the margin of improvement remaining between the actual and the target.

Item 6.1 All wagons - The term 'all wagons' includes through loaded, through empty, local loaded, local empty and departmental wagons, wagons on 'through trains' (as defined in item 1.01 & 1.02). Sick and damage wagons will be excluded. However, sick and damaged wagons will be included wherever the sick lines form part of the Marshalling Yard area. In respect of the Yards which may as well be depots for holding empties, such empties should not be included for the purpose of this item. These Yards should, however, be denoted by a suitable footnote specifying therein the average daily holding of the depot.

The "exit" and "re-entrance" timings may be fixed on the basis of sample observations made once a year. These fixed timings may be rechecked annually and also when any major change occurs in the working of the Marshalling Yard.

Item 6.2: Through loaded wagons - The term "loaded wagons" means loaded wagons which neither originate nor terminate at the station but which are dealt within the Yard and are not on "by- passing" trains (as defined in item 1.01. and 1.02).

Item 6.3: Through empty wagons - The terms "empty wagons" means

empty wagons which neither originate nor terminate at the stations but which are dealt in the Yard and are not on 'by-passing" trains (as defined in items 1.01 and1.02).

Item 6.4: Outward Local - This item will include detention to local wagons dispatched by trains from the Marshalling Yard i.e. from the time of their entry into the Marshalling Yard from the outlying sheds and sidings till their dispatch by trains.

Item 6.5: Inward Local - This will include the detention to local wagons from the time of their arrival in the Marshalling Yard till their placement into the local sidings.

Item 6.6: Sick Wagons - Detention to sick wagons in the Marshalling Yard will be included under this item as also under "all wagons". In case the sick lines form part of the Marshalling Yard the detention in the sick lines will also be included under this item. If the sick lines are outside the Yard, such detention will be excluded.

11011: Present Status and the Road Ahead:

Closure of conventional marshalling yards was an outcome of–

(a) Unit train movement

(b) Advent of containers

The container revolution ensured that an universal flat rail car could move all description of traffic of varying cargo sizes - train load, full container load or less than container load. It can quickly eliminate shunting operations, which was replaced by gantry or road mobile trains; picking up containers and repositioning them - the equivalent of tortous shunting as detailed above. It ensured that freight customer does not have to register a wagon or rake, he has to ask for simply a given number of containers which are sent to his premises for loading/unloading and are brought back to modern freight terminals. The exorbitant cost involved in taking freight consignments to railway goods shed and unloading inward consignment there and carting them to customer's premises are totally eliminated. This intermodal operation ensures door to door service, which till now was the hallmark of road transport, which had captured nearly 80% of market, making Indian Railways the second largest mode of transit movement.

Rightly enough the era of modern freight terminals has begun. These are world class facilities and include:-

(i) An ICD for export/import cargo with customs clearance facility

(ii) Appointed warehouse to facilitate custom duty being paid as and when the cargo is needed.

(iii) Large warehouses where cargo can be stuffed/de-stuffed/ stored and moved as per customers' instruction.

(iv) Road, rail and air transport connectivity on demand.
(v) Cold chain for refrigerated cargo
(vi) Banks
(vii) Fax, Telex & Telephone Internet connectivity
(viii) Continuous cargo tracking globally

11012: Freight terminal operating companies and some of the railroad companies which have a customer services centre are working round the clock to receive customers' instructions for change of destinations, rebooking of cargo etc. and in this new environment the freight customer may visit the commercial office to execute agreements or long term contracts. The freight terminal is like a factory where the cargo goes in and goes out. Process for bringing about this business-like cause is already on way with private operators managing their terminals, running their own trains, serving their customers in an entirely business like environment. In this scenario the erstwhile marshalling yard are in the following areas.

i. Providing rail substitute to road
ii. Serving large production units like steel plants & refineries
iii. Major customers like thermal powerhouse, fertiliser plants, cement plants, ensuring availability of inputs and clearance of their outward cargo.
iv. Major carriage & wagon depots for freight rolling stock
v. Crew and loco changing locations
vi. ICDs of IR's subsidiary CONCOR

The transition from conventional goods shed and marshalling yards to freight terminals have equipped railway system worldwide to win back high profit yielding, finished products from road to rail-cum-road system which reduces cost to the company and the customers, substantially reducing the adverse environment impact of road transport and paving the way for sustainable transport. The future manifestation of railway yards is likely to be as Logistics Parks, as railways strives to become a logistics provider rather than a mere transporter.

CHAPTER-12
MOVEMENT OF OVER DIMENSIONAL AND OTHER BULKY CONSIGNMENTS

12001: Definition:

Consignments, which when loaded upon a wagon, would infringe the maximum standard moving dimension, at any point, on the entire route, from the booking station to the destination, including via break of gauge is called an Over Dimensional Consignment (ODC).

Therefore, any consignment exceeding the dimension quoted below shall not be registered for booking unless prior sanction for its acceptance has been obtained from the Zonal headquarters.

Maximum Moving Dimensions from rail level (at any point):

Description	Gauge		
	BG(mm)	MG(mm)	NG(mm)
Height at Centre	4115	3430	3200
Height at sides	3505	3200	2895
Maximum Width	3050mm for Bogie Wagon 3200 for 4 wheeled Wagon	2590	2286

Note:- (i) Above mentioned dimensions include lashing and packing.

(ii) When a dummy truck is used, the maximum weight that may be loaded, in any wagon or truck, is distinctly marked on each vehicle and must not be exceeded.

12002: Classification of ODC consignment:

ODCs are divided into 3 classes according to the minimum clearance available between the consignment and minimum fixed structure profile.

Class'A': Those ODC loads, which have a gross clearance of 22.86 cm (9 inches) and above.

Class'B': Those ODC loads, which have a gross clearance of 15.24 cm (6 inches) and above, but less than 22.86 cm (9 inches),

Class'C': Those ODC loads, which have a gross clearance of less than 15.24 cm (6 inches) but not less than 10.16 cm (4 inches).

	A	B	C
Gross clearance	9" or more	6" or more but < 9"	4" or more but < 6"
Net clearance	6" or more but < 9"	4" or more but < 6"	<4"

12003: Net Clearance: - The net clearance shall be worked out as under:

The net clearance between the consignment as loaded in the train and any fixed structure should be calculated after making an allowance of 75 mm (3 inches) for lurch (horizontal) and 75 mm (3 inches) bounce (vertical) on the straight, together with the following additional factors applicable only when the structure in question is situated on a curve:

1. **Horizontal Clearance**:

(a) Allowance for lean due to super-elevation and overhang due to curvature. The lean should be calculated for that point on the profile of the load which is likely to have smallest clearance from fixed structure, the formula being : $\frac{H\,C}{G}$

where H = height in feet to the point being considered.
C = Super elevation
G = gauge.

For the central overhang due to curvature, the formula will be:-B2/8R
Where
B = distance between bogiecentres
R = Radius of curve.

In cases where the overhang at the end of a vehicle may have to be calculated, the formula will be: -

$$\frac{L_2 - B_2}{8R}$$

where L is the length of the vehicle.

(b) Additional lurch on curves may be taken as 38mm.

2. **Vertical clearance:**

In cases where the top width of the consignment exceeds the gauge of the track, the vertical tilt should be added to the height of consignment to work out the vertical clearance from the fixed structure.

12004: Procedure for sanctioning movement of "Out of Gauge" consignments on North Central Railway:

When an ODC consignment is offered at a station for booking, SS/SM will verify if the consignment exceeds the maximum moving dimension from

originating station to destination station including via and break of gauge, if involved. Sr. DOM will obtain the necessary sanction of the competent authority.

An application must show the length, width, height and weight of the load accompanied by a sketch in duplicate of the consignment.

(a) On receipt of an out-of-gauge consignment offering at a station, the Station Master concerned shall advise the Sr. Divisional Operations Manager, furnishing the following particulars:-

(i) The exact measurements and weight both in figures and words.

(ii) Stations from and to.

(iii) The route via which it is to be moved.

A confirmation copy of this message accompanied by a fully dimensioned sketch of the consignment, in duplicate to be obtained from the consignor, should be sent by the Station Master through Sr DOM to:-

Principal Chief Operations Manager

Headquarters Office, North Central Railway, Subedarganj

Prayagraj and marked "ODC."

(b) On receipt of this information the SSE (C&W) attached to the Operating Branch shall promptly take action and advise the station concerned the same day, the type of wagon into which the consignment should be loaded and the maximum over all dimensions to which the consignment should be confined, with a copy addressed to the Sr. Divisional Operations Manager of the originating Division. On arrival of these, the Station Master should arrange to load the consignment and securely fasten the same to the truck. After loading, the Station Master should advise the SSE (C&W) of the Section to accurately measure the over-all dimensions of the consignment including packing and lashing etc. A FOIS/ COIS/FAX/Telephonic massage giving dimensions both in words and figures will, then, be issued by the Station Master to the PCOM with a copy to the Sr. Divisional Operations Manager. The SSE (C&W) in the Headquarters office shall then arrange to make a final check in these dimensions and issue instructions the same day for movement of the consignment and the route to be followed after obtaining necessary sanctions from PCOM. Under no circumstances must the wagon with the "ODC"be moved without the receipt of these final instructions.

(c) If the load falls under Class 'A', he should advise the Sr DOM of the originating Division and the other Sr DOM's where necessary. The Sr DOM of the originating division will then make arrangements for the movement of the consignment subject to the compliance of the general instructions as given in the para below. The Sr DOM of the originating division will intimate the other Sr DOM's concerned of the movement with complete references,

so that they may issue instructions to all concerned on their Divisions for receipt and movement of the consignment in their respective sections.

(d) If the load falls under class 'B' or class 'C' the SSE/DRG in the Headquarters Office will immediately take the case to the Deputy Chief Engineer (Train Operations). The case should be collected personally by the SSE/DRG, the same day with complete instructions from Dy CE (TO) who will advise the movement by defining the route and special conditions if any, if the load falls under class 'B'.

(e) If the load falls within class 'C', the Dy CE (TO) will immediately address the Commissioner of Railway Safety for obtaining his sanction.

In communicating sanction for the movement of ODC, specific route, through which the particular consignment will move, should be indicated and it will be the responsibility of the SS/SM of the station from which the load originates.

In addition to strictly adhering to the specific route, the restrictions (e.g. speed restrictions, night running restrictions, platform restrictions etc.) notified for conveyance of the consignment over the route, must be adhered to and no relaxation in this regard is permitted.

12005: Movement of "Out-of Gauge" consignment tendered on North Central Railway to another Railway:-

a. The Station concerned will furnish the particulars as indicated in the Para above. The Station Master will send four copies of a fully dimensioned sketch of the over dimensioned Consignment (ODC)

b. On receipt of this message, action will be taken by the SSE(C&W) in PCOM's Office as mentioned in the Para above.

c. As soon as it is decided to accept the over-sized consignment, the other Railways concerned over which it will move will be addressed by the PCOM's Office to examine it and communicate their provisional sanction. The division shall load the consignments only when the provisional sanction has been communicated by the PCOM's Office of this Railway.

d. After loading the consignment, the SSE (C&W) of the section will register the measurement as indicated in Para (b) above and advise the Station Master concerned of the various overall dimensions including packing and lashing etc., as loaded on truck, who in turn will transmit the information by FOIS/COIS/FAX/Telephonic massage to his SrDOM and office of the PCOM.

e. On receipt of this information PCOM's Office will send the case through the SSE (C&W) immediately to the PA to CE if the load falls under class, 'C', otherwise the Operating branch will dispose off the case themselves. The SSE/DRG will collect the case from Dy. CE (TO) the same day with his final instructions.

f. The Operating Branch will simultaneously arrange to advise the PCOM of the other railways, full dimension of the consignment, as loaded on truck for issue of necessary final sanction for movement.
g. An oversized consignment may fall under Class 'A' on this Railway and under Class 'B' or 'C' on the other railways. In such an eventuality, the case will be referred to the Dy. CE (TO) by the SSE/ DRG Headquarters, for further instructions.
h. Under no circumstances, provisional sanction should be treated as final sanction and final sanction must invariably be obtained before the consignment is dispatched.
i. When an "Out-of-gauge" consignment is dispatched from a Yard/ Station, it should be the duty of the dispatching YM/SM to give the control full details of the ODC e.g. owning railway, type of truck, station from and to, route over which it is to move including painted number of the wagon, train number, date etc.
j. As shunting and transship trains are to be taken on platform line for loading and unloading of goods, wagons loaded with over dimensioned consignment should not be attached to these trains and should be forwarded by ordinary through goods trains and not by fast goods running at a speed of over sectional speed of 4 wheeler per hour. If there is no through goods train running on a section, the wagon loaded with ODC may be attached to a pick-up or transship train with instructions to all concerned to avoid taking such a train on platform lines.
k. No over dimensioned consignment must be attached to or transported by a passenger train. The SSE (C&W), when issuing a "fit to run" certificate for any train or wagon containing an over-dimensioned consignment must endorse all copies of the "fit to run" certificate to the effect that the loaded wagon concerned is safe to run and that special sanction exists for the movement of over-dimensioned consignment via the particular route specified.
l. When an over-dimension consignment has been offered for transport and the overall dimensions when loaded are intimated to all concerned and the acceptance for its transport is asked for and it is found that for some or other reasons, this consignment is not required to be dispatched, the sanction accorded to dispatch this particular consignment, a fresh sanction must again be obtained from all concerned before it is ultimately dispatched.
m. Pocket labels on wagons containing over dimensioned loads are to be specially marked "ODC" (Meaning over-dimensioned consignment) and provided before dispatch, showing the correct route as stipulated by the Headquarters Office which must be adhered to.

Class	Sanctioning Authority	Maximum Permissible Sanctioned Speed	Movement During Day or Night	Required to be escorted by
'A'	Within Division: DRM Inter Division of the same zone : PCOM Inter Rly.: PCOM of the Zone and PCOM of concerned Railway.	Sectional speed	Day & Night	----
'B'	Local : DRM Inter Div/Fgn.Rly: PCOM	BG-40 KMPH MG-25KMPH NG-15KMPH	Day & Night	SSE(C&W)
'C'	CRS	BG-25 KMPH MG-25 KMPH NG-15 KMPH	Day	SSE (C&W), SSE (P.Way) & TI.

Movement of over-sized consignment from other Railways to North Central Railway or via North Central Railway.-

(a) The Office of the Principal Chief Operations Manager will take action, if the consignment falls under class'A'

(b) If, however, it falls under Class 'B' or Class 'C', the SSE/DRG should take the case to Dy. CE(TO) and arrange to collect the same from him the same day. If a reference is to be made to the CRS, PA to CE will arrange to do so the same day.

(c) On receipt of approval either by Dy. CE(TO) or CRS, the office of the Principal Chief Operations manager will issue instructions for movement to the Sr. DOM concerned, with a copy to all concerned en route.

(d) A register should be maintained by the SSE (C&W) Headquarters Office so that movement of each ODC is checked by the ATM/STM (G) in the Headquarters Office.

12006: Loading:

(i) On receipt of the sanction, the consignment should be loaded carefully, lashed and packed properly, so as to avoid any dislocation enroute.

(ii) While examining the wagon loaded with ODC, the SE (C&W) must pay attention that the Load is well secured and is within CC of the wagon.

(iii) SE (C&W) will ensure that the weight on any pair of wheels does not exceed Axle load restriction, if any.

(iv) After loading the consignment, SSE (C&W) will register the

measurement and advise the SS/SM concerned of the various overall dimensions, including the packing and lashing etc., as loaded in truck. SE (C&W) must issue a "fit to run" certificate to the effect that the loaded wagon concerned is safe to run via the particular route specified for the movement of ODC.

(v) Thereafter SS/SM will inform, Sr DOM/DOM and office of the PCOM, followed by a confirmation copy, to be sent to PCOM through SrDOM.

(vi) The Operating Branch will arrange to advise the PCOM of the other Railways concerned, with full dimensions of the consignment, as loaded in the truck for issue of necessary final sanction for movement.

(vii) Under any circumstance, provisional sanction must not be treated as final sanction and final sanction must invariably be awaited before consignment is dispatched.

(viii) SS/SM/CYM/YM concerned must furnish full particulars of the wagon to the Control, such as Wagon No., Owning Rly., Type of Wagon, Station from and to, route over which it is required to move, etc. After this, Control/ Divisional office will give necessary permission to the concerned staff to dispatch the wagon by a particular train on the date advised and obtain their acknowledgement.

(ix) A Caution Order will be given to the Guard and Loco pilot of the train carrying ODC to restrict the speed and observe any other speed restriction at any other point or other precautions as laid down.

12007: General instructions applicable to all "Out-of-Gauge"Loads:-

The following general instructions must be observed for the transport of all Out-of Gauge loads over North Central Railway:

(a) The booking Railway on which an 'Out-of-Gauge' load originates is responsible for obtaining the provisional acceptance of the receiving railways concerned quoting the over-all dimensions, weight of the consignment, the type of truck on which it is to be loaded, the route over which it is required to move and the starting and destination stations.

(b) On receipt of the provisional sanction, the consignment should be loaded carefully and lashed and packed properly so as to avoid its shifting enroute.

(c) Before any 'Out-of-Gauge' load is dispatched from the loading point, a responsible official not below the rank of a Sr. Section Engineer (C&W) must personally take measurements of each such load and note in a register (having serially numbered pages) specially maintained for this purpose, the actual overall dimensions and painted number of the truck.

(d) All 'Out-of-gauge' loads should move on the route selected by the

railways-concerned.

(e) The dimensions of the 'Out-of'-gauge' loads, both as regards its distance from the centre line of the truck and its height above the floor of the vehicle and rail level, should be checked by each SSE (C&W) at his headquarters stations throughout the route over which the load travels.

(f) Loco yards, goods sheds and transshipment platform sheds should be avoided for transporting 'Out-of-gauge' loads. This does not prohibit the use of portions of the line adjacent to the goods sheds and transshipment platform sheds, which are not directly in front of such sheds and can be approached without running the consignment in front of the shed.

(g) When the width of the consignment is in excess of 10' - 6 inches (3200 mm) when loaded on a truck and a height less than 4' - 0 inch (1200 mm) from rail level, such consignments should be unloaded short of the goods platform at the destination.

(h) If the overall width of an 'out-of-gauge' load exceeds 5' -6 inches (1650 mm) from the centre line of the truck, platform edges must be kept clear of passengers and their luggage during transport.

(i) Speed of the trains carrying an 'Out-of-gauge' load must not exceed the prescribed speed, subject to any other speed restrictions on the section of the line and General Rule 4.10 (1).

(j) 'Out-of-Gauge' loads having 0-9 inches (228.6 mm) or more gross clearance from structures horizontally and vertically after making allowances for curvature, super elevation etc. can move during the day and night.

(k) Shunting of trains with an 'Out-of-gauge' load should be avoided as far as possible and arrangements will be made for inspection of the load by an experienced Section Engineer (C&W) at the station where shunting becomes necessary, in addition to the check by the Section Engineer (C&W) enroute at their Headquarters stations, vide sub para (e) above.

(l) The articles shall be securely fastened to the vehicles or bolsters in such vehicles on which they rest in such a manner that they cannot shift from their position. However, if any shifting still takes place the consignment must be brought to the proper place and position and securely fastened before the train is allowed to proceed.

(m) If the articles rest on more than one vehicle, they shall rest on not more than two points, one in one vehicle and one in another; suitable bolsters or other arrangements should be provided to enable the vehicles to pass freely round any curves on the line. Other vehicles

may, if necessary, be interposed either between or beyond those on which the articles rest, but the articles must not under any conditions touch or be fastened to any part of such other vehicles.

(n) The greatest weight on any pair of wheels shall not exceed that for which the vehicles are designed and this weight shall, as nearly as possible, be evenly distributed on the two rails. In no case must the load rest on the end of a vehicle in such a manner that the weight on any pair of wheels shall be more than double that on any pair of wheels in the same vehicle.

(o) 'Out-of-'Gauge' loads should, as far as possible, move by through trains and not by work or Shunting trains.

(p) Due to restrictions on night running or for any other reason if any 'out-of-gauge' load is detached from any train at any station, the traffic staff is responsible for stabling the load in a safe place till dispatch from the station.

(q) The freight for transport of 'Out-of-gauge' load should always be charged on the actual distance over the carried route and not via the shortest route.

12008: Additional special precautions in addition to General Instructions for the transport of 'B' Class 'Out-of Gauge' loads :

(a) The load must move under the personal supervision of a competent SSE (C&W) and TI, who must submit full report of their journey to the Principal Chief Operations Manager, Prayagraj "through Sr.DOM".

(b) The load may move during day and night.

(c) The speed of the train carrying the load must be restricted to 40 KMPH on Broad Gauge, 25 KMPH on Meter Gauge and 15 KMPH on narrow gauge and must further be restricted to 8 KMPH while passing stations, yards and turn-outs.

(d) Such loads must be attached next to the engine in a goods train and one additional Brake van must be attached just after the load for the convenience of the SSE (C&W) and the TI(M).

(e) All high level platforms and Passenger Sheds must be avoided throughout the journey.

(f) In addition to freight and other charges, infringement charge, as per existing rules, per truck for the actual distance of carriage over the railways specified by Principal Chief Operations Manager, Prayagraj must be realised for this movement.

12009: In addition to instructions mentioned in above paras further instructions to be observed for the transport of 'C' class 'out-of-gauge' loads:

(a) 'C' Class 'Out-of-gauge' loads can be moved only on receipt of sanction

from the Commissioner of Railways Safety.

(b) Representatives of Engineering and Mechanical Departments must also accompany the load.

(c) The speed of the train carrying the load must not exceed 25 KMPH on Broad Gauge, 25 KMPH on Metre Gauge and 15 KMPH on Narrow gauge or such lower speed as may be specified in each individual case. It must further be restricted to 8 KMPH while passing station yards, curves and turn outs on BG and MG.

(d) The load must move at a dead slow speed while passing the fixed structures at the minimum distance prescribed in the schedule of Dimensions on the straight and curves and all isolated side structures, such as signal posts, trestles of foot-over bridges etc.

(e) Train carrying Class 'C' 'Out-of-gauge' loads on the double line section must not cross in the block section to other trains having ODC on account of width.

12010: ODC (Over Dimension Consignment) Movements on Electrified Territory:

Various guidelines regarding the movement of ODC as stipulated in Indian Railway Schedule of Dimenstions (IRSOD) & AC Traction Manual (ACTM) are as below :-

(a) Classification of ODCs in electrified territory (Para: 10435, ACTM Vol.-I) ODCs are classified as under:

'A' class ODC (Permitted out of Gauge Loads): Those ODC loads, which have gross clearance of 228.6 mm (9 inches) and above.

'B' class ODC (Exceptional out of Gauge Loads): Those ODC loads, which have gross clearance of 152.4 mm (6 inches) and above but less then 228.6 mm (9 inches).

'C' class ODC (Extra-ordinary out of Gauge Loads): Those ODC loads, which have gross clearance of less than152.4 mm (6 inches) but not less than 101.6 mm (4 inches).

(b) Precautions for Movement of ODCs in 25 KV AC Electrified Section (Para: 10436, ACTM Vol.-I)

The following precautions must be observed for transport of ODCs in the electrified sections:

The following are the prescribed clearances from contact wire for the passage of ODCs through electrified sections and the special restrictions required:

i. A Special speed restriction is not required when the gross clearance is more than 250 mm.

ii. Speed must be restricted to 15 kmph when the clearance is between 250 mm and 200 mm. (ODC would not be stopped under critical locations i.e. where clearance is between 250 mm to 200 mm).

iii. Speed must be restricted to 15 kmph and power to OHE must be switched off when the clearance from the contact wire is less than 200 mm**. (Para 10436(3), ACTM Vol.-1), ACTM Correction Slip No. 29, dt- 25-10-2018**
No consignment with less than 100 mm clearance from the overhead contact wire will be permitted in a 25 KV electrified section. **(Para 10436(4), ACTM Vol.-1)**
A representative of the OHE section should accompany all ODCs having clearance as specified in items b(ii) and b(iii) above to supervise safe movement of the ODC at locations where clearance from the contact wire is critical. (Para 10436(5), ACTM Vol.-1)

(c) Electrical Clearance: (Para 1: Chapter-V, Page 6 of 9, ACS-10 to IRSOD dt.08.11.2012)

Electrical clearances have been revised in IRSOD correction slip no. 10 and are as under:

(i) Long duration:250mm
(ii) Short duration:200mm

A minimum vertical distance of 270mm shall normally be provided between rolling stock and contact wire to allow for a 20mm temporary raising of the tract during the maintenance. Whenever the allowance required for tract maintenance exceeds 20mm, the vertical distance between rolling stock and contact wire shall correspondingly be increased.

Further, as per para 5, Appendix A to Chapter V-A, IRSOD it is stipulated that in case of light structures such as foot over bridges, it would be desirable to keep the standard height of contact wire of 5.50m. In the case of heavy structures, such as flyover bridges or road over bridges, it is desirable to keep the height of contact wire as low as possible consistent with the requirement of movement of standard class 'C' over dimensional consignments of height 4.80mtrs.

(d) Minimum Height from Rail Level to underside of contact wire: (Para 2 : Chapter V, Page 6 of 9, ACS-10 to IRSOD dt. 08.11.2012.)

(i)	Under bridges and tunnels	: 4.80 m
(ii)	In the Open	: 5.50 m
(iii)	At Level Crossings	: 5.50 m
(iv)	In Running and carriage Sheds	: 5.80 m

Note:

1. In cases where it is proposed to allow locomotives or rolling stocks not higher than 4.42 m, the minimum height of contact wire, specified under Item d(i) above, may be reduced to 4.69m.
2. In cases, where it is proposed to allow only locomotive or rolling stocks not higher than 4.27m, the minimum height of contact wire, specified under Item d(i) above may be reduced to 4.54 meter. A board showing this restriction and specifying "locomotives or stocks not permitted to ply on

such section", shall be exhibited at the entrance to the same.

3. For the movement of Over Dimensional Consignments, the height specified under Item 2(i) above shall be increased by the difference between the height of the consignment contemplated and 4.42 m. In case, such an Over Dimensional Consignment is moved at a speed not exceeding 15 kmph and is also specially escorted by authorized Railway Staff, the derived height of Contact wire may be reduced by 50mm.

4. On curves, all vertical distances specified in Item (d) above, shall be measured above the level of the inner rail, increased by half the super-elevation.

5. Suitable prescribed gradient on the height of contact wire shall be provided for connecting these wires installed at different heights.

(e) After determining the height of contact wire on the assumption that it would permit passage of standard locomotives and stock, the maximum height of Over Dimensional Consignments (ODC) with the live overhead equipment at speed over 15 kmph (when vertical oscillations are pronounced) is derived as under : **(Para 4(b), Chapter-V, Page 8 of 9, ACS-10 to IRSOD dt. 08.11.2012)**

Minimum Height of Contact wire		**:**	**4.69m**
Less-			
(i)	Minimum Electrical clearance	:	0.20m
(ii)	Tract Allowance	:	0.02m
(iii)	Allowance for vertical Oscillation of contact wire under the influence of moving pantographs	:	0.05m
Total		**:**	**0.27m**
Permissible height of ODC		**:**	**4.42m**

(f) If an Over Dimensional Consignment is moved at slow speed not exceeding 15 kmph, there will be no downward displacement (due to oscillation) of contact wire. However, to cater for likelihood of an Over dimensional Consignment halting under a structure, a clearance of 0.25 m under rest condition is to be provided. In this case, derived height of contact wire may be reduced by 50 mm. (Para 4(c), Chapter-V, Page 8 of 9, ACS-10 to IRSOD dt. 08.11.2012)

(g) Thus, prescribed clearances from contact wire for the passage of ODCs through electrified sections along with the special restrictions inferred from existing guidelines are as follows :

a) Special speed restriction is not required when the gross clearance is more than 270mm.

b) Speed must be restricted to 15 kmph when the clearance is between 270 mm and 220 mm and specially escorted by authorized Railway Staff.

c) Speed must be restricted to 15 kmph and power to OHE must be

switched off when the clearance from the contact wire is less than 220 mm and specially escorted by an authorized Railway Staff.

d) No consignment with less than 100 mm clearance from the overhead contact wire will be permitted in a 25 KV electrified section.

12011: Dispatch of ODCs:

1. At the originating station, the ODC wagon will be moved only when final approval has been obtained from the competent authority.
2. At the originating point, the number of wagon/wagons carrying ODC should be entered by the Train Clerk/SM in the vehicle guidance in red ink to be handed over to the Guard of the train.
3. SS/SM should advise the Section Controller on duty, before starting the train and while asking line clear and describe the train number with letter 'X" suffixed on it.
4. It will be the duty of the Dy. Chief Controller to keep the adjoining Control Office informed about the movement of such ODC, till such time, it is handed over to the adjoining division by specified train. He will also ensure that the consignment is moved strictly by the authorised route.
5. Shunting of train with an ODC should be avoided. Loose and rough shunting of ODC wagon and against such wagon is prohibited.
6. When any ODC wagon is detached from the train at any station, SM and Guard are responsible to ensure safe placement and securing of wagon/load.
7 Facility for accompanying staff for extra wagon/brake van should be provided, if so required.
8 When a load is so long that it cannot be accommodated in two trucks (i.e. two 8 wheelers), it must be loaded in three trucks so that the entire weight is carried on the centre vehicle and the end trucks are idlers. The load must be placed on packing in the centre truck, so that it is clear of the floor of the end trucks by not less than 152.4 mm and there must not be less than 304 mm up side clearance in the end trucks between each of loads and side of truck.

   If the weight of the load is such that it cannot be carried on the centre truck, then the load must be carried as equally as possible on the trucks and the centre vehicle must be an idler.

CHAPTER-13
REGISTRATION, ALLOTMENTS AND LOADING (GOODS STOCK)

13001: Registration:

Detailed rules regarding Registration and Booking of Goods Traffic are contained in the "Goods Tariff, Part I (Vol. I)".

13002: PREFERENTIAL SCHEDULE:

Movement of wagon load traffic is regulated by what is known as the Schedule of Preferential Traffic, laid down by the Central Government (Railway Board) under Section 71 of the Railways Act, 1989 and is designed to ensure that certain essential commodities and urgent movements are accorded necessary preference at a time when the available transport is not adequate to meet with all the demands. Traffic is classified into 4 categories viz., A, B, C, and D. Commodities registered in the lower categories cannot have preference over those registered in the higher categories even if the former may have been registered much earlier.

(a) This Priority Schedule is decided by the Traffic Transportation Directorate of Railway Board.

(b) It lists the Sponsoring Authority and Accepting Authority for programmed traffic. (Copy of Priority Schedule can be obtained from Indian Railways website)

(c) Special preference to any particular consignment can be accorded only under orders from the Railway Board.

(d) For the present, traffic in categories A to C is treated as "Preferential" and that in category D as "Non-Preferential".

(e) Priority 'A' : Military Traffic when sponsored by MILRAIL.

(f) Priority 'B': Only for emergency relief work for victims of natural calamities when sponsored by an officer not below the rank of Dy. Secretary of Central/State Government or a non-official organization nominated by the Central/State Government and mentioned in the sponsorship.

(g) Priority 'C': All programmed traffic for which monthly or quarterly programmes are allowed by Railway Board/Zonal Railway.

(h) Priority 'D' : All which are not included in priority 'A' to 'C'

13003: Rationalization Order:

Under section 71 of Indian Railways Act 1989, Railway Board has been empowered to charge freight over route, which may not be the shortest between alighting point and destination. The Rationalization order indicating the route through which the freight is to be charged is issued by the Traffic Transportation branch, Railway Board.

Revised rule 125 of IRCA Goods Tariff Part-I (Volume-I) vide Board's letter No. ECR 1125/94/3 dated 6/10/94 states that unless there is specific instruction in writing from the consignor or his authorized agent to the contrary, goods will be dispatched by the route operationally feasible and freight charges will be levied by the shortest route. However, charging of freight by shortest route is subject to any instructions issued under the rationalization order issued from time to time.

13004: Indents:

(i) Stations shall submit their indents for loading wagons in their Daily Stations Reports. Number of wagons required, commodities to be loaded, weight of each consignment, destination stations and via's, serial number of registration in the Priority Register and date of registration should be indicated.

(ii) Station Masters, under no circumstances, should load any wagons without getting prior allotment order from the Divisional Railway Manager concerned on indents submitted by them.

(iii) In case where an indent is placed by a Station Master relating to a "Sponsored" programme issued by the Divisional Office, the serial number and the programme number should be clearly quoted against entry.

13005: Allotment:

(a) All allotment orders shall be issued from the Divisional Office. No wagon is to be loaded by Station Masters or Goods Clerks without allotment orders from the Divisional Office.

(b) On receipt of the Daily Reports from stations, the Allotment Branch in the Divisional Office shall check up with all operational restrictions and embargoes in force and expunge those items, movement of which is restricted. The Allotment Office shall advise the stations concerned of the items so expunged.

(c) The Allotment Branch shall record all the valid items duly summarised in a register specially maintained for the purpose, indicating the following information:

(i) All valid indents shown under two heads, viz. "Preferential traffic" and "Non-Preferential traffic".

(ii) Stations from which the indents have been received.

(iii) Commodities.

(iv) Destination station and vias.

(v) The serial order in the Priority Register and the date of registration at the stations.

(vi) Quotas fixed for different commodities for the entire division should be shown on the top of the Allotment Register in red ink. If, specific quotas are allotted to individual concerns, indents from each such

concern are to be shown separately specifying the quotas permitted to them individually.

(vii) Indents for loading via junctions for which quota limitations are fixed should be shown separately for each such point and the quotas permitted shown on the top of the Allotment Register.

(d) The Allotment Register referred to in sub-para (c) above shall be put up to the Departmental Officer concerned and he shall personally make the allotments.

(e) That Officer shall make the allotments after taking into consideration the following points:

(i) Stock orders inforce.

(ii) Numbers of wagons to be allotted after taking into consideration the number of empties that are likely to be available after meeting the daily quota for coal fields or any special interchange order.

(iii) The loading capacity of a particular station.

(iv) The bearing capacity on the section.

(v) The importance of the particular station from the point of view of traffic offering.

(vi) Requirements of seasonal traffic.

(f) In the case of "Sponsored" movements, the programme shall be accepted in the Divisional Office and then sent to the stations for acceptance of requisitions for wagons. The station shall accept the registration made by the representatives of parties concerned and submit their indents in the usual course. On receipt of indents, allotment orders shall be issued by the Divisional Office in the normal course.

(g) Allotment orders issued by the Divisional Office shall hold good for 48 hours in case of main and important branch lines where work trains run daily and for 72 hours on unimportant branch lines where work trains run on alternate days. If these orders are not availed of due to the failure of the parties to submit their goods for booking, they should be treated as cancelled and the registration made in the Priority Register for such consignments should also be treated as cancelled, Registration Fee being forfeited according to the rules. Divisional Railway Manager should be advised of all such cancellations.

13006: Advice by Station Staff:

(a) After the Allotment has been received at the station, the Chief Goods Supervisor, Station Master or the Independent Goods Clerk concerned shall prepare a statement showing the following :

(i) Number of wagons allotted to each merchant, giving the individual number of wagons, if possible.

(ii) Commodity.
(iii) Station to.

(b) At stations where there is no Merchants Association, a copy of the statement giving the above information should be put up on the Station and Goods Shed Notice Boards each day and a few spare copies kept, to be made over to any party which may be interested in the matter.

13007: Loading on trucks and motor vans:

(a) Conveyance trucks which have cross-bars and screw clamps, shall ordinarily be used for loading carriages and motor cars.

(b) Conveyances and motor cars, when loaded in open trucks, shall be covered by tarpaulins firmly lashed to the sides and ends of the trucks.

(c) The wheels of all conveyances or motor cars shall be kept from moving either by the sliding cross-bars in the trucks or by wood scotches which the Train Examining Staff shall supply and fix.

(d) In the event of neither cross bars nor scotches being available, conveyances or motor cars shall be secured in position by being tied to the truck by means of strong ropes or wires.

(e) Every loaded truck shall, before being attached to a train at the sending station, be examined by the Train Examiner who shall issue the usual certificate of correct loading.

(f) Should a truck be damaged en route by the Train Examining Staff, the Station Master shall arrange to adjust the load or transship the contents to the satisfaction of the train Examiner.

13008: Loading of rails and long and bulky articles on trucks: Before loading a pair of trucks with rail, special care shall be taken to screw up the centre coupling as tightly as possible.

(a) Rails loaded in this manner shall be secured by passing a piece of fence wire through the fish- plate bolt holes and fastening in such a manner that the rails are prevented from separating. The binding chains of the trucks must be passed round the load and hooked up as tightly as possible.

(b) When low-sided trucks are used for the conveyance of rails of such a length as to require more than one truck for their conveyance, the trucks shall be fitted with bolsters or the sender must provide wooden sleepers, one to be placed crosswise in the centre of each truck clear of the sides for the load to rest on.

(c) A space of at least 10 inches shall be left between the sides of the trucks and the rails.

(d) Rails loaded by the Engineering Department shall be examined by a responsible official deputed by that Department before being made over to the Transportation staff for dispatch. Station Masters shall refuse, in writing, to dispatch any trucks of rails not properly loaded.

(e) At the starting and changing stations, as also at stations on the journey where rail trucks are attached to trains, Station Masters shall inspect the trucks in conjunction with the Guard and should any truck be found loosely or improperly loaded, it shall be detached.

(f) The Train Examiner shall inspect trucks loaded with rails, independent of the joint inspection by the Station Master and the Guard and order any vehicle loosely or badly loaded to be detached from trains.

(g) Trucks loaded with rails shall be sent by goods trains or when goods trains are not running, by slow Passenger trains and attached next in front of the rear brake van. They must never be attached to fast Passenger trains.

(h) When trucks loaded with rails or other heavy material are detached at stations for adjustment, the assistance of the Engineering Department may be obtained to do the work if the Station Master has no men available to do it.

(i) After timber has been unloaded off a truck, the lashing chains shall be wound round the stanchions and the two ends coupled together across the bolster. Unless this is done the chains are liable to be hanging down and getting damaged by catching on obstructions when running.

(j) When long and bulky articles, such as timber, rails, girders etc. are loaded in two trucks coupled together, twice the carrying capacity of the lower tonnage truck shall be taken as the maximum capacity of the two trucks. When the length of the article necessitates more than two trucks being used, twice the carrying capacity of the lowest tonnage truck shall similarly be taken as the maximum carrying capacity, the additional trucks being treated as dummies only.

(k) When the load of a truck or other vehicles projects more than 8” beyond the headstocks and where there is less than 2”-0” clearance between loads of two adjacent coupled trucks or from the end of the next coupled wagon or vehicles, an empty truck shall be attached next to it as a dummy.

(l) When it is found necessary to load bogie rail trucks or open wagons with bamboos and ballies etc., the load must be kept well within running dimensions, suitable bamboos or ballies according to the nature of the load being lashed to the stanchions, where such are provided, as uprights and the load secured by lashings.

(m) The Station Master of the loading station shall see that the vehicles have been properly loaded and lashed and he shall also advise the Head Train Examiner of the next train Examining station to personally inspect such loads on arrival at his station. The latter shall similarly advise the next Train Examining station and so on, till the consignment reaches its destination.

13009: Over-loaded wagons: Whenever it is thought that any wagon is overloaded, a man shall be sent underneath to see whether there is a clearance of an inch between the flanges of the wheels and the bottom of the wagon. If a wagon is badly over-loaded, the flanges of the wheel touch the bottom boards of the wagon and cut into them, thereby impeding its movement. As a rough test, a man should be able to push a finger between the flanges of the wheels and the bottom boards of the wagon and if that cannot be done, the wagon should be considered as over loaded.

GOODS STOCK

13010: Definition of goods stock: "Goods Stock" means and includes all goods wagons, i.e. all rolling stock other than coaching stock, irrespective of contents and whether attached to passenger or goods trains.

Object and nature of control: The object of controlling Goods stock is to secure the best possible utilisation of wagons consistent with the requirements of the current priority Schedule for wagon-load traffic. Control is exercised at the Divisional level through the medium of daily Stock Reports submitted by stations and at the Headquarters level through the medium of daily Stock Reports submitted by the Divisions, with the help of Freight Operations Information System (FOIS). These reports enable a day-to-day watch to be kept on the clearance of traffic and on the transit, transshipment and unloading of wagons.

13011: Station Stock Reports:

(a) Every station must submit a daily/Stock Report to the Control Office in respect of the position obtaining at 18.00 hrs. or such other time as may be prescribed by local instructions.

(b) These Stock Reports must contain the following items of information as well as any other that may be required from time to time:

(i) Wagon-load Traffic on Ground By–
- (1) Priority classes (with oldest dates of registration under each class).
- (2) Railways of destination station.
- (3) Commodities

(ii) Loading during previous 24 hrs. (Including Road Vans) By–
- (1) Priority classes
- (2) Railways of destination.
- (3) Direction
- (4) Commodities.

(iii) Loaded wagons received during Previous Covered and open 24 hrs. (Including Road vans).

(iv) Loaded wagons dispatched in the

Up and Down directions during Previous 24hrs.

(v) Loaded wagons awaiting dispatch in Up and Down directions.

(vi) Handling in Goods Sheds during previous 24 hrs. (Including Road Vans).

(1) Number of wagons awaiting unloading at 6.00hrs.
(2) Number of wagons unloaded during the day.
(3) Number of wagons awaiting unloading at the end of day.

(c) Empty Stock available. By type

(d) When preparing Stock Reports, the Codes mentioned in Annexure 'B' must be used.

(e) Block stations must submit Stock Reports to the Dy. CHC (Stock) in Control Office on the control telephone. Key siding stations, unless connected to control, must send their Stock Reports to one of the block stations on either side and the Station Master of the station receiving them shall be responsible for transmitting them to the Dy CHC (Stock) in Control office.

13012: Daily Report of Marshalling Yard & Goods Shed Operations: Selected Marshalling yards must submit a daily report to the Control Office communicating the position obtaining at midnight. These reports must include the following items of information besides any others that may be prescribed for individual yards:

(a) Through Loaded Wagons:

(i) Number on hand on the previous day for each section or direction served by the yard.

(ii) Number received during the last 24 hours for each section or direction served by the yard.

(iii) Number dispatched during the previous 24 hours for each section or direction served by the yard.

(iv) Number on hand for each section or direction served by the yard.

(b) Terminal Loaded Wagons:

(i) Number on hand on the previous day for placement in the Goods shed, transit shed and important sidings.

(ii) Number received during the previous 24 hrs. for placement in the Goods shed, transit shed and important sidings.

(iii) Number placed during the previous 24 hrs. in the Goods shed, transit shed and important sidings.

(iv) Number released during the previous 24 hrs. in the Goods shed, transit shed and important sidings.

(v) Number on hand awaiting placement or release in the Goods shed, transit shed and important sidings.

(c) Empty Wagons:

(i) Number on hand on the previous day.

(ii) Number received during the previous 24hrs.

(iii) Number dispatched during the previous 24hrs.

(iv) Number on hand.

(d) Number of wagons out of commission.

13013: Daily Report of wagons interchanged between Divisions: (a) Every Divisional interchange terminal station must send a daily telephonic report to the Divisional Railway Manager of the Divisions concerned detailing the number of loaded and empty wagons made over to and received from each Division during the previous 24 hours (midnight to midnight). This information must also be telephoned to the Control Office as soon after midnight as possible.

(b) Daily telephonic reports regarding the number of goods brake-vans interchanged during the previous 24 hrs. (From midnight to midnight) must be similarly submitted by Divisional terminal stations.

13014: Daily Report of wagons interchanged with Foreign Railway –

(a) Each junction of interchange with other Railways must give telephonic advice to the Control Office as soon as possible after midnight detailing the number of covered loaded, covered empty, open loaded and open empty wagons interchanged with the other Railways during the previous 24 hours (from midnight to midnight).

(b) Daily telephonic reports regarding the number of goods brake-vans interchanged during the previous 24 hours (from midnight to midnight) must be similarly submitted by interchange junctions.

13015: The Goods "Sitrep" (Unusual Incidence) and the Line and Stock Position Report –

(a) From the detailed information received through Divisional Stock Reports, a goods 'sitrep' (also in three parts) for the North Central Railway is prepared for references by the Operating Officers of the Headquarters office.

(b) A daily Line and Stock Position Report for North Central Railway is compiled at the Headquarters offices from Part A of the Goods 'Sitrep' referred to in the sub-para (a) above and sent to all concerned, including the Railway Board, all Divisional Railway Managers and Station Masters of selected stations. It contains the following consolidated information:

(i) Interchange with Foreign Railways
(ii) Wagon Holdings division wise.
(iii) Wagon Balance.
(iv) General orders about stock movements issued by the Railway Board and Headquarters Office.
(v) Traffic registered in wagon loads with details of oldest date of registrations (ODRs).
(vi) Loading in wagonloads.
(vii) Transshipment at break of gauge junctions.
(viii) Goods trains stabled.
(ix) Summary of train operations for certain important sections.
(x) Position of important junctions with adjoining Railways.

13016: Control of special Type of Stocks:

(a) Tank wagons of all types are controlled by the Headquarters office. Certain tank wagons are based at selected stations for the use of the specific mills and factories and are allotted by the Station Masters concerned for the use of these mills and factories on receipt of requisitions.

(b) Tank wagons, other than those earmarked for the use of specific mills and factories are headquartered at convenient stations. Every tank wagon on release is required to be returned to the station at which it is based or headquartered. Appropriate directions are stencilled on each tank wagon for this purpose.

(c) The movement of every tank wagon must be intimated telephonically to the Divisional Railway Manager concerned by originating, terminating and interchange stations. On the basis of these movement advices, a card index record of tank wagon is maintained by the Headquarters office for movement over the Railway and by the Divisional office for movement over the Division.

(d) Crocodile trucks and well wagons are also controlled by the Headquarters office. Requirements for such stock must be consolidated in the Divisional office and forwarded to the Headquarters office.

(e) The movement of every crocodile truck and well wagon must be intimated telephonically by originating, terminating and interchange stations to the Headquarters office, where a card index record of such movements is maintained.

(f) Originating, terminating and interchange stations must send telephonic intimation regarding the movement of every BFR to the Headquarters office where card index record of such movements is maintained. Similar 'card indexing' record of BFRs has to be maintained by each Division, so far as movement over respective Divisions is concerned.

13017: Movement of Empty Stock: The Railway Board decides from time to time at what level the wagon balance of each Railway should be maintained. If the wagon balance thus fixed entails the movement of empties to foreign Railways, orders are issued by the Headquarters office laying down the number of empties to be made over in interchange and also the number of empties to made over by one Division to another.

13018: Operating Restrictions:

(a) Whenever any difficulty is experienced or anticipated in the handling of inward traffic at a particular station or in the transit of traffic through a break of gauge junction, marshalling yard, etc. orders are issued by the headquarters office or the Division office as the case may be, suitably restricting traffic to or via such points. Such restrictions are known as Operating restrictions.

(b) Divisional Railway Managers are not authorized to issue restriction advices for movement of traffic from and to other Railways and from and to other Divisions. If such operating restrictions are desired, the Headquarters office must be requested.

(c) Operating Restrictions must not, in the ordinary course, exceed one month. If the period up to which an operating restriction is likely to remain in force cannot be visualized at the time of the issue of restriction message, it is issued "until further advice". Full particulars of all such restrictions are brought out in the "Restriction Circular" issued fortnightly by the Headquarters office.

CHAPTER-14
FREIGHT OPERATION

14001: Importance of Freight Operation:

Freight business is the major source of revenue for the Indian Railways. Main activity centers of Freight operation include terminals, yards, control office and stations.

14002: Broad Classification of Goods Trains:

1. **End to End:**

- Trains, generally run from the train-originating Terminal to the final destination. This is an express stream of freight trains and does not require any stoppage enroute, except for crew change.
- Such trains will normally include container trains, air braked block rakes for single destination. These trains are planned to run like nonstop Rajdhani trains and may have a fixed time table and guaranteed transit time. This group may include trains of private freight operators.
- Other through trains are also block rakes or may have two or more destinations on the same or adjacent section. These may have conventional bogie stock.

2. **Work Trains, Shunting Trains, Pilots etc.:**

- These train movements are for short distances for clearance of damaged wagons made fit or for supply/removal of rakes to and from the sidings or important terminals served by a yard.

3. **Departmental trains:**

- These include Material Trains, Track maintenance trains, Ballast trains, Relief Trains, Wiring Special, Crane Specials etc.

14003: Complexity of Freight operations:

Freight operation is generally more complex than passenger train operations for the following reasons:

1. The changing pattern and fluctuations in demand for rakes/ wagons due to changes in the level of production, changes in the pattern of distribution and changed consumption centers.

2. The variety of commodities to be moved, with different characteristics & type of wagons required.

3. Preferential traffic schedules, rationalisation scheme & other public policy regulations.

(i) Seasonal variations in demand

(ii) Time taken in loading/unloading - whether manual or mechanical

(iii) Train examination Systems
- End to End/Intensive Examination
- Premium end to end
- CC rake

This in turn results in Sick Wagon detachments & attachment of fit wagons for completing the rake composition.

4. Following is the series of operations for empty rakes being offered for loading:
- Examination
- Supply/placement
- Loading
- Dispatch

5. For inward loaded trains which, after placement and release, have to be back loaded at the same terminal or at other location, withdrawal from loading points may require an outward examination unless the rake is fit for round trip or for a prescribed distance.

Once the train is fit in all respects and commercial formalities have been completed a set of activities are initiated. These include:
- Preparation of train documents
- Train ordering
- Arranging train crew & locomotive
- Monitoring train movement
- Arrival at the destination

This cyclic operation requires constant monitoring and co-ordination.

14004: Ordering of Goods Train:

(a) Each freight Train is required to be ordered to run under a unique number/name or Train ID for monitoring its movement through intermediate divisions, zones etc as also to facilitate all processes at control offices, yards, C&W depots, stations and Crew/Guard booking, Lobby Power Controller/Traction Loco Controller.

(b) The message from Divisional Control that a train is scheduled to leave from a Station or Yard at a certain time is known as the Train Notice. The message is, in turn, further conveyed to all concerned minimum two hours in advance. The availability of suitable:
(i) Load
(ii) Locomotive
(iii) Crew/Guard and
(iv) Path has to be kept in view for ordering of goods trains.

(c) Co-ordination among the Traffic Controller and the Power Controller (the shed, if fresh power is required); the Yard/ Station, C&W staff and the Crew/Guard booking lobby is thus required.

(d) Regular conference with yards, terminals and the adjoining Division is held by the Control for exchange of information regarding forecast of trains in yards; completion of loading/ unloading at sidings etc. and interchange with adjoining Divisions. This monitoring should be enforced through FOIS, so that the time of staff spent on phone is reduced and more productive work is done by better planning.

(e) Constant monitoring for expediting loading/unloading at major sidings/goods sheds is also done by Control and the Station Staff for ensuring the availability of load.

14005: Planning of Locomotives:

(a) Power Plan:

The power plan indicates the daily average number of locos required and planned for freight services, section wise, for each division.

This bare requirement of Locos for Traffic use is calculated on the basis of the traffic turn around and average number of trains run on each section.

This represents the average number of locos needed on the Division.

(b) Loco Outage and Loco Utilisation:

Loco Outage means the average number of locos available for traffic use in a day (24 hours). Since the Diesel and Electric Locos have long extended runs and may cover many divisions in a day, the position may be maintained graphically for the entire duration (0 to 24 hours) the loco is on line on the Division. Different colour graphic representations on the Bar Chart can represent the time spent by each Loco to serve as a good tool of Management Information System e.g.

(a) time taken by running train
(b) time taken for Crew Changing
(c) time for Fuelling (Diesel Locos)
(d) time taken for Loco inspection
(e) time for repairs online
(f) time for Light Engine running
(g) time taken for Shunting
(h) time spent at terminal/destination
(i) en-route detention.

Thus, the total hours for which the various Locos were available for Traffic use divided by 24 (number of hours in a day) would give the Loco outage.

$$\text{Loco outage} = \frac{\text{Engine Hours for traffic use}}{24}$$

Loco outage can be prepared service-wise/shed-wise/railway-wise/traction-wise, etc. The actual Loco outage should generally be around the target fixed for each Division.

However, it should be appreciated that while the target is based on average, the actual requirement of Locos may fluctuate due to bunching of trains, increase in traffic or due to bottlenecks on account of operational reasons, equipment failure or after effects of interruption to traffic.

(c) Control of Operating Department on Loco running:

Electric and Diesel Locos are maintained by the respective Loco Sheds. Once turned out of the shed, locos are available for utilisation for a number of days till the prescribed maintenance /inspection schedule is due in the shed or the locos require out of course repairs. Thus, while the operating staff has operational control over utilisation of Locos as well as flexibility of using the Locos as per operational requirement, they have to keep in view the maintenance/ inspection schedules of the Locos and send the Locos to the Shed well in time. Overdue running of locos should be avoided by suitably planning the train running. Similarly, all out efforts should be made to send the dead locos or locos requiring attention in the home shed. The hauling capacity of the Locos and special restrictions, as jointly agreed to by the officers of operations and loco departments should also be adhered to.

While the operating department has to optimise the work done by each Loco i.e. moving maximum traffic with the minimum number of Locos, by adoption of operational strategies and improving efficiency, the Shed and the Loco organisation should provide optimum number of Locos in good fettle, keeping in view the traffic needs, as shortage of Locos can lead to transport bottlenecks and inability to move the existing and potential traffic.

Along with the availability of locos, their reliability, safety and predictability have to be aimed at. Loco failures, Loco troubles en-route and ineffective locos should be kept to the bare minimum. Balancing of Locos is also required to be done i.e. Locos without loads may be sent to other Divisions where they are required.

Reduction in terminal detentions and increasing the average speed of goods trains would substantially improve engine utilisation.

(d) Availability of Engine Crew and Guard:

Running staff for Goods operations are generally booked on the principle of 'first in and first out'.

Balancing of Crew/Guards by sending staff spare is also required to be done in case the running of trains is not even in both directions on a section.

(e) Availability of Path:

Theoretically, on a double line section, a Goods Train can always be

run when load, power and crew are available and the next block section is clear.

On single line sections, dispatching a train out of path will be counter productive, due to Mail/Express Blocks, Peak timings of Suburban or Commuter traffic. Readiness of the interchange point or the terminal to accept trains is to be kept in view before pushing a goods train ahead. It is better to have directional flow if possible.

Master Charts incorporating all Passenger carrying trains and realistic goods train paths are prepared in consultation with Operating Officers, Controllers, Yard Staff, Power Controller, Station Masters of important stations etc. in order to:

(i) Find out line capacity of the section.

(ii) Highlight the set of suitable paths for guidance of Control, which can be used for goods train ordering also.

(iii) Prepare tentative goods train time table for selected express stream of trains.

(f) Lobby System:

A Lobby is like a Control Office in the field. It is established with the twin aim of reducing engine detention and crew detention in a Yard or a Crew/engine changing station by realistic ordering of trains and Crew/Guard booking.

It is advantageous to have a combined Crew and Guard booking lobby so that both are available simultaneously. The lobby supervisors/staff can take forecast of train running from the Deputy Controller/Section Controller along with details regarding the names of Crew, Guard and their signing in time, loco particulars, last C&W examination etc.

They can verify the dates of Loco Schedules from the Chart available with them and keep liaison with the Power Controller /TLC. They also keep watch on "expected time" of train formation, examination, readiness etc. and by constant chasing, planning and updating of information, trains are ordered on realistic expected schedule. Trains may be put back or cancelled, if required and Crew booking and engine allocation changed promptly.

Some overlapping Crew/Guard may also be kept in the Lobby to take care of the last minute absenteeism. Shunters may also be kept in the Lobby of big yards/junctions to attach, detach and run round locos or to pull the train from Yards up to the Crew changing points, so as to avoid wastage of main line Loco pilots.

The pre-departure detention to the Crew, Crew hours balancing, rescheduling of Locos and Yard detentions to Locos can be thoroughly monitored by the Lobby and remedial measures taken.

14006: Role of Various Agencies in Freight Operation:

A large number of agencies play important roles in freight operation. Marshalling Yards, Train Examination, Locomotives and Lobbies have been discussed elsewhere in this Manual. Role of a few agencies is discussed below with special reference to freight operations.

(i) Control Office:

The main function of the Control Office is planning, execution and review with all the three activities going on simultaneously.

(ii) Planning is aimed at forecasting and optimising the following:

1. Interchange
2. Trains to be run section-wise
3. Supply of rakes for bulk loading.
4. Release of inward loaded rakes placed for Unloading. Information regarding the following items is generally required for this purpose:
   (a) Analysis of divisional wagon holding
   (b) Power availability
   (c) Availability of loads
   (d) Disposal of empty rakes
   (e) Demands for loading

The plan is made by Control in the early hours of morning and reviewed by Operating Officers. Changes in the plan, as deemed necessary, are made at various stages on the basis of updated information received from the activity centers, adjacent divisions and instructions received from the Head Quarters.

(iii) Execution:

- The goods operation plan is executed on the basis of actual materialisation of the forecast with suitable adjustments made for short falls/excesses.
- Yards, Loco Sheds, Stations, Terminals, Lobbies and TXR depots are actively involved in execution of the plan.

(iv) Review:

The trend of the day's position is reviewed by the Chief Controllers and Officers in the afternoon. Detailed review of the previous day's performance is carried out early in the morning by the Operating Officers with the following objectives:

(j) Analysing shortfalls of previous day to take remedial measures and pin-point weak spots.

(ii) Provide data for planning for the current day.

The main features of performance, which can be reviewed, include:

- Interchange failures
- Divisional Wagon Balance (Wagons on Division)
- Train Running
- Disposal of empties
- Loading at important goods terminals/sheds and in case of shortfall, reason for the same.
- Review of unusual occurrences
- Scrutinization of Control Charts
- Particulars of stabled loads
- Yard performance
- Unloading on Division
- Registrations and Loading
- Power position, utilisation of Locos & Terminal detention
- Sick line working
- Special type of stock
- Clearance of piecemeal wagons (sick or otherwise) from roadside stations.

14007: Head Quarter's Role in Freight Operations:

The Division's Freight Operations generally require close co-ordination with and assistance from other Divisions and Railways. While direct contact is also maintained by the Control and Operating Officers of various Divisions, the Zonal Head Quarters play a pivotal role in this respect. Some of the functions performed by the Head Quarters are summarised below:

Management Information System:

1. Important information concerning the position of Freight Operations on various Divisions of Railways is obtained through line and stock report daily telephonically or through FOIS or Tele-printer or FAX by the Head Quarters (Central Control) from Divisional Control. Now more and more Zones and Railway Board are shifting to FOIS generated reports. This includes, loading and stock position, particulars of old outstanding and fresh registration of indents, category wise position of unloading, transshipment, Yard balances of important yards, wagons on Divisions, Train Running on each section, average speed, interchange position, Locomotive position and Locomotive utilization etc.

   The position is reviewed and analyzed by the PCOM/CFTM/ Dy.COM (Goods), STM (Goods), CMPE and CELE. The important position pertaining to various Departments is conveyed to the Departments concerned as well as the General Manager. The Head Quarter Office also obtains the Statements at the end of each month or whenever required and the performance is compared with:

(i) The Targets
(ii) The figures of the previous month
(iii) The figures of the corresponding month of the previous year and
(iv) the best ever record etc.

In addition, the Statistical Branch also provides data to the General Manager and the Departments concerned with Operations for detailed analysis and review.

2. Head Quarter plays an important part in planning and coordinating freight operations. After detailed conference with the Operating Officers and in terms of Railway Board's current operating directives, Head Quarter issues directions and instructions regarding the following items:
   (a) Interchange transactions (category wise).
   (b) Loading and Unloading.
   (c) Traffic insight from other Railways/Divisions. This information is now available on FOIS terminal, where a pipe line can be seen from end to end and expected arrival of train at destination is also estimated by FOIS system.
   (d) Conveying priorities for the day and setting quantified objectives to be achieved.
   (e) Reviewing the work done at the important activity centers like Yards, Terminals etc.
   (f) Train and Traffic regulation in case of accidents etc.
   (g) Certain items of Goods Operation are directly controlled by Head Quarters e.g. Co-ordination and directions regarding rake loading of programmed and committed traffic, movement of special type of stock, movement of over dimensioned consignments, out of turn allotments and allotment despite restrictions etc.

14008: Railway Board's Control on Freight Operations:

The Railway Board provides Unity of Control and direction for the freight operations. It also has the important role of supervision and co-ordination, which is very much essential for a big network like Indian Railways. The Railway Board's Control Office also remains in contact with the Head Quarter (Central Controls) of the Zonal Head Quarters and watches loading and movement of important streams of traffic, like coal, raw material for steel plants (iron ore), cement, food grains, fertilisers, POL, sugar, export ores, container traffic etc. It also watches loading, interchange, power position, goods train running on important sections etc. to ensure that each Railway fulfils its obligation and optimises the use of various assets. The items watched are more or less the same as those watched by the Zonal Head Quarters in respect of the Divisions, but the perspective is wider.

Railway Board plays an important co-coordinating role among various Railways, other Central Government Departments and vital sectors of the Economy connected with Railways. Policy formulation and Planning, which have an important bearing on Freight Operations, is also a major function of the Railway Board.

14009: Role of Some Other Departments:

The Commercial Department plays an important role in canvassing for Traffic, improving marketing, customer relations in general, booking of traffic, expediting loading/unloading of wagons, quick disposal of unconnected wagons and transshipment of Wagon detached out of course for Hot Axles etc. Various other Departments, like Mechanical, Electrical, Civil Engineering and S&T provide and maintain various assets and infrastructure (track, wagons, engines, S&T Network etc.). These departments also ensure sufficient availability, reliability, predictability, safety and reduction in equipment failures; promptness in restoration in case of breakdowns and accidents should also be ensured. They also endeavor to achieve technological up-gradation, alongwith contributing to development of operating strategies and determine the level of excellence in Railway Operations to a great extent. In a nutshell, all the functionaries have to work as a dedicated team.

14010: Some Indices of Freight Operation and Efficiency:

The important Operating Statistics, most of which are indices of Operating efficiency, have been discussed in detail later in this Manual (Operating Statistics). Some Indices of Freight Operations and efficiency are highlighted below:

14011: Wagon Holding:

For a given amount of originating loading and receipts of loaded wagons from other Railways and making an allowance for percentage of stock out of commission for repairs etc., there is an optimum number of wagons that a Railway and separately its constituent divisions, should hold to maintain fluidity of the railway transport system. More wagons than the optimum number might lead to increase in the repairs and maintenance percentage, heavier detentions to wagons and trains and transport bottlenecks i.e. more congestion in sidings, yards and sections without a proportionate increase in the tones lifted or in the efficiency of operations. Similarly, excessive shortage of Wagons may lead to loss of traffic. Proper estimation and projection of requirement, proper planning and working at various stages of freight operations is necessary for keeping wagon holding low. “Ineffective Stock” percentage should also be kept to the minimum.

(i) Interchange Balance:

Maintenance of the interchange target is an indication of a Railway's overall operating performance and its efforts to meet inter railway obligations, hence interchange balance should not be very high, even when maximum trains are interchanged. However, attempts should be made to see that on busy sections, interchange is not only confined to few hours of the day but uniformly distributed.

(ii) Load of trains:

A train is a unit of transport. Depending upon the load, a suitable loco is provided for its haulage. In order to get the optimum use of motive power and to increase capacity utilisation and throughput, each Locomotive is given a load approximately equal to its maximum hauling capacity unless operating necessity requires utilisation of a loco for lesser load. The stations should also ensure that wagons are loaded to the carrying capacity or the minimum weight prescribed for some commodities.

(iii) Loading and Unloading:

To optimise the loading is one of the most important items in freight operations because it is through loading that Railway earns the maximum revenue. Similarly, unloading is necessary so that the wagon becomes available for the next loading. Reducing the time taken for loading/unloading by technological upgradation and other strategies in co-ordination with the customers has to be endeavored.

(iv) Empty Running:

Ideally it is a waste of transport capacity to run a wagon empty or with light load but much of empty running is inescapable on account of the unbalanced nature and quantity of outward and inward traffic at terminals and necessity of supplying empty wagons. Certain special type of wagons for POL, Steel, Coal, Natural Gas, Ammonia, LPG etc. have to be generally run empty to the loading points. Operating skill lies in avoiding or reducing the extent of empty haulage and cross movements of similar type of empty stock.

(v) Dispatch of Block Rakes:

Dispatching of wagons in small numbers always means transit delay while a block load can go direct to the farthest destination skipping many yards, thereby eliminating detention that the wagons might have suffered in the intermediate yards. Piecemeal wagons passing through a number of marshalling yards, where they have to be combined with other wagons to form train loads, cause huge amount of work for the staff and result in loss of efficiency, avoidable delay, anxiety and uncertainty regarding their arrival at destination. Unit train movement i.e. a train load consigned by a single consignor to a single consignee is ideal. Consignees can also be motivated to club their Indents to get train load and block rakes.

Also two points loading on same engine run can improve wagon usage. Closed circuit rake movement can also be resorted to between selected pair of stations or rakes. Maintaining the purity of freight rakes has also to be ensured.

(vi) Long Distance Trains:

It is an age-old principle of operations that full train loads should be formed at the earliest point for the longest possible distance. Long distance trains should have least stoppages like long distance passenger trains. Trains can also be run as "crack trains" or Link Trains.

A crack train/Link Train is a train in which the same crew (and engine if possible), instead of "Signing off" at the intermediate crew changing point, works a train to a farther junction. Thus, a train running from GMC to DDU or vice versa without Crew/Guard change at Allahabad can be run as X 'Crack'. The Crew can also be utilised on 'Crack' basis when the same Crew performs a round trip without "Signing off" at the outstation and is promptly provided a load so that crew returns to its Head Quarters within normal duty hours.

(vii) Wagon Turn Round:

The interval between two successive loadings, calculated from the time a wagon is placed for loading till the time it again becomes available for reloading is the actual turn round. As the calculations for individual wagons in the manner stated above are not practicable, the following statistical formula is generally used:

$$\text{Wagon Turn Round (T)} = \frac{S}{L+R}$$

Where 'S' stands for the effective daily wagon holding or midnight wagon balance of a day (excluding sick, POH wagons in or waiting for shops, departmental wagons, wagons lent for departmental use and the wagons used for coaching traffic), 'L' stands for the total number of wagons loaded on date on the Division/Railways plus the wagons loaded at Transshipment Point, 'R' stands for the total number of loaded wagons received from other Railway/Divisions. Thus, for example, if a Division loads 350 Wagons on BG (including 50 BG Wagons loaded through transshipment of MG Wagons), 150 inward loaded wagons are received from other Divisions and its effective wagon holding at the end of the day (midnight) is 2250 wagons, the Divisional Wagon turn round will be 4.5 days.

$$\text{i.e.} \quad \frac{2250}{350+150} = \frac{2250}{500} = 4.5 \text{ days WTR (Wagon Turn Round)}$$

(viii) Detention to Trains and Wagons:

(a) Detention to Trains: A check on the detention to trains:
   (i) outside signals or at stations adjacent to Goods Terminals,
   (ii) in shunting operations at road side stations and
   (iii) enroute, for various reasons, should be exercised regularly.

(b) Detention to Wagons:
   A close watch should be kept on the areas, e.g. Marshalling Yards, Goods Terminals, Stabling Points etc., where wagons are likely to suffer avoidable detention during various phases. Although this is watched through periodical data, special attention should be paid to pockets, where piecemeal wagons suffer prolonged detention and often remain out of sight.

(ix) Engine Utilisation:

Since engines are costly resources, their utilization has to be carefully monitored. Some of the measures for improving Engine Utilization are as under:

(a) Running of the Goods Trains on proper path: For this, the Master Charts have to be properly framed and consolidated.
(b) Proper co-ordination between Control and Line Staff.
(c) Reduction in Terminal detention of Locos by proper monitoring, co-ordination and working of Yard Staff, C&W Staff etc.
(d) Judicious ordering of Trains and Right time starts of Goods Trains.
(e) Proper controlling, judicious crossings and precedences.
(f) Loop Lines on critical block sections should not be generally blocked.
(g) Stabling and picking up of load should be judicious and properly planned.
(h) Loco pilot should run at maximum permissible speed, subject to restrictions.
(i) Light Engines can be coupled or attached to trains in order to save path and energy.
(j) Light Engines (Single or Coupled) should run at maximum permissible speed, for which they are fit, subject to speed restrictions.
(k) Signals must be taken off promptly at Stations. Distant/Warner Signals must always be taken off promptly.
(l) Tangible authority to proceed should be handed over at the appointed place instead of getting the train slowed down in front of the Station for handing over the Authority from the Platform.
(m) Trains should be run through Main Line (as far as possible) since looping results in extra time on run.
(n) Locomotives should be in good working order and staff should be well versed in Loco operations and troubleshooting.
(o) Hauling capacity of the Locomotives should be properly utilised.
(p) Engineering speed restrictions should be regularly reviewed and reduced by maximising the output of the Engineering staff and machines. Due care and foresight in offering blocks for track maintenance should be exercised.

(q) Regular foot plating by officers and staff involved in operations, motivates train crew and alerts the line staff.

(r) Effective control over traffic yards to reduce other engine hours, detention to locos at important loading/unloading points and industrial sidings.

(s) The factors adversely affecting the Locomotive utilisation, speed of goods train, terminal detention etc. should be got analysed by suitable multi departmental teams and remedial measures taken.

(t) Incentive schemes for motivation of staff connected with Goods Operation, so as to improve Engine utilization. Special watch on Loco pilots losing time on run and not running on maximum permissible speed.

(x) Average Speed of Goods Trains:

The average speed of goods trains is calculated by the following formula:

$$\text{Average Speed} = \frac{\text{No. of Goods Trains X Distance travelled by each train in 24hrs.}}{\text{Total time taken by all the Goods Trains run.}}$$

The distance and the time taken are calculated from the Control Charts. Thus all detentions to Goods Trains enroute enter into calculation and have the effect of bringing down the average speed.

Almost all the factors affecting engine utilisation play a part in the average speed of goods trains, the difference being that in the calculation of average speed of goods trains, the detention at originating point and terminating point as well as the Light Engine Running are not taken into consideration, while computing average speed of freight trains.

(xi) Staff Supervision:

Excellence in freight operations requires that the staff offer their willing co-operation. To achieve this, proper training for constantly developing the knowledge, skills and commitment is essential.

14012: Targets and Statistics:

One of the important means to fully and efficiently utilise the existing carrying capacity of a Railway is to set measurable and specific targets for the various performance indices after taking into consideration all the local conditions. Once the targets are laid down, all possible efforts must be made to attain them.

The targets should be set sufficiently high and reviewed constantly with a view to improving the performance further. Details regarding Statistics pertaining to Railway Operations are given in the chapter on Operating Statistics. Where targets are not attained within a reasonable period, the causes must be traced and effective remedial action taken. If necessary, revised targets should be laid down.

CHAPTER-15
CONTAINER TRAIN OPERATION

15001: With a view to increasing Railway's share of container traffic and introducing competition in Railway container transport services in India, Ministry of Railways decided to grant eligible parties the right to require the Railway Administration to haul their Container trains on the Indian Railway network for movement of both Export and Import Traffic as well as Domestic Traffic subject to various terms and conditions contained in an Agreement. This Agreement sets out in detail their mutual relationship and the terms and conditions, which shall govern the right of the Concessionaires to offer their Container trains for movement to Railway Administration and the obligation of Railway Administration to move the trains.

15002: The salient features of this Agreement as well as of related instructions with respect to train operations are given below. The salient features of the Concession Agreement with Container Train Operators and of other related instructions are indicative in nature and for guidance only. For actual provisions, the Concession Agreement and the Circulars and Railway Board's letters mentioned above should be referred to.

1. Concessionaires have a non-exclusive right to require the Railway Administration to haul the Concessionaire's Trains subject to the Concessionaire establishing/ensuring access to Rail Terminals and acquiring a minimum number of wagons including brake vans to form a Block Rake for the commencement of operations and for transportation of containers.
2. The term of this Agreement shall be for a period of 20 years starting from the Commercial Operations Date.
3. In the event the Concessionaire fails to operate its Container Trains in accordance with the requirements of this Agreement within three (3) years from the date of award of the In Principle Approval, Railway Administration shall have the right to terminate the Agreement.
4. The rights of the Concessionaire shall include the following:
   (i) The right to undertake the business of collecting, storing and loading onto Wagons, consignments of goods from any third party;
   (ii) The right to determine, charge, collect, retain and appropriate all the fees that it charges from the consigners;
   (iii) The right to obtain access to Rail Terminals and develop, own, operate and maintain Rail Terminals, including inland container depots;
   (iv) The right to procure and own/lease Wagons and containers.

5. The concessionaire will be responsible for loading and unloading operations at both the origin and destination Rail Terminals.
6. The Railway Administration shall haul the Concessionaire Trains on the payment of prevalent haulage charges as notified from time to time. The present haulage charges are contained in Railway Board's letter no. 2008/TT-III/73/8 dated1-7-2008.
7. The Central Government (Ministry of Railways) shall have the right to specify certain commodities, which ordinarily move in railway wagons in trainload as notified commodities, to be subjected to different tariff and conditions for haulage. At present, as per Board's letter no. 2008/TT-III/73/8 dated 1-7-2008, carriage of coal, coke, minerals and ores in containers is prohibited.
8. The existing incentives/schemes extended to rail customers or that may be introduced in future shall not ipso facto apply to the Concessionaires. Upon request of the Concessionaire(s), Railway administration may consider extending such schemes to the Concessionaire to the extent possible in a non-discriminatory manner.
9. All commercial rules like that contained in Commercial Manual, as amended from time to time and as applicable to other freight traffic moving on Indian Railways, shall apply to the Container traffic, except rules specially covered in this Agreement in a non-discriminatory manner amongst similarly placed entities.
10. It shall be the Concessionaire's sole responsibility to procure the requisite approval/authority for the Concessionaire's Train and/or a Railway Administration locomotive to enter into and utilize the origin and destination Rail Terminal(s).
11. Each concessionaire is required to set up two rail linked inland container terminals within three years of obtaining the license to operate or have access to inland container terminals.
12. Use of Railway freight terminals (Goods sheds) as Container Rail Terminals (CRT) has been permitted by the Railways in terms of Rates Circular 10 of 2008.
13. Each Rail Terminal, other than a Railway owned Terminal, that is used by the Concessionaire shall conform to the following:
    (i) Each Rail Terminal shall have rail facilities for handling Concessionaire Trains along with locomotive, in conformity with siding rules prescribed by Railway Administration from time to time.
    (ii) Be equipped with a RDSO approved in-motion weigh bridge of prescribed standards for weighing of Wagons with and without containers of the Concessionaire's Train.

(iii) Be equipped with TMS and such other facilities as may be required to interface with and ensure transfer of data online to, FOIS of Railway Administration.

14. The Concessionaire shall declare the weight of each Wagon/container prior to departure of the Concessionaire's Train.
15. The Concessionaire shall procure by way of purchase, lease or hire, Wagons including Brake Vans and Containers required for the purposes of operating the Concessionaire's Trains. However, till such time as the Concessionaire procures the required Brake Vans, Railway Administration may provide its own Brake Vans (provided they are available), on non- discriminatory basis, at a reasonable charge, notified by the Railway Administration from time to time.
16. In the event of any of the wagons of the Concessionaire lying idle ("Idle Wagons"), the Concessionaire may offer to the Railway Administration or other Concessionaires, for use of any such Idle Wagons. However, Railway Administration shall be under no obligation to accept such an offer of the Concessionaire for use of any idle wagons and may levy a Stabling Charge as specified.
17. In the event of an Emergency, Railway Administration shall have the right, to temporarily assume control and make use of the wagons of the Concessionaire. For any such Emergency Use, Railway Administration shall pay to the Concessionaire, a reasonable rent/charge to cover the cost of provisions, maintenance and operation of the Wagon.
18. The Concessionaire shall at all times conform to the maintenance standards specified by the Railway Administration in accordance with Good Industry Practice for the Concessionaire's Containers, rail related equipment and tracks.
19. The Concessionaire's wagons shall be maintained by the Railway Administration in accordance with the maintenance schedule notified by the Railway Administration. Such maintenance shall, inter alia, include intensive examination, routine overhaul ("ROH") and periodic overhaul ("POH"). The Concessionaire will provide and maintain the requisite wagon examination facilities (as specified by Railway Administration) inside the Rail Terminal and bear a onetime capital cost for tools and plants as specified by Railway Administration and approved by RDSO.
20. Wagon maintenance charges for maintenance by Railway Administration of the Concessionaire's Wagons shall be included in the Haulage Charges. The present Haulage Charges include 5% thereof by way of maintenance charges.

21. Railway Administration shall normally complete the intensive train examination within a period of 6 hours from the time the Concessionaire's Wagons (in empty Rake formation) are handed over by the Concessionaire for such examination. Provided, however, that the minimum interval between two successive Rakes offered for intensive train examination shall be at least 6 hours. Alternatively, the Railway Administration may examine the Concessionaire's Wagons at suitable point enroute its destination where the facilities for such examination exist. The time stipulated for maintenance shall not be applicable vis-à-vis such Concessionaire's Wagons that are declared sick during the course of examination and are required to be detached from the Concessionaire's Train for sick line/ workshop attention.
22. In the event of the Railway Administration's inability to conform to the time schedule specified for intensive train examination, it shall pay to the Concessionaire for every 24 hours of delay (inclusive of initial 6 hours) so caused, an amount equal to the Stabling Charges payable for such period of delay.
23. The Concessionaire may undertake maintenance of the Concessionaire's Wagons through any other entity, including the Concessionaire, on such terms and conditions as specified by the Railway Administration from time to time; provided, however, that the maintenance is carried out as per maintenance schedules and various stages of inspection, as may be notified by Railway Administration and pre-departure certification of such Wagons shall be issued by the Railway Administration for which the prescribed charges shall be paid by the Concessionaire.
24. The Concessionaire shall hand over empty wagons of the Concessionaire, in rake formation, to Railway Administration for carrying out maintenance as per the schedule specified by the Railway Administration.
25. The haulage charges for moving the Wagons, in rake formation, from a Rail Terminal to the workshop/maintenance depot/train examination point of the Railway Administration and back shall be borne by the Railway Administration; provided, however, that the scheduled haulage charges shall be payable by the Concessionaire in the event maintenance is carried out by an entity other than the Railway Administration and inspection is carried out by the Railway Administration at the location of maintenance.
26. In the event wagon maintenance is undertaken by the Concessionaire or any other party (other than Railway Administration in accordance with the provisions of this Agreement) a proportionate rebate in

haulage charges (equivalent to the built in maintenance charges) shall be given to the Concessionaire.

27. Subject to any operational constraints, Railway Administration will provide locomotives to haul the Concessionaire's Trains on a non-discriminatory and non-exclusive basis vis-à-vis other Concessionaires only.
28. At least four (4) hours prior to the planned departure of Concessionaire's Train, the Concessionaire shall submit an indent ("Indent for Locomotive") for supply of locomotive. The existing incentive schemes, if any or incentive schemes that may be introduced in future for supply of locomotives may be extended to the Concessionaire's Trains, with suitable modifications such that it is applied in a non-discriminatory manner among different concessionaires.
29. The Concessionaire may, any time prior to arrival of a locomotive, cancel its Indent, provided, however, that the Concessionaire shall be liable to pay to Railway Administration indent cancellation charges equivalent to one (1) hour Locomotive Detention Charges. In the event, indent for cancellation of locomotive is received by Railway Administration after the loco is dispatched for the Rail Terminal, the Concessionaire, in addition to indent cancellation charges, shall also be liable to pay to Railway Administration such charges as may be prescribed by Railway Administration for the infructuous movement of locomotive both ways. Such charges, however, shall not exceed the charges levied for the movement of the locomotive for the distance from the nearest locomotive shed.
30. If, after arrival of the locomotive at the Rail Terminal from where the train is required to depart or the Rail Terminal where the train is required to terminate, as the case may be, the Concessionaire's Train, for whatsoever reason not attributable to Railway Administration, is not attached or detached and released (as the case may be), prior to expiry of the Free Waiting Time of two hours (entry to exit), the Concessionaire shall be liable to pay to Railway Administration, Locomotive Detention Charges for every hour (or part thereof) for which the locomotive is detained beyond the Free Waiting Time. Provided however, if a locomotive is detained for a period of more than eight (8) hours at any Rail Terminal (either the Rail Terminal of origin or of termination, as the case may be), then without prejudice to the Concessionaire's liability to pay to Railway Administration the Locomotive Detention Charges, Railway Administration shall have the right, but not the obligation, to withdraw and remove the locomotive

from such Rail Terminal. In case Railway Administration withdraws and/or remove the locomotive from the Rail Terminal after detention of 8 hours, the detention along with movement charges shall be levied without granting any free time. In the event Railway Administration withdraws the locomotive, then the Indent for locomotive shall deemed to have lapsed, with no further effect. These provisions shall also apply to the situation where the locomotive arrives at a Rail Terminal where the train is scheduled to terminate, but is denied entry into such Rail Terminal for reasons attributable to the Concessionaire and/or the Rail Terminal operator.

31. Locomotive Detention Charges payable by the Concessionaire for detention of a locomotive beyond the Free Waiting Time shall be at the rates as prescribed for Diesel/Electric Train Engines by the Railway Administration from time to time. The current Locomotive Detention Charges are contained in Rates Circular No. 18 of 2008.
32. Railway Administration shall, in the event of delayed supply of locomotive beyond 12 hours from the indented schedule time of departure of the Concessionaire's Train, be liable to give to the Concessionaire a onetime rebate equal to two (2) percent of the haulage charges payable by the Concessionaire for the Booked Route. This rebate shall, however, not be admissible in contingencies such as interruption of traffic due to accidents or any other similar unavoidable reasons beyond the control of Railway Administration.
33. Transportation of the Concessionaire's trains shall be in Block Rakes. In the event a Concessionaire's Train operates with lesser number of Wagons/Containers than those prescribed in the Block Rakes ("Non-Block Rake Trains"), the haulage charges for such Non-Block Rake Trains shall be recovered on the basis of the minimum composition of Block Rake as specified by Railway Administration. Provided, however, in the event a Concessionaire's Train has less than half the Wagons required to constitute a Block Rake, the Railway Administration shall have the right to refuse to haul the Concessionaire's train comprising less than half a Block Rake. The Railway Administration may, however, at its sole discretion extend the facility of two point rakes for Container Trains during specified periods and on specified routes.
34. The Concessionaire's Trains to be hauled by Railway Administration pursuant to this Agreement shall be booked by the shortest route possible (the "Booked Route") and the haulage charges shall be determined with reference to such Booked Route. Provided, however, in case of any accident or other operational exigencies on or affecting the Booked Routes, Railway Administration shall, in its sole discretion,

be entitled to transport the Concessionaire's Train by an alternative route ("Alternate Route").

The Concessionaire shall be liable to pay haulage charges only for the Booked Route even when Concessionaire's Train is transported by an Alternate Route. Provided that in case the Concessionaire's Trains are carried by a longer route in pursuance of the Rationalisation Scheme of MOR (under section 71 of the Railway Act 1989), the Concessionaire shall be liable to pay charges accordingly.

35. The Concessionaire shall, at least 7 (seven) days prior to any calendar week in which it proposes to operate any Concessionaire's Train, inform ("Weekly Advance Scheduling Notice") Railway Administration of the number of Concessionaire's Trains, it requires to be moved, the proposed routes and the likely departure dates ("Weekly Advance Schedule").
36. Notwithstanding anything to the contrary, the Concessionaire shall, at least twenty four (24) hours prior to the day of programmed loading (excluding the day of loading itself) of a Concessionaire's Train, confirm to Railway Administration the departure schedule of such Concessionaire's Train, provided that such notices shall not in any way be binding and shall be only indicative of the Concessionaire's operations schedule for the following week /day.
37. Railway Administration shall maintain a level playing field among all Concessionaires and shall devise and implement a transparent and non-discriminatory system for dispatch of Concessionaire's Trains on a first come first served basis.
38. Notwithstanding anything to the contrary contained in the Agreement, dispatch of locomotives and Concessionaire's Train(s) shall be subject to any operational exigencies and/or system restrictions.
39. Railway Administration shall make all efforts to ensure minimum enroute detention of the Concessionaire's Trains.
40. Subject to any operational and capacity restrictions of Railway Administration, there shall be no restriction on the number and frequency of Concessionaire's Trains that the Concessionaire may require Railway Administration to haul pursuant to this Agreement.
41. The Concessionaire may request the Railway Administration to accept, at any time after the departure of a Concessionaire's Train, the diversion/re-diversion of such Concessionaire's Train to any other Rail Terminal, in accordance with the various terms and conditions (including, but not limited to, payment of haulage charges and other charges) and procedures specified by Railway Administration from time to time subject to its operational exigencies and/or for system

restrictions. It is clarified that the Railway Administration shall not be under a legal obligation to comply with such request.

42. The Concessionaire shall be liable to pay to Railway Administration Stabling Charges, in the following events:
    (i) In case the Concessionaire's Train suffers detention at the serving station for reasons attributable to the Concessionaire or when the Concessionaire either declines to accept Wagons inside the Rail Terminal, scheduled to be the terminating Rail Terminal or is not in a position to receive placement of subsequent Wagons; or
    (ii) In case of non-acceptance of trains inside any port by the port authority concerned; or
    (iii) At any of the stations en route due to any reason attributable to the Concessionaire.
    (iv) Provided, however, that Stabling Charges shall be levied only where the detention of the Concessionaire's Train is for a period in excess of 4 hours.

    Stabling Charges shall be payable at the rates notified by Railway Administration from time to time and the Railway Administration shall have the right to revise the Stabling Charges on an annual basis; provided that any increase in charges in any Financial Year during the term of this Agreement, shall not exceed 10% (ten percent) of the charges payable in the preceding year. The current Stabling Charges are contained in Railway Board's letter no. TC-I/2005/201/2 Pt.R dated 22.03.2013 (Rate Circular No. 5 of 2013).

CHAPTER-16
OPERATING STATISTICS

16001: Railway Statistics: These statistics are essential for planning, prioritizing and executing activities connected with operations.

The railway statistics are based on four factors – Quantity, Distance, Duration and Service.

In Railway environment, these relate to –

1. **Primary Units:**

(a) Quantity- Expressed as tones and number of passenger carried and earnings derived.

(b) Distance- Expressed in kilometres.

(c) Duration- Expressed in minutes, hours & days.

(d) Service performed- Expressed in terms of trains, vehicles, wagons, engines.

2. **Fundamental Units:** Relationship between primary units, expressed in composite terms is called 'Fundamental units'. The fundamental units express two primary ideas in their relationship to one another viz. Tonne-kms, Passenger kilometres, Train-kilometres, Wagon-kilometres-Hours, Wagon days etc.

3. **Derived Units:**

Expresses the relationship that exists between two sets of primary or fundamental units and the results thus arrived are termed 'Derived Units'. The process by which this relationship is ascertained is as illustrated in the following examples:–

(a) Passenger earning (Primary): Passenger carried (Primary) X Earning per passenger

(b) Passenger earning (Primary): Passenger kilometres (fundamental) X Earning per passenger kilometre.

(c) Passenger kilometer (fundamental): Number of passengers (Primary) X Average distance travelled by a passenger (also called lead of passenger traffic).

(d) Wagon kilometres (fundamental): Wagon days (fundamental) X Wagon kilometres per wagon day.

These 'Derived Units' highlight special features of transportation output and are useful in evolving suitable management strategies.

16002: Classification of Railway Statistics:

The principal heads under which the railway statistics are generally grouped are indicated below:–

(a) Economic and financial statistics:

Under this head are to be included detailed statistics relating to the advance statement of gross earning and traffic handled i.e. the number of passenger booked, tonnage lifted, wagons loaded for current information and the statistics of revenue and expenditure as booked in monthly and yearly accounts.

(b) Operating statistics:

Operating statistics are broadly divided into:

(i) Traffic
(ii) Power.
(iii) Rolling Stock

(i) **The traffic statistics include:** statistics of wagons loaded, wagon mobility, wagon usage, train loads, train mobility, productive and unproductive services, wagon detention, marshalling yard, terminal goods station and punctuality.

(ii) **The power statistics include:** engine usage, fuel and energy consumption, engine failure statistics etc.

(iii) **Rolling stock;** holding & availability, repairs & maintenance percentage etc.

(c) Commercial Statistics: Coaching and freight revenue and volumes, and earnings by class of passengers, for different commodities, claims paid for compensation of goods and parcels lost or damaged.

(d) Rolling stock and workshop repairs statistics: Under this head are grouped statistics dealing with POH of coaches, wagons, locomotives and other information relating to workshop activity.

(e) Administrative statistics: These statistics relate to staff matters, numbers by categories and classes of staff.

(f) Other statistics: Number of stations by Class, halt stations, Standard of interlocking etc.

(g) Medical statistics: relate to sickness of staff etc.

(h) Engineering statistics: give details of track and bridges requiring attention - ultra sonic tests done or overdue, track renewals, distress bridges etc.

16003: Compilation of Railway Statistics:

1. Compilation of statistics of Indian Railways falls broadly under two categories, namely–
   (i) the statistics required to be compiled by the Railways for submission

to the Railway Board in order to keep the Board generally informed about the different activities of the Indian Railways and

(ii) further detailed Railway statistics which individual Railways may undertake for their own respective domestic requirements.

2. The statistical compilation work on the Zonal Railways is in the charge of a Statistical Officer working under Finance deptt. The format and the methods of compilation of the monthly Statistical statements and the Annual Statistics required to be submitted to the Board are detailed in the Manual of Statistical Instructions, Volumes I and II, respectively.

16004: Operating Statistics:

1. Operating Statistics for the various Indian Railways are issued in the form of various pamphlets published periodically by the Railway Board. Detailed Statistics relating to each division and gauge are contained in various parts of the 'Domestic' statistics issued quarterly (Parts, I, II and II- B & C).
2. Some of the important statistics include the following:-

16005: Operating ratio:

The ratio of working expenses (excluding suspense but including appropriation to Depreciation Reserve Fund and Pension Fund) to Gross Earnings. (Expenditure incurred in connection with Administration, Operation, Maintenance and repairs of lines open for traffic)

A. Passenger Train Performance:

1. Punctuality:

Punctuality is the main criterion for judging passenger train performance. Some of the statistics compiled separately for 'Mail and Express trains', 'Other Passenger Trains', and 'Mixed' trains are:

$$\text{Punctuality} = \frac{RT + NLT}{\text{Total no. of Mail/Express trains}} \times 100$$

RT = Trains arriving Right Time

NLT = Trains not losing time. (15" for all Mail/Exp. & Passenger trains and 5" for Superfast trains).

2. Vehicle Kilometers per Vehicles Day:

This figure indicates by the vehicle days, which is the product of average number of coaching vehicles on line/in use and the number of days in the period under reference.

This figure indicates the extent to which coaching vehicles are kept 'on the move'. The main factors affecting its value are:–

(a) The average speed of trains

(b) The average length of train run (average lead)

(c) The idle periods provided for in rake links.

3. Since in the short run, train composition is not amenable to change, it is only by increasing the speeds of trains and tightening up rake links that an improved performance can be achieved.

4. This result is calculated by dividing the coaching vehicles kilometers by the vehicles days (which is the product of average number of coaching vehicles on line and the number of days in the period under reference).

$$\text{Vehicle km. Per Vehicle day} = \frac{\text{Coaching Vehicle Km}}{\text{Vehicle days}}$$

5. Average Speeds:

This figure represents the average time tabled speeds of passenger trains. The higher this figure, the better the service to the passengers.

Shunting Kilometers per 100 Train Kilometers (Passenger including proportion of Mixed):

(i) This figure indicates the amount of unproductive service that has to be performed per 100 train kilometers (Passenger, including proportion of mixed). Since the amount of shunting to be done on a passenger train depends upon various local factors, the figure, which will vary from Division to Division and from Railway to Railway, traffic conditions remaining constant is indicative of wasteful shunting.

(ii) The figure is arrived at by multiplying by 100 the quotient of shunting kilometers divided by train kilometers (passenger, including proportion of mixed). It can be depicted by the formula given below:-

$$\frac{\text{Shunting Kms} \times 100}{\text{Train kms.}}$$

B. Wagon Usage:

1. Average Starting Wagon Load:

(i) This figure is compiled separately for coal and coke, heavy merchandise and light- merchandise, thus affording an indication of the extent to which wagon space is utilised by stations from which traffic originates. It is extremely important that wagons be given as full a load as possible because this means economy in wagon usage and hence engine power and less strain on line and yard capacity. Even a slight improvement in the starting wagon load can mean a tremendous saving to the Railway.

(ii) The result is calculated by dividing the number of tones loaded by the number of wagons loaded (in terms of four wheelers) CR and TR vans,

as also wagons used for livestock and departmental purposes, however are excluded.

$$\text{Average Starting Wagon Load} = \frac{\text{Tonnes Loaded}}{\text{No. of Wagons Loaded}}$$

2. Wagon Kilometers per Wagon Day:

(i) This figure is a measure of wagon mobility and indicates the average number of kilometers moved by a wagon, on the average, per day, both loaded and empty journeys being included. Delays in marshalling yards, delays at stations when loading or unloading, delays in clearance from roadside stations, decrease in average speed of goods trains, increase in the number of wagons awaiting repairs and shorter loads of trains are some of the factors normally responsible for poor mobility.

(ii) This result is obtained by dividing wagon kilometers by wagon days (which is the product of daily average number of wagons on line and number of days in the period).

$$\text{Wagon Km. Per Wagon day} = \frac{\text{Wagon Kms.}}{\text{Wagon Days}}$$

3. Net Tonne Kilometers per Wagon Day:

(i) This unit is a measure of the revenue earning work done by the wagons and reflects both mobility and loading. A decrease in this figure may be due interalia to any of the causes which affect the figure of wagon kilometers per wagon day. The proportion of loaded to total wagon kilometerage, the average loaded wagon and the relative amount of heavy and light merchandise carried are some of the other factors which may affect this figure.

(ii) The numerator in this case is the net tonne kilometres (excluding departmental) and the denominator is wagon days.

$$\text{Net Tonne km. Per wagon day} = \frac{\text{Net Tonne kms.}}{\text{Wagon days}}$$

4. Wagon Turn Round:

This figure expresses the ratio between the total number of serviceable wagons on a Railway and the number of wagons required daily for effective use on the Railway for its outward, inward and transshipment traffic. Stated in a different way, wagon turn round represents the average period of time in which a particular wagon completes its average loaded trip and after which it again becomes available for loading.

$$\text{Wagon Turn Round} = \frac{\text{No. of effective wagon holding}}{\text{Loaded Wagons of date + Loaded received wagons}}$$

5. Average Wagon Load during the Run:

(i) This unit is a good index of wagon utilisation as it refers to the average load of all loaded wagons carried. It suffers from the draw back that it does not directly reflect the performance of the division, gauge or Railway to which it applies, as only a proportion of the loaded wagons carried is loaded locally and the balance consists of both received traffic and cross traffic.

(ii) For obtaining this figure, net tonne kilometers are divided by loaded wagon kilometers (the figures relating to departmental trains are excluded).

$$\text{Average Wagon Load during the run} = \frac{\text{Net Tonnes Kms.}}{\text{Loaded Wagon kms.}}$$

16006: Goods Trains Performance:

Average Speed of Goods Trains:

1. This result is calculated separately for 'through goods trains' and all goods trains and is arrived at by dividing the total train kilometers by total train engine hours of the concerned service. Detentions to goods trains at roadside stations enter into the calculations and have therefore the effect of bringing down average speeds.

$$\text{Average Speed of Goods Trains} = \frac{\text{Train kms.}}{\text{Train Engine hours.}}$$

2. Some of the factors on which the average speed of goods trains depends are:
   (a) The proportion of the density of trains to the sectional capacity. The nearer a section is worked to its sectional capacity, the proper the speeds obtained.
   (b) Hauling power of the engines used, standard of maintenance of engines and time taken by loco pilots for loco requirements.
   (c) Loads of trains.
   (d) Condition of rolling stock, particularly the brake power available.
   (e) Standards and maintenance of signalling and interlocking.
   (f) Facilities at major stations and at roadside stations to complete shunting in the minimum time and shorter block sections which will increase the sectional capacity.
   (g) Engineering restrictions - permanent and temporary, gradients and

curves.

- **Average Net Train Loads (in tonnes):**
  This figure refers to the average freight load carried in tonnes, i.e., to that portion of load which earns revenue for the Railway.

$$\text{Average Net Trainloads} = \frac{\text{Net Tonne kms.}}{\text{Train kms.}}$$

- **Average Gross Train Loads (in tonnes):**
  This figure represents the average overall load of goods trains i.e. the freight load plus the weight of the rolling stock.

$$\text{Average Gross Train Loads} = \frac{\text{Gross Tonne kms.}}{\text{Train kms.}}$$

The principal factors affecting this figure are:

1. The tractive capacity of engines on goods train services.
2. The gradients on various sections of the line.
3. The nature of goods carried.

- **Shunting Engine Kilometers per 100 Train Kilometers:**

1. This figure indicates the amount of non-revenue earning work done per 100 train kilometers (Goods and proportion of mixed). Its value is affected mainly by the load of goods trains and the amount of terminal work involved.

$$\text{Shunting Engine kms. per 100 Train kms.} = \frac{\text{Shunting kms.} \times 100}{\text{Train kms.}}$$

2. However, for the same division or railway, the pattern of traffic remaining the same, rise in this figure is indicative of wasteful shunting.

- **Net Tonne Kilometers per Engine Hour:**

The figure of net tonne kilometers per Engine hour is a very useful index of the efficiency of freight working on a division. Net tonne kilometers indicate the amount of revenue earning work done while engine hour measure the cost of doing it.

$$\text{Net Tonne Kilometers per Engine Hour} = \frac{\text{Net Tonne kms.}}{\text{Engine hours}}$$

A decrease in Net Tonne Kilometres per engine hour may be due to factors such as:

1. Shunting engine hours not cut down in proportion to the decrease

in traffic offering.

2. Increase in departmental, assistance required, assisting hot required and light engine running.
3. Decrease in the average number of train and or the average speed of goods train.
4. Decrease in the average starting wagon load or in the wagon loads of wagons received from other divisions.
5. Increase in the proportion of unbalanced traffic.
6. The type of traffic carried, heavy or light.

16007: Average Detention per Wagon:

1. All wagons
2. Through loaded wagons:

Detention suffered by stock in a yard depends, interalia, on the layout of the yard and on the number of trains per day that can be dispatched in various directions. Target figures have been laid down for each yard for detentions to all wagons and through loaded wagons. Such targets take into consideration the condition of work and facilities available in the yard concerned. Detentions in excess of this figure indicate inefficient yard work. Lesser detentions mean lesser cost of handling wagons in yards.

$$\text{Average Detention per Wagon} = \frac{\text{Total Detention Hours}}{\text{No. of Wagons dispatched}}$$

Number of Wagons Dealt with per Shunting Engine Hour:

The number of wagons that a given yard can deal with per shunting hour depends/interalia, on its lay-out. Accordingly a target figure has been prescribed for each yard to enable the efficiency of yard work to be gauged. As shunting involves cost, the higher this result, greater the efficiency of the yard.

No. of wagons dealt with per shunting engine hour

$$= \frac{\text{No. of Wagons dealt with}}{\text{Shunting Engine hours}}$$

16008: Locomotive Performance :

- **Engine Kilometres per Day per Engine in Use:**
  This figure is compiled separately for passenger, mixed and goods train services as well as for all services. It refers to 'engines in use'. This is affected by such factors as:
  1. The average run of trains.
  2. The average speed of trains.

3. The engine links
4. The location of engine shed with respect to the stations which they serve.

$$\text{Engine kms. per day per engine in use} = \frac{\text{Engine kms.}}{\text{Engine days in use}}$$

- **Engine Kilometres per Day per Engine on Line:**
  This figure is also compiled by services and for all services put together. The proportion that this figure bears to the corresponding figure of 'engine kilometres per engine day per engine in use' indicates the proportion of available engines 'on line' that were put to effective use during the period in question.

$$\text{Engine kms. per day per engine on line} = \frac{\text{Engine kms.}}{\text{Engine days on line}}$$

- **Quantity of Fuel Consumed per Engine Kilometre by Service:**
  This figure indicates the fuel consumption in relation to engine kilometres only and does not reflect the tonnes hauled.

Quantity of fuel consumed per engine km by service

$$= \frac{\text{Quantity of Fuel Consumed}}{\text{Engine kms.}}$$

- **Quantity of Fuel Consumed per 1000 Gross Tonne Kilometres by Services:**
  This figure indicates the fuel consumption in relation to the work done and is, therefore, a better index of fuel consumption than the quantity of fuel consumed per engine kilometer figure. The main factor that influences this result is the gross load of the train. It is derived by the formula given below:

$$= \frac{\text{Quantity of Fuel Consumed} \times 1000}{\text{Gross Tonne kms.}}$$

Traction Energy consumption per engine km and per 1000 gross tonne kms are worked out exactly in the same way, replacing 1000 litres of diesel by kwhs.

Chapter -17
FREIGHT OPERATIONS INFORMATION SYSTEM (FOIS)

17001: INTRODUCTION:

In keeping with the global trend, there has been a long outstanding demand of the industry & trade for transparency in sharing of information to give the customers an up-to date business like environment. In this millennium, Railways have decided not only to perform the traditional tasks of carrying passengers and goods efficiently, but also to change the mindset of working as a closed system. The great concern to improve on its market share has prompted Railways to have a multi-pronged approach in its freight policy.

Continuous Cargo Visibility has always been a critical component of the Supply Chain Distribution Management System. To achieve this, out of the stated multi-pronged new freight policy, a lot of emphasis has been laid on establishing a computerized FREIGHT OPERATIONS INFORMATION SYSTEM (FOIS). The system, indigenously developed, is fully functional in the B.G. system of Indian Railways, being the first of its kind in South East Asia.

17002: Freight Operations Information System Mission – (FOIS):

- To give a totally transparent system with continuous Cargo visibility and an up-to date business environment to the Customers with instant access to information regarding their consignments in transit for 'just in time' inventory.
- FOIS is an On-line Real-Time system based on the current State of Art Technology and efficient Communication system.
- A management tool to optimize utilization of costly assets and resources by improving the distribution of Rakes/Wagons & Locos and also scheduling and Routing Traffic in an optimized cost effective manner.

17003: Strategic Advantages Derived from FOIS:

- Extension of the current business practice from bulk movement of freight traffic in train load formations, to piecemeal traffic, by clubbing and moving together similar type of stock in 'Hub & Spoke' arrangement to increase its market share by re-diverting high profit yielding piecemeal cargo from road to rail.
- Global tracking of consignments in real time Rakes or individual wagons.
- The insight and pipeline of consignments thus captured on the entire

BG network is made available for timely planning and 'just in time' inventory management on a time span cargo movement, which may extend from 2 to 5 days from origin to destination.

- Facilitate acceptance (customer's Orders), billing and cash accountal of freight traffic from identified nodal customer centers, which may not necessarily be the handling terminals.
- Extension of such facilities to customer's premises and introduction of e-commerce, benefiting both IR and the trade & industry, by eliminating manual transactions, which unnecessarily add to the burden of logistics management.
- Providing the requisite foundation for a total logistics system furnishing real time information of the chain of physical distribution, which is an essential element in reducing inventory costs.

17004: Scope of FOIS Systems:

Presently two subsystems of FOIS are already in use after extensive field trials and validation: - RMS and TMS.

(a) Rake Management System-RMS

- Rake based consignment tracking and pipeline
- Train/Rake operation
- Stock Holding in terms of summary of wagon types
- Train and stock Interchange
- Terminal Handling performance
- Loco holding, outage and power on-line
- Reporting to take care of Train/Load on summary basis
- Invoice based consignment tracking
- Wagon wise Stockholding
- Reporting of consist, Wagon wise
- Invoice based loading originating tonnage and revenues.
- Wagon wise Interchange
- Statement of missing Wagons/wrongly delivered

(b) Terminal Management System-TMS

- Computerized booking and delivery of consignment
- Station Accounting
- RR generation/Transmission
- Improved Customer Interface

17005: Crew Management Systems (CMS):

CRIS has developed software named 'Crew Management System', wherein booking of crew and guards, which was being done manually and monitored at various levels by Inspectors and Officers, is arranged through software. Crew Management System (CMS) is a unique system in which accuracy and monitoring is automatically maintained. The software system

was rolled out in December 2007 and already installed at about 2200 data entry nodes at over 290 crew booking points. These are spread over entire Indian Railways. CMS at present has a database covering 89,000 crew members and over 30000 crew members are being booked daily through the system. The work has been completed and provided with Thin clients connected to a server cluster at CRIS, wherein all the functions like crew bookings, call served to crews, their signing on duties are done through computers after ensuring their rest, training and medical particulars. The job which was done manually till a few years back is now monitored automatically. Not only it has a single data base of all the running staff of Indian Railways but also has an all-around reports (more than 500 reports of these crews are visible to the monitoring authorities of the Railways). All the officers sitting in their offices can monitor performance reports of the train operating staff. This enhances the performance planning by the officers. This project which was initially started in Nov 2006 with a team of 5-6 software persons is now managed by a GM rank officer of CRIS with a dedicated team of software developers and domain experts, who are basically attached to driving jobs since the last 15–20 years. The system caters for all gauges BG, MG & NG.

The CMS system is being implemented in the Railways Lobbies at 306 lobby (Location where Railways crew are booked) locations with touch screen along with biometric devices for Sign-On/Off of crew from their duties. The CMS software uses FOIS and Railways network with adequate provision for security in the system so that it is not be vulnerable to hacking from outside. It also has on-line application processing (distributed) & data inter- viewing at the Divisional and Zonal offices.

The different applications of CMS require various levels of organization hierarchy to access it via a web browser. This application extends to various stakeholders and provides a single window interface to the Train Crew.

17006: FOIS Design Architecture:

FOIS is designed and developed in conformity with the 'state of art' technology, which is scalable, maintainable, with open systems architecture and is based on the Indian Railway's organizational hierarchy, its present and future requirements. Based on the business processes that are being adopted, the business model developed in the FOIS - IT architecture is based on the following assumptions: -

(a) The current business practice of bulk movement in rake formation is the accepted norm for future also. Around 80 to 85% of traffic already moves in Rake, majority of which comprises similar type of rolling stock.

(b) Global perception is more important, with respect to tracking of

consignment and Rakes rather than of individual wagons, locomotives and trains. The insight and pipeline of consignment and rakes should be seamlessly available. Railways would like to share information on booking and movement of consignments with individual customers also.

(c) The operations and data capturing, will remain control centric for train, rake, locomotive and stock management and terminal centric for booking, loading, unloading and delivery, taking into account the spatial distribution of activities, which need to be captured.

(d) Integrity of Operations and Commercial data is an absolute necessity. RMS and TMS application are conceptualized to provide integration with the other subsystems as and when these are developed.

(e) FOIS ultimately expects an event driven integrated reporting in real time, beginning with the tendering of Forwarding note to loading and generation of invoice followed by load consists, train ordering and departure/arrival of load destination, unloading and delivery. The data thus captured is used for generating associated managerial reports on-line information (MIS). The data will also be used for expanding the scope to cover other functional areas of the remaining modules and can easily integrate with RMS/TMS using appropriate middle ware technology for sharing information locally. Therefore, a strategic approach has been adopted to computerize IR operations by implementing RMS/TMS systems in a phased manner using modular approach.

17007: FOIS System Architecture:

Key components of the System Architecture:

Intelligent terminals will be placed at the field locations to capture the data from the place of activity, namely control offices, yards, goods sheds, C & W depot, Loco sheds etc. and connected to the identified Application Server through reliable communication links for transaction processing.

Application servers are centrally placed in the office of CRIS. These servers are connected to the Zonal Hd. Qrs., Divisional Control Offices, yards, interchange points, goods sheds etc. with a reliable and integrated network. The servers are networked amongst themselves and to the central server for global level transactions.

The central Server provides management Reports at Board level, acts as repository of all the global data and also provides global services to maintain referential integrity of the databases including master files.

17008: Network Topology:

In view of the Centralized application architecture, a star based network topology has been designed. However, in order to provide alternate paths

(to meet the up time requirement of 99.9%) from reporting locations, a mesh has been created within each zone so that every location has at least two paths to reach CRIS. Each zonal HQ has been connected to the central location (CRIS) on high bandwidth pipes. In addition to this, another zonal location has been connected to CRIS using high capacity link. Hence these two high bandwidth links shall cater to the entire transaction load generated by a zone. Railway telecommunication network, leased lines, DOT, VSAT Technology as communication media have been provided for reliable and fast means of data transfer.

17009: Phased Implementation – Approach:

(i) In case implementation is attempted for events of all the functions to be reported in real time, concurrently from day one, then the reporting sites to be readied, the associated communication requirements and the number of staff to be trained assume enormous proportions. To ensure that the implementation effort is within manageable limits, one way is to take up, one by one, only limited portions of geographical territory for computerization at any given time. On the other hand, if the territory is small, instances of repetitive data entry increase, resulting in redundant expenditure on reporting infrastructure that will have no use as the territory expands. At the same time, if the MIS requirements are to be met in totality, the territorial expansion must ensure that a function is implemented on end to end basis as quickly as possible, otherwise only a truncated picture will be available to various levels of users and the benefits of computerization remain postponed till the entire Indian Railways have been covered.

(ii) FOIS comprises several subsets of functions each meeting a distinct set of objectives. Certain FOIS subsets presuppose others to be operational before they can be implemented. Loco and wagon based functions presuppose load/train/rake functions to be operational. Goods shed functions expect wagon-based functions to be in place before they can be implemented. With these assumptions the FOIS / RMS systems have been designed in a modular structure which could be taken up for implementation in a phased manner.

For example:-

Phase-I (PI module):

Provides facility for reporting load summary with only wagon type and number of units.

Phase-II (PII module):

Provides facility for reporting the consists with details of wagon numbers.

Phase-III (PIII module):

TMS provides facility for goods shed functions and generation of RR.

17010: Implementation Strategy:

Realizing that functional phasing is the only way to keep the implementation effort within manageable limit and yet remain meaningful at every stage, FOIS software has been developed as above in three modules such that functions of global utility are implemented faster from fewer sites. It also takes into account that the beginning is made from the control offices where computer awareness is of a high order. The implementation can grow on need basis driven by the Railways themselves.

For timely completion of field implementation, the total involvement and commitment of Railways is very essential from day one. Therefore, PCOM's of Railways have been given the total responsibility and charge of implementation of FOIS, to provide for the following:-

1. Railways to get staff identified and train them to work on PCs.
2. Railways to prepare the sites for installation of hardware including zprovision of electrical and civil facilities.
3. Maintenance of channels & data com equipment has been given to CSR of the zones.
4. CRIS would provide specifications for the same.

   For facilitating this process the organization of CAO/FOIS has been strengthened and made responsible for coordination & implementation on All-India-basis.

   The software implementation and maintenance shall remain the responsibility of CRIS. Pre implementation training of the required number of staff (consisting of Core Implementers and Telecom Inspectors from each of the divisions), in RMS - phase 1 has been completed by CRIS for all the zonal railways and their divisions. However, Railways will be required to make arrangements through the Zonal Training Schools to train the remaining staff of the concerned categories.

17011: Benefits:

(i) Continuous Cargo Visibility:

a. Rake based consignment tracking and pipeline.
b. Invoice based loading -Originating Tonnage & Revenue.
c. Information of trains on the run, the expected time of arrival (ETA) at next point and the work to be performed.
d. Vehicle guidance of all trains on run.
e. Daily report describing the performance of all through trains operated in a controlled territory for the day.
f. Actual/Estimated arrival and departure particulars for a particular train at any or all the reporting points.

g. Information of delay in yards or on run.
h. Train & stock Interchange.
i. Wagon wise Interchange.

(ii) Optimised Asset Utilisation:

a. Improved Locomotive Utilization by reduction in Light Engine running and reduced 'ineffective'.
b. Statement of missing or wrongly delivered wagons and finally its elimination.
c. Elimination of unconnected wagons.
d. Increased availability of Repair Capacity.
e. Stock Holding.
f. Loco Holding.

(iii) Increased Revenue:

Savings in wagon fleet would result in corresponding saving in the recurring cost of maintenance of wagons:

a. Reduced Locomotive power and Rolling Stock Maintenance Cost.
b. Savings in Time & Cost of handling in yards, cost of empty haulage.
c. Ensures optimal crew management and monitors statutory limits for running duty and overtime payments.
d. Reduction in staff cost per unit of transportation due to improved productivity of the available manpower.

(iv) Improved Productivity per Man Year:

Accuracy of reporting :- In the 'Head & Hand' system, collecting data on telephones results in sizeable error levels, which need to be reconciled & corrected periodically. FOIS data with built in validation systems has Zero errors.

a. Drudgery of manual processes like maintenance of registers etc. is eliminated.
b. Particulars of crew on train with hours spent on duty.
c. Re-deployment of major portion of staff involved in wagon tracing and accounts checking activities.
d. Improved Customer service and satisfaction: - Facilitation of acceptance (customer's Orders), billing and cash accountals from identified nodal customer services centers and not necessarily at the handling terminals.
e. E-Commerce will facilitate the customers to operate from their premises for the above requirements of billing and cash accountal and thus reduce the burden of logistics management, and in addition drastically bring down the inventory costs in the entire chain of physical distribution system.
f. Quick settlement of Claims.

g. 'Just in Time' Inventory.

(v) Goods shed Operations:

- Arrival particulars of Wagons.
- Placement and Release Particulars.
- Information on demands registered and pending Indents.
- Preparation of Railway Receipts.
- Information on Demurrage and Wharfage.
- Loading Particulars.
- Goods Shed Earning.
- Information on delayed wagons and Wagons awaiting Placement/Release.

17012: MANAGERIAL REPORT:

Interchange:

Yesterday Interchange: This query displays the information of the trains actually interchanged in terms of the Loads and Light Engines at the divisional interchange point. The shortfall and excess columns display direction wise summary of loads that were short or excess vis a vis the forecast for the previous day. Receipts and dispatches are shown separately for each of the interchange point. It is updated by the Interchange forecast and Arrival/Departure Reporting tasks.

Current:

Interchange monitoring this query gives view of current interchange, giving the Status of forecasted trains and also the trains, which are not forecasted, but are likely to go in the I/C. It is updated by train forecast, arrival/dep tasks.

Rake & Terminal Position:

Yesterday

24:00 Hrs Terminal Position: gives status of load at terminal along with its insight at 24 hrs. It is updated by arrival/dep reporting, I/W no. taking, Rake placement/release tasks.

Current

Optimised movement of rakes: This query displays movement of rakes originating from the logged in zone and available in the database till the queried date. It shows empty and loaded runs of the rakes, the kms clocked by them and time taken for a run. It has the facility for displaying the detention details of the rake. Filters are provided to view details of specific commodities and stock types. This information is updated by the arrival / departure, rake formation / dissipation, placements / release- reporting tasks.

CC rakes BPC Position: This query gives running details of closed circuit rakes which are running in the system on the logged in date for the logged

in Zone/Division or selected BPC station of that zone. An option is available for selecting a rake type also, if the rakes of a specific rake type are to be seen. It is updated by BPC details, train arrival/rake formation/ dissipation tasks.

Movement of a rake: It shows empty and loaded runs of the rake, on entering the ID of the rake, the kms clocked by them and time taken for a run. It has the facility of displaying detention details of the rake. Filters are provided to view details of specific commodities and stock types.

This information is updated by arrival / departure, rake formation / dissipation, placements / release.

Reporting Tasks:

Demand & Loading:

Yesterday

Commodity wise loading and outstanding: This query displays loading information for a Division/zone against a particular station, in terms of the no. of rakes 4-w, piece meal 4-w and the total tonnage and freight. The user can use options for a specific consignee or all consignees or excluding a consignee and for a specific commodity or all commodities, or excluding a commodity. These options are mutually exclusive and can be used in any combination.

Load Planning, Consist Reporting, Loading tasks, update this query.

Yesterday Loading

Terminal wise loading of rake demand: This query gives the terminal wise rake loading performance of a zone/div. along with demand details and handling activity details. Views of commodity wise and destination railway wise summary are also available.

An option is also available for viewing terminal wise unloading details in term of balances.

Arrival/departure, rake formation/dissipation, placements/release-reporting tasks update this query.

Loading performance: This query displays loading information for a Division/zone against a particular station in terms of the no. of rakes 4-w, piece meal 4-w and the total tonnage and freight. The user can use options for a specific consignee or all consignees or excluding a consignee and for a specific commodity or all commodities or excluding a commodity. These options are mutually exclusive and can be used in any combination.

In this query, there is a sub-menu for outstanding loading, Division wise and commodity wise loading and outstanding.

Demand reporting and placement/release tasks update this query.

Current:

Type wise stock position: This query gives break up of all rake types or

selected rake type over the zone (in terms of rake/pm) on selecting a row and pressing enter. Details of the highlighted wagon type are shown.
This query is updated by arrival/departure, rake formation, dissipation, and consist reporting tasks.

Piecemeal outstanding summary: gives destination wise details of piecemeal outstanding over a zone with ODR. Demand reporting and piecemeal placement/release tasks update this query.

Loco:

Power interchange gives summary of Zonal loco interchange and also a summary of holding of locos type wise over a zone.
Arrival/departure and loco reporting tasks update this query.

17013: REPORTS AVAILABLE IN RMS MODULE:

Conference Set:

Interchange forecast summary: gives desktop summarized view of forecast & interchange of current date. It is updated by interchange forecast and arrival/departure reporting task.

Running interchange: gives detailed view of forecast & interchange and also gives running position of trains forecast. It is updated by interchange forecast and arrival/departure reporting task.

Current interchange: gives summary information of interchange with break-up of empties and loaded stock, stock (4-w) interchanged. It also provides summary of jumbo and box rakes interchange it is updated by interchange forecast and arrival/departure reporting task.

Likely shortfall: gives summarized view of interchange along with trains likely to fall short, along with the reasons of their shortfall. It is updated by interchange forecast, arrival/departure reporting and interchange shortfall reporting task.

Train interchange shortfall: gives shortfall/excess of yesterday's interchange along with reason of shortfall in dispatch. It is updated by interchange forecast and arrival/departure report task.

Stream wise pipe line: provides pipeline between two nominated stations and also pipeline for a via. It is updated by Load planning, Train ordering, arrival / departure reporting tasks.

Loads on run: this is an unstructured query for all loads on run in the system. There are different filters available for viewing loads according to users' requirements.
It is updated by Load planning, Train ordering, arrival / departure reporting tasks.

Traffic flow: gives information regarding likely traffic flow to interchange points, up to 3 days in advance.
It is updated by Load planning, Train ordering, arrival/ departure reporting

tasks.

Outward train railway wise: gives division wise & destination railway wise view of all outward trains on a zone. Filters for rake types & commodity are also available.

It is updated by Load planning, arrival / departure reporting tasks.

Terminal position: displays total rakes at the terminals as well as the insight for those terminals. On selecting a cell, relevant details, rake wise, are displayed.

It is updated by arrival/departure reporting, inward number taking, Rake placement/release tasks.

Terminal performance: gives terminal performance for a selected period.

It is updated by arrival / departure reporting, inward (I/W) number taking, Rake placement/ release tasks.

Terminal history: gives details of individual rakes handled at the terminal for a selected period. It is updated by arrival / departure reporting, inward (I/W) number taking, Rake placement/release tasks.

Terminal performance and running position: gives status of load at terminal along with its insight.

It is updated by arrival/departure reporting, inward (I/W) number asking, rake placement/ release tasks.

ODR wise rake outstanding (details): gives ODR wise outstanding demand details. It is updated by demand reporting task.

Rake performance: gives performance of rakes for the period they were in the division /zone along with total kms ran in the division.

It is updated by arrival / departure reporting, rake formation/ dissipation, inward (I/W) number taking, Rake placement/release tasks.

Rake position: gives break up of rakes over a division/zone under the following heads: under release (U/R), under loading (U/L), outward (O/W), inward (I/W) and Empty. It is updated by arrival/departure reporting, inward (I/W) no. taking, Rake placement/release tasks.

Rake integrity: gives details of all attachment/detachment/sick reporting on an individual rake on the selected zone. The examination & dissipation (if done) is also shown. Further details can be seen after selecting a cell and pressing enter.

It is updated by all rake reporting, consist reporting, and TXR examination.

Current traffic flow: holding of each railway is shown in terms of inward (I/W), outward (O/W) and empties. The flows between Railways are shown by arrows for both loaded & empty rakes.

Details of individual rakes can be seen on selecting the desired cell and pressing enter. It is updated by all rake & load reporting.

Terminal management planning: For a selected group rake type, division

wise, outstanding rake demands, rakes on hand and pipelines of terminating loads are displayed.

On selection of cell & pressing enter, details relevant to that cell are displayed. It is updated by demand, rake placement/release and arrival/departure tasks.

All stock: Current rake holding of zone is shown division wise, specifying loaded empties, at terminal, cross traffic (through), originating for foreign railway, local and terminating received from other Railways.

The facility to see details of individual rakes on selecting any cell is also available. Other stock icons in the conference set run on the same query for (BCN, CRT, BCX, BOXN, BOX, SHERPA, SHERPA-N, CONTAINER, TANKS)

It is updated by load planning, consist reporting, Placement/release tasks.

Loco position: This query displays all the locos for the selected Division, location wise. A type wise summary is also displayed.

It is updated by loco reporting, arrival/departure, loco attachment/ detachment task.

17014: OPERATIONS CONTROL:

Interchange:

Yesterday

- **Train wise interchange:** This query displays interchange load wise of a division, interchange point wise for specified date. View is available for specified interchange point and direction. The details of loads, like load name, L/E, type, loco, unit, interchange date/time for handed over and taken over are listed separately. This information is updated by load planning, arrival/ departure tasks.
- **Load interchange analysis:** This query displays interchange load wise of a division, interchange point wise for specified period. View is available for specified interchange point and direction. The details of loads, like load name, L/E, type, loco, unit, interchange date/time for handed over and taken over are listed separately. There are filters provided for originating Zone/ Div/ Station and terminating Zone/Div/Station so that various analyses can be done on interchange data. This information is updated by the arrival/departure and interchange reporting tasks.
- **Stock interchange load wise:** This query displays summarized information of receipts and dispatches of stock at divisional level for a specific type of stock. Loaded stock is classified in terms of through and terminating. Empty stock is shown separately. This query displays and distributes output fields like No. /units for each classification with total (No. /Unit), for both receipts and for every interchange point.

  This information is updated by the arrival/departure and I/C reporting

tasks.

Current:

- **Stock forecast:** The query displays summarized information of receipts and dispatches of stock at Divisional level for a specific type of stock. Loaded stock is classified in terms of through and terminating. Empty stock is shown separately. This query displays output fields like No./Unit, for both receipts and dispatches for every interchange point. The train interchange forecast reporting task updates this information.

Stock interchange (summary): An online query which gives forecast and actual trains ran till the time of viewing the report, along with stock interchanged in terms of L/E in four wheeler (4-w) units interchange point wise. Summary of interchange is also given Railway wise. Interchange forecast and placement/release update this query.

LOAD & PIPELINE:

Yesterday

Change in load destination: The query gives information on the loads for loaded/empty/mixed/All within Zone/ Division with revised change of destination and the station where the change was effected with the message No. and the functionary who authorized the change of destination. The reports can be obtained selectively for a specific commodity for consignee or for a specific destination. This information is updated by the change in Load destination tasks.

Stabled loads at 24.00 hrs. : This query gives information on the loads for both loaded/empty stabled with date and time, reason as at odd hrs. This information is updated by load planning arrival/departure and train stabling tasks.

Current:

Type wise Terminating load in sight: The query gives information of terminating loads for a station/division. The load details along with the current location and status with the expected arrival/departure time and date at the interchange station and destination are displayed. This query is updated from Load Planning, train ordering, Train Arrival/Departure tasks.

Outgoing loads: gives details of loads which have originated from the logged Zone/Div./Station. It also gives the interchange time of that load and also its expected time at its destination. Load planning, placement/release, arrival/departure tasks update this query.

Running position optimized destination wise: This query displays rakes loaded from a zone which are running on that date. It gives loading details and interchange date and time. Its current status filters are provided for stock type commodity and unloading zone. Load planning,

placement / release, arrival /departure tasks update this query.

STOCK:

Yesterday

Rake performance: gives performance of rakes for the period they were in the division / zone along with total kms ran in the division. (Query picks rake from their date of exit from zone/div)

It is updated by arrival/departure reporting, rake formation/dissipation, inward (I/W) no. taking, Rake placement / related tasks

Stock holding: The query displays yesterday's position of the total holding of the zone for all Wagon types, loaded and empty, separately for piecemeal, Rakes and DVS Stock. Details of a stock can be seen by selecting that stock type by clicking and pressing enter. This query is updated by Inward No. taking, departure, consist reporting, rake formation/dissipation and attachment/ detachment of wagons enroute reporting tasks.

Rakes at 24 hours: The query displays information of rakes at 24 hrs of 'yesterday'. Rakes are group type wise or rake type wise for a specific commodity included or commodity excluded or all types and for a specific consignee included or a specific consignee excluded or all consignees for a zone. This query is updated by Inward No. taking, Arrival/departure, consist reporting, rake formation/dissipation and placement/release tasks.

Current:

Rake Position: The query displays information of rakes on real-time basis. Rakes are group type wise or rake type wise for a specific commodity included or commodity excluded or all types and for a specific consignee included or a specific consignee excluded or all consignees for a zone. Inward No. taking, Arrival/departure, consist reporting, rake formation/dissipation and placement/release tasks.

Destination Rly Wise Outstanding: displays demand details of a zone, division wise, clubbed on destination railway basis. Gives details of commodity and no. of units indented. Filters are provided for viewing rake/piecemeal wise demands; commodity and consignor can be selected. This query is updated by demand and placement/release tasks.

Inward (I/W) traffic shows handling details of inward loads of a specified terminal on current date basis.

Arrival/departure and placement/release tasks update this query. Outward (O/W) traffic shows handling details of outward loads of a specified terminal on current date basis. Arrival/ departure and placement/release tasks update this query.

MISCELLANEOUS:

Load Wise Route : This query gives the complete route details for the

selected load (selection is made by entering the load name) like load from-to, load direction, load type, units, Station Arrl/Dep, Date/Time, Inward Direction, Outward Direction of the selected load. This information is updated by the load planning, train ordering, arrival/departure tasks.

Load Wise Train Details: This query gives the details of all the trains ordered for a particular load's journey (selection is made by entering the load name). The load is recalled by giving departure time from the originating station; details of each train leg are also available, including the Loco details.

The train details show all the stations en-route and the reporting if any, made during that run. This information is updated by the Train ordering and arrival/departure tasks.

Train Schedule: This query shows all train schedules in the system between any pair of stations. The details show all the stations in the train schedule, including indicators for zonal, divisional and sectional interchange. This information is updated by the static database in the system.

Route display: This query shows the default load route between any pair of stations. The inward and outward details are shown against each interchange station on the route. This information is updated by the static database in the system.

Invoice details: gives details of invoices generated in a division/station for a period. This query gives RR details and freight and weight of loading done. This information is updated by demand registration, placement /release and RR reporting tasks.

Station Help: This Query provides help regarding station code or name. In case only part of either station name or station code are known, the system shows all stations in the database having the input name as a part. This information is updated by the static database in the system.

Booking profile: this query gives the booking profile of the selected station as given in the Alphabetical List of IRCA. This information is updated by the static database in the system.

EXCEPTION TASKS:

Transaction log: this task is provided to monitor the delay in reporting taking place. This can be viewed for a date and for a division/station. There are filters to view train and rake reporting tasks separately. Train and rake reporting tasks update this.

17015: Statistical Report (Reports): INTERCHANGE (I/C):

Interchange Summary gives: interchange summary in terms of no. of loads Interchanged vis a vis forecast and shortfall. Forecast and arrival / departure tasks update this query.

LOAD & PIPELINE:

Reason wise stabling: gives details of load stabled during a specified period, along with load details, reasons of stabling and the time when that load was lifted. Stabling, load planning and arrival/departure tasks update this query.

Diversion register: gives diversion details for a specified period: Filters available for originating station commodity, i.e Diversion task updates this query.

17016: INTEGRATED COACHING MANAGEMENT SYSTEMS-AN OVERVIEW:

1. MODULES IN ICMS:

(i) **Punctuality Module (PAM):** For Post facto analysis of punctuality loss and its causes (not an on-line system), it captures train running at Originating / Terminating and interchange points and the causes of detention. Data input is predominantly at Divisional/ HQ level. Status: Implemented.

(ii) **Coaching Operations Information System (COIS):** Captures events on Coaches/ Rakes, generates reports for management of Coaching Stock. Data input is predominantly at Station/Coaching Yard level. Status: Implemented.

(iii) **COIS Data Entry Module:** Supports module of ICMS to maintain database pertaining to the information of Rake Links, Yard Infrastructure, Coach Master, Train Schedules etc. Data input is at Zonal / HQ level. Status: Implemented.

(iv) **Coaching Maintenance Module:** To capture depot activities related to coaching maintenance operations, utility tool for managers looking after mechanical and electrical maintenance, includes module for Material Management and Manpower data (gang strength per shift, etc). Data input is at CDO level. Status: Under system study.

(v) **Time-tabling Module:** For simulating the suitable timings for running of all kinds of trains, simulating the best available path for planning a train, keeping in view all variables, simulating optimum utilization of rake link, generating all time-tabling documents. Data input is at Zonal HQ level. Status: Under system study.

2. ICMS-SYSTEM ARCHITECTURE:

1. User connects through browser interface (like Internet Explorer)
2. Separate URL for PAM, COIS and DATA modules (for example: http/../cois, http.../pam, http/../data and so on)
3. Users have Thin clients at location
4. Back-end: RDBMS (Oracle based)

3. ICMS-DATAFEEDING:

(i) Master Data: Common Master database for PAM and COIS, includes Infrastructure data (of more permanent nature like List of Stations, Platforms, washing lines) and Other Master Data (of less permanent nature like Rake Link data, Time Table data, Coach Master etc.)

(ii) Running Data: Separate and independent running database for PAM and COIS.

(a) PAM:

Feeding mostly at divisional level, Interchange owning division controls the data feeding for handing over or taking over, Zonal client does the responsibility fixing (deciding the trains "lost in punctuality")

Activities include:

- Originating, terminating, interchange timings
- Detention Reports,
- Cause wise logging,
- Fixing Responsibility

(b) COIS:

Unlike PAM, there is no concept of data "feeding" in COIS. Instead, working on the system at station/yard level leads to generation of required data (and memos for the operator).This works as input for MIS.

All station/yard activities from arrival to departure of rake are captured:

Yard stock entry	Dispute Resolution
Yard Position	Sick Marking
Rake formation	Sick line Placement, Sick line Operation
Modify consist	Shop Marking
Movement	Shop Placement
Movement (Yard to yard)	Remove fit available coaches
Rake Examination	Search Feedbacks
Departure Reporting	Send Feedbacks En route
Attachments/Detachments	Generate memo

(iii) CMS-MIS-REPORTS:

(a) PAM : Reports for Management at Divisional Level, HQ level, Board level like:

- Railway Punctuality Performance for a date for a Division
- Movement of Trains (Division wise) in a Zone
- Punctuality percentage of Mail/Express trains
- Cause wise/Gauge Wise breakup of Lost Trains between dates
- Division wise analysis of Cause of Lost Trains on Date in a Zone

- Railway Punctuality performance for a date in a Zone
- Cause wise breakup of Trains lost in a period
- Summary of Monitored trains daily Run and Lost
- Section wise/Cause wise analysis for all trains on a date
- Zone wise/Cause wise analysis for all trains on a date etc.

(b) COIS : Reports for Management at Station Level, Divisional Level, HQ, RB level, like:

- Departure Reporting Send Feedbacks
- En-route Attachments/Detachments Generate Memo
  Arrival Reporting:
- Yard Stock Position (Line position)
- Vehicle Guidance
- Zonal Stock Balance sheet (type wise details of Bare Requirement, allotment, running in service, ineffective etc.)
- Coaches on way from/to shop
- Foreign Railway Coaches
- Ineffective Coaches
- Coach History
- Rake Link Information, Zonal/Divisional Coaching Stock allotment/availability etc.

17017: Control Office Application:

Introduction - General Information:

1. What is Control Office Application?

Control Office Application (COA) is a comprehensive software for the automation of Control Charting at the railway divisional control office. COA is intended to replace the tedious manual plotting of running trains on a chart. The core functionality of control charting with ergonomics is intended to provide the Traffic Controllers with a good look-and-feel and user-friendly work environment. The benefits of COA would include-better planning and decision-making in train operations and thus contribute to increased operational efficiency.

COA is designed to form the core application to drive the existing allied systems like FOIS, NTES and COIS. The integration with allied systems will be facilitated through a Central Application Server at CRIS.

The flow of data on real time basis to adjoining divisions will mark a significant breakthrough in the train operations without dependency on human interference.

2. Scope of COA :

COA covers the following core functionalities Control Office Operations:-

(i) Train Ordering
(ii) Maintain Train Information
(iii) Manage Train Movement (Abnormal Working, Stabling, Banker Movement)

(iv) Report Unusual Occurrences.
(v) Management of Maintenance Blocks
(vi) Caution Orders
(vii) Plot Graph.
(viii) Advance Plotting —System/Manual
(ix) Maintain referential data
(x) MIS Reports
(xi) Yard Management Siding
(xii) Miscellaneous Functions
(xiii) View Station Layout

The application will have interfacing capability with Data Logger to capture data pertaining to train movements in the final version of the product.

3. **Intended Audience:**
   - Operations Managers
   - Train Controllers
   - Key functionaries of sister departments.
4. **Benefits**:
   - Fully Automated work environment.
   - As an aid to the controller in terms of efficiency, precision & time management.
   - Leverage to Controller's experience in decision making through manual forecast.
   - Real time information on train operation without human dependence.
   - To serve as a backbone system for sharing of data between allied systems.

Chapter-18
APPLICATION SOFTWARE

18001: RMS Module: RMS module has been developed with GUI interface which is highly interactive & very user friendly. The software is totally menu driven and navigation is through logically linked tasks. The application and front end forms for reporting events have been developed in Visual Basic and reside in the client machine located at the reporting location. Data is stored in the central server located at CRIS.

18002: General Concepts:

A Rake is a very generalized term, which refers to any set of wagons moving together and has been identified in the system as rake. Wagons can be attached/detached to a Rake. A Rake is identified by a uniquely defined ID number, which remains unchanged through various Load/Empty cycles & movements. A Rake, when given a destination, is known as a Load. A Load, when given a loco, is known as a Train. Thus, there can be no Train without a Load & no Load without a Rake (except where a load is mixed and is not identified in the system as a rake). With a clear understanding of these terms, you enter data through clearly defined "tasks".

The RMS software has two identifiable cycles-

(a) **Train cycle :** It starts the moment a load is identified as a train and the following tasks are used for online reporting:-

Train Ordering: Train ordering (TO)/Call between two crew-changing points.

Train Departure: reports departure.

Train Arrival: reports arrival.

Train Run-through: reports through runs

Train rerouting

(b) **Yard Cycle:** It starts as soon as a terminating load arrives at its destination or a train is cancelled. (i.e. the load is sent to load planning) and the following tasks are used for various online reporting tasks:-

(i) Load Related Tasks:

Inward Number Taking: Destination validates consist. Load Planning: initial activity, following rake assignment.

Load Stabling: run/ordering termination is reported through this.

Load Diversion/Termination/Extension: reports changes in planned load destinations.

Load Yarding: takes a load-to-load planning screen, but will not reflect in stabled position. Vehicle Guidance Related Tasks.

Consist Reporting: originating station reports summary details. (Guidance is also called as Consist).

(ii) **Rake Related Tasks:**

Rake Formation Details: form/modify rake consist.

Movement order: facility to give advance assignments to rake. Rake Placement/Release: reporting Load/Empty cycle.

Rake Dissipation: for generating piecemeal out of rake or for doing away with a rake which has no wagons left.

After a load is made ready, loco attached and train ordered. Again the train cycle begins.

Loco Related Tasks:

Attachment/Detachment of Locos.

Loco Reporting: reporting shed activities of loco.

Light Engine: reports of light engine movements.

Given above is the list of tasks that are to be performed on real-time basis i.e. as soon as the event takes place.

Demand: - This function is to be reported at a station where the party/consignor registers his Demand for supply of Rake/Piecemeal wagon for loading of goods. The following tasks are used for reporting this activity:-

New demand

Modify demand

Add/delete demand

Fulfilling demand

Forfeiture/Withdrawal of demand

Interchange forecast: In the system as the trains are planned, a pipeline is generated from Originating Station to destination and the position can be viewed at any point in its route. Forecast can be reported by selecting trains from the pipeline shown at the interchange point. The task used is interchange forecast reporting task.

Given below is a summarized list of entity related tasks: - Rake Related Tasks

Rake Formation Details: form/modify rake consist. Movement order: facility to give advance assignments to rake

Rake Placement/Release: reporting Load/Empty cycle. Rake Merging: moving wagons from one to another rake.

Rake Dissipation: for generating piecemeal out of rake or for doing away with a rake which has no wagons left.

(iii) **Load Related Tasks:**

Load Planning: initial activity, following rake assignment.

Load Stabling: run/ordering termination is reported through this. Inward Number Taking: destination validates consist.

Load Diversion/Termination/Extension: reports changes in planned load destinations

Load Yarding: similar to stabling but will not reflect in stabled position.

Cut-in by Arrival/Departure: was useful when there were non-computerized territories also.

(iv) **Train Related Tasks:**

Train Ordering: Train Ordering/Call between two crew-changing points.

Train Departure: reports departure.

Train Arrival: reports arrival.

Train Run-through: reports through runs.

Loco Related Tasks: Attachment/Detachment of Loco, reporting loco failure on run.

Loco Reporting: reporting shed activities of loco.

Light Engine: reports light engine movements.

Roadside/Piecemeal Wagons Related Tasks

Attachment/Detachment of Wagons en route: load & consist are automatically modified in this task.

Piecemeal Placement/Release: reports piecemeal activities.

Piecemeal Sick/Fit Reporting: reports sick/fit.

Clearance of Detached Wagons: clears detached wagons.

Demand: reports indents for a good shed type of loading.

(v) **Vehicle Guidance Related Tasks:**

Consist Reporting: originating station reports summary details. (Guidance is also called as Consist)

Detentions Related Tasks:

Train Detention en route: reports unscheduled stoppages.

Pre departure Detentions: reports detentions suffered by loads/trains at yards/stations.

Other Tasks:

Interchange Forecast: reports daily targets, which should be frozen by noon. BPC & Crew Details: reports these details.

Modify ETA: changes expected time of arrival (ETA) for a train.

Re-routing: changes path of a train while on run.

As you realize, these are all routine tasks. Besides this the divisions have to carry out some systemic tasks which help in generating MIS reports (name for reports which are not generated on online data) and sometime specific reports.

18003: TSS (Terminal Sub-Systems):

TSS (Terminal Sub-Systems) is a generic word used in FOIS to refer to PCs, Printers & UPS. This PC is used for entering (and retrieving) data. Following are the important guidelines for users:

(a) Power Connection:

Please make sure that a data entry PC or a "Reporting Terminal" is always kept in the "ON" condition.

The power feed required is met through a 5A dedicated socket.

Please make sure that all the different PCs & Printers have a separate 5A socket. Don't use multi-plug adapters.

Also check up with the Electrical personnel as to whether your sockets have Earthing arrangement. In the absence of the same, your PC may get damaged. The earthing to neutral voltage should not be more than 2-3V.

It is also better to have a MCB attached to main power supply point/board.

Your AC connection & PC supply must be on different phases. This saves the PC from fluctuations.

Your PC should not be connected to the mains directly. Instead, the Power supply should be routed through a UPS (Uninterrupted Power Supply). Please ensure that this is always done. This saves your PC from power fluctuations as well as gives power from batteries for about 20 minutes, in case of power failure. There should be a power back up, either through AT (OHE) or through Diesel Generator. The changeover switch should be close to you. (care to be taken that earthing is proper). It is a healthy practice to ensure that various power chords feeding your PC, Printer etc are neatly tied together, rather than strewn allover.

If you locate your UPS very close to your monitor, the display will wobble. Please ensure that the UPS & Monitor are separated by at least 24 inches.

When the PC is ON, don't try to change any connection. This applies equally to not only power connectors, but also to various chords connecting different equipments, LAN Cables etc.

When turning the PC ON, (if the need arises) follow this sequence: – Mains → UPS → Monitor → Printer → CPU

The reverse is followed when switching off.

(b) Environment:

If an AC is provided, make sure that it is working properly.

AC should be on a phase different from the one feeding your PC.

The room should be kept as clean as possible. Dust, smoke particles & moisture cause maximum damage to your PC. So, don't allow any smoking, eating or drinking at the workstation.

Never clean your PC using an organic solvent (such as Colin). Always use a soft, damp, dirt- free cloth.

When the PC is not in use, keep it covered with "Dust Covers".

Make sure that the Keyboard has been supplied with a "Skin" - a tight-fitting plastic covering for Keyboard, which does not stop usage.

Your PC should not face direct sunlight. Nor should it be placed so close to window where rains can affect it.

CPU (Central Processing Unit) & Monitor should not be placed in such a way that the fans/outlets at the rear of these equipment get blocked by walls/other objects.

(c) Virus Protection:

Viruses come to you PC through pirated softwares of games & utilities that you load. Yet another source is downloading of files from Internet. Once a virus is on a single PC of a network, it spreads on its own to the entire network. Therefore, you must not load pirated software or download wallpapers etc from Internet.

Make sure that Virus protection files are loaded on your PC.

Please enable virus scans on data transfers, floppy drive files & CD files.

Please schedule your Virus software to run every day at a fixed time. To do this, open "My Computer".

Double Click on "Scheduled Tasks" Folder. Double Click on "Add Scheduled Task". This will activate "Schedule Task Wizard". Click next & select the name of the Anti-Virus program given to you. Keep following the simple steps to schedule your Anti-Virus to run daily. Once scheduling is done, your PC will automatically run the program every day at a given time, as specified by you.

There is an arrangement whereby we get updated Anti-Virus files every 3 months. These CDs are available at your Divisional HQ through Operational Control Centre (OCC). You must update your anti-virus programs to enable it to take care of new viruses.

There are telltale signs of virus on your PC. Please be on lookout for these signs, which are listed below:

(1) Unexplained disk drive activity light or floppy drive light
(2) Reduction in RAM Availability
(3) "File Copied" message appears without copying anything
(4) Failure of a memory resident program to operate properly
(5) System behaves slowly or in a chaotic manner
(6) Bad clusters on the disk
(7) Increased number of files on disk
(8) Increase in size of executable programs
(9) Change in file's date and time stamp, without modification
(10) Program running slower; taking more time

(11) Program/Data file corruption/disappearance

(d) Internet Connections:

There should be no Internet connection on your PC. This restriction is applicable to everything related with Internet - email, chat, surfing etc. Further, your PC should not have access to another network - such as Rail net. This makes the network prone to hackers & Viruses. Since the information available on FOIS is confidential, therefore, hackers have to be prevented from entering our network. This is the reason for having separate LAN and Routers for FOIS.

Important Files (Software):

You work with Windows-2010 (FOIS-COA 5.2.3, RMS-Zonal 6.1 exe, TMS-9.3). A quick restore CD is also available with you, along with Anti-Virus software & RMS. Also windows back up files are normally available in the cab folder. Please ensure that none of the following files are tampered.

18004: COMMAND.COM:

IO.SYS:

MSDOS.SYS:

Similarly, ensure that RMS file - which resides in Program Folder of your Hard Disk - is never tampered with.

Datacom Equipment & Connectivity:

In this chapter, we shall deal with some pertinent issues regarding Connectivity. Your PC is connected not only to the adjacent PC but also to each & every PC on FOIS. (Each PC on the network, therefore, has a unique identification or Address - known as IP address). This has been achieved by using leased lines, ISDN connections & VSATs for data transfer. This data transfer rate is higher than PRS system. Also, unlike PRS terminal, your terminal is a full- fledged independent machine. The interface is Windows, unlike text type processing in PRS.

Your PC is connected to FOIS through a Router, which is a junction between LAN (Local Area Network - connecting all PCs in your premises) & WAN (Wide Area Network - a bigger network which connects all PCs on the system). A Router does this mostly through Channels - which are connected to it using Modems. (A channel has two ends. One end is connected to Router through a Modem in your premises. The other end is again connected through a Modem to the equipment of Channel Provider, at his premises. This can be RLY S&T or BSNL or any other telephone company). Finally, a Router will have connections with your LAN (through Hub/Switch), Modems (one for each channel), ISDN Connections (directly to Router) & VSAT (directly to Router). All these equipment are collectively referred to as Datacom Equipment.

Routers:

A Router routes the data that you want to send/receive. It is an intelligent device, unlike Hubs & Modems. The data is sent & received in data packets. A LAN works below a Router. Data sharing among various PCs connected on a LAN is automatic & the Router has no role in it. Itis only when the data requires to be sent/accessed from a remote PC/Server - i.e. accessing WAN terminals - that Router's role assumes significance. Its IP Number specifies each Router - like all intelligent devices on a network. This IP Number actually identifies its Ethernet port. A Router may have WAN, LAN & VOICE port. A port is a point where a channel (through Modem) or LAN or ISDN or VSAT connection can connect to Router. On Railways, we have two makes of Routers supplied - Cisco & Motorola.

Router has to remain "ON" at all times.

It has to be also ensured that the power feed has a proper earthing arrangement. The earthing norm of 2-3V is to be maintained.

Power supply to Router should be routed through a UPS. One should never operate a Router without a UPS. Also, wide fluctuations in input voltage can damage the Router.

There should be a power back up, in addition to Normal Power Supply. This could be through Auxiliary Transformers (AT) in OHE area or through a Diesel Generator Set (DG Set). The changeover switch should be accessible easily.

The Router should be kept in an environment free of dust, smoke & moisture. One should use Racks provided to house the Router. Since the Router is an expensive & sensitive equipment - which does not require daily maintenance - therefore, it is better to leave the equipment undisturbed.

Essentially provide Air-conditioning for routers

A Router, along with Modems, should be placed at a location where it is always accessible to the user. You actually don't have to do anything with the Router, but just by looking at various displays & reporting the same, you will be participating in troubleshooting. For this reason, you must have Router under your control and not locate it in the Test Room.

Some of the Routers have a specialized Port for ISDN. (Not all Routers have it). Unlike all other terminating leads on a Router, the ISDN connection gives a higher voltage (H" 100 V). Therefore, if ISDN lead is connected to any other port that port will burn down. Be careful.

Firm connections of all chords to the Router are to be ensured. Nothing should be placed on the Router.

Router should not be dragged.

Modems:

Modem (Modulator/Demodulator) is the device through which a channel

connects to your Router (& through it, to your PCs on LAN). It is a very sturdy & maintenance-free device. It also requires a dust & smoke free environment. It is normally housed in a Rack along with Router. A lot of information is available on its front display.

There are two types of Modems on Railway - G703 (at service provider's premises) & V35 (at Railway's premises, with Router).

When the channel connected to a Modem is working properly, you will find both "RD" & "TD" glowing & blinking. If it is not so, then there is some problem with the channel.

As always, you have to ensure that Modem is always kept "ON". Also ensure that the power feed has a proper earthing arrangement.

Never use a metallic brush to clean the surface. Organic solvents are also not permitted.

Since one end of a channel always resides at the channel provider's premises, therefore you must also know some simple checks to analyse the channel position. Some of these steps are to be taken in tandem with the operator at other end, who is observing his Modem. These steps, which are invoked when the channel is down (i.e. "line protocol" is down), are Make "LL" (Local Loop) switch "ON". This gives the status of the Modem & Router. If "TD", "RD" blinks, then the local equipment is OK. If it doesn't, then the problem is with Modem/Router.

In the next step, we make "RL" (Remote Loop) switch "ON". This checks the local lead condition between Modems. However, to get the response of this action, there should be an observer at the other end. If everything is OK, then at the remote end, "RD" & "TD" will blink. Similarly, remote end can also give a "RL", in which you will get blinking "RD" & "TD" on your Modem, if everything is OK between two Modems.

If both "RL" & "LL" give OK results, then the problem is beyond the Modem at the service provider's end. You have to take a docket number after registering the fault with service provider (i.e. S&T or BSNL).

If Modem at the other end is not able to execute "LL" successfully then Modem at that end is defective/improperly connected.

If all loops show positive result & line protocol is still down, try initialising Modem by switching it 'Off' & then 'On'.

If everything gives OK & data is still not able to pass through, then there may be a problem with the Router.

Inform Divisional Control:

Always ensure that all leads are firmly connected. However, no lead should be checked with power at "ON" position.

Channels:

A Channel refers to a leased line dedicated channel for data transmission.

There are two types of channels - Railway & BSNL. However, as a user, you don't see a difference. Though technically a Channel refers to a leased line channel, in this section we will also cover ISDN & VSAT. A channel connects your system through Modems & Routers. In addition to leased channels, there are also ISDN connections & VSAT (Very Small Aperture Terminal) connections to enhance Connectivity. Connectivity refers to the immediate links that your PCs on LAN (at a Node) have with neighboring nodes. It has been planned that ideally each node has a minimum of two links, each giving a different route to your data - so that data transmission can continue even if one link is down.

This is technically known as Route Diversity.

Unless a Channel is available, data will not transmit. If your node is connected through two channels & one of them is down, you will not know the difference. However, with one channel down, you are in a very precarious position as data entry will stop as soon as the second channel even flickers. It is, therefore, important for you to take active interest in knowing the state of a channel. This can be done through "pinging". Pinging is the name given to sending & receiving a test data packet from one computer to another remote PC/Router or to any intelligent device. However, you can ping only if you know the (IP) address of remote PC or Router. These are listed in Annexure I. You can ping by the following command:

Start⟶ Run⟶ Ping [IP Address of Remote Router] ⟶ OK

Only an entry like "Request Timed Out" or "ttl expired in transit" indicates failure.

VSAT connections can also be pinged. Some other important points for VSATs are as follows:

The data is transferred directly to CRIS SERVER. This is a sturdy system, which once stabilized, works in a trouble-free manner.

The earthing resistance should be less than 1 ohm.

Neutral to earth leakage should be 2V. It should never work without UPS & CVT. Air-conditioning is a must.

The antennae base structure should be firmly fixed and clamped. At the time of installation, it should be ensured that ODU has its protective laminated cover (to protect it from water and dust) OR at least the rubber cap of Radio Frequency (RF) unit is in place.

There should be one ladder for antennae access.

There should be a routine of checking the equipments. It should be ensured that the rubber cap of RF unit is in place and the cord going to the indoor unit is firmly in place.

Similarly, ISDN connections can directly pass the data, bypassing Router

(or more accurately, bypassing Router at that node but connecting to a remote Router). Only in such ISDN connections, where Routers are not provided, you will not know the status of channel through pinging.

Please ensure that ISDN connections are always with power "ON". Also ensure that ISDN connections are not STD barred.

Though it is not possible for you to know as through which particular channel your PC is transferring data, the same is always very accurately known to the Router. Depending on the channel availability, it keeps on defining the route dynamically. Thus, if ISDN is available & all other channels are down, Router shall use ISDN to transmit data. (ISDN connection can also be assigned a higher priority by configuring the Router). As soon as any of the other channels becomes stable for a predefined time interval, it again resumes data transfer through that channel, shutting off ISDN. This is what is known as programming of Router.

ISDN is a secondary channel and, since its usage is very expensive, so it should be used very judiciously.

LAN:

LAN connects all PCs available at a location. However, it need not be confined to a building. It can be extended to a few kilometers (up to 6 km) also. Such extension is normally through a LAN Extender. Even if PCs are connected through LAN Extender, there is no role of the Router in sharing of data among these PCs.

LAN is achieved by using the network card available on your PC. An identical work group is to be defined on each PC on the LAN so that they are "visible" to all other PCs.

While defining Network Properties on your PC, make sure that only one Gateway (i.e. IP address of your Router) is defined. Disable DNS.

A PC may be visible on a LAN. However, other PCs can use only those files, folders, drives etc of that PC which the owner of that PC has decided to "Share". To share a file, single click on the file name, followed by right click. Select "Properties", followed by the "Sharing" tab. Share to the extent you desire.

You can decide to allow other users to even write on your Hard disk. However, you cannot differentiate between your co-users on LAN & other users on WAN.

You can also share some scarce resources - such as Printers - through this scheme.

LAN wiring consists of two parts – (1) a CAT5 structured cabling from Router/Hub to I/O box (a 3" x 3" x 2" white box) & (2) a flexible cable from I/O box to your PC. Please ensure that all PCs at a location are connected

on LAN.

Ensure that CAT5 cable is mounted on the wall properly & is not hanging loosely.

Ensure that flexible chord is not stretched. Also ensure that I/O box is located close to your PC.

Hubs/Switches are devices for connecting additional PCs to Router's LAN port. Please ensure that these are properly mounted on the wall.

Uptime:

It refers to the time when a node or a channel remains available for data entry. As explained earlier, it is of utmost importance to know the status of availability of equipment for the user.

You should keep records both of Channel Uptime & Node Uptime. It is easier to maintain a record of Node uptime. Simply record in a register the daily position of availability of a node, along with the reasons of failure for the purpose of analysis. It is very essential to keep a check on the health of the secondary channel when the primary channel is up.

Give a summary position of the entire day to your Zonal Operational Control Centre (OCC) at odd hours.

For finding the channel uptime, you have to schedule the task of pinging, even if your Node is up. Ideally, every 4 hours, you should ping to adjacent Routers & note the result. This, compiled over the entire day, will give channel availability of each channel at your Node. Record this also in a register, giving a message to the Zonal Operational Control Centre (OCC) through the messaging feature of RMS.

There should a fixed regime of reporting of failure in place, so that in case of a failure, trouble shooting is fast.

A list of phone numbers of the service provider should be readily available both at divisional headquarters and zonal headquarters.

You also have to keep a tab on the time taken by various service providers to attend to your reports of breakdowns of Routers, Modems, UPS, Printers, PCs etc. This should be in a separate register, which is not to be reported daily to your headquarters

Other Applications:

Do not use your FOIS network for any other regular data transfer programs. This can cause virus threats, slowing down of application, vitiate Operational Control Centre (OCC) tasks & mis-programming of Routers.

Within LAN, you can share information occasionally. However, running regular & heavy programs may reduce the availability of the system for data entry to FOIS. Please don't run any heavy or regular programs on your LAN.

Unless you procure genuine copies of software that you intend to use on a single PC, please don't load it. In any case, this should never be done on a

"Reporting Terminal".

Other Networks:

Your PC should not have access to another network - such as Rail net. This makes the network prone to hackers & Viruses. Since the information available on FOIS is confidential, therefore hackers have to be prevented from entering our network. This is the reason for having separate LAN and Routers for FOIS.

Do not allow any Internet connectivity.

18005: SYSTEM ADMINISTRATION:

Operational Control Center (OCC)

For successful implementation of FOIS over Indian Railways, each zone shall have to undertake the following responsibilities towards FOIS:

- Real time updating of system data
- Management of Network
- Maintenance of equipment - PCs, Printers, UPS, RAS, LAN extender, Routers, Switches, Hubs and associated accessories
- Replacement of manual information system
- In service training

To achieve this, each zone should deploy personnel to set up an Operational Control Centre (sufficient work charged posts have been provided and adequate staff has been trained by CRIS).

Operational Control Centre (OCC) will be the empowered body for prescribing and enforcing working procedures. It will also monitor performance and take appropriate (pre-emptive and remedial) measures to ensure cent percent availability of the system.

Operational Control Centre (OCC) shall be manned round the clock to operate NMS and to provide proactive support to field reporting units (help desk) in every respect. It will have additional functionaries during day shift for management support for maintenance, analysis of system efficacy, up gradation of procedures and escalation as may be required.

Real time updating of system data:

Procedures, roles and responsibilities should be prescribed to ensure that data is entered into the system as soon as the physical event has occurred but definitely before the next event takes place. These delays can be monitored with the help of Transaction log.

(Query ⟶ Operation Control ⟶ Exception task ⟶ Transaction log)

Procedures should be location specific and further device specific i.e. Functionary specific. Specific office orders are to be issued covering every possible eventuality on a given territory, with the sole objective of not allowing any data element to escape.

Participation of train staff to deliver data though train documents for both

normal and abnormal working will be prescribed, as per local procedures. In case, when abnormal working has been introduced on account of failures, Operational Control Centre (OCC) is to co-ordinate for proxy reporting and restoration of normal working.

Each division should nominate a senior supervisor who shall be responsible for timely updation over his division and accountable to Operational Control Centre (OCC). Reporting terminals have been provided at divisional and sub control offices, in yard locations, (terminals are provided at the place where all the information required to be inputted is available). Control Office will report for non-device locations. The entire gamut of reporting to the system is to be engineered around these terminals, which must be manned round the clock.

Procedures should also be prescribed for reporting, in case any failure affects data entry from the nominated device beyond two hours.

Each division shall have a predetermined reporting regime in case of failure. In such cases, data should be entered from a pre-defined alternative device at that location/site or from the reporting devices at another location by following the mechanism of proxy reporting. Proxy reporting will be possible through the permission of zonal Operational Control Centre (OCC), which will enable the nominated device to report for the failed location/site.

Proxy reporting regime can be devised on the following lines:

(a) If at a location, terminal/s have failed, reporting will be done through remaining terminals at that location/site.

(b) At a location there may be several sites. If a particular site has failed, proxy reporting will be done through a nominated site.

(c) In case of failure in a yard - Divisional Control or sub control office will report.

(d) In case of failure in the Division - Zonal Operational Control Centre (OCC) will report.

(e) In case of failure in the complete Zone - Disaster management will come in use.

Management of Network: -

Availability of route/media diversity and adequate spare equipment has provided sufficient redundancy. It should always be ensured that redundancies are always in working order. Monitoring functioning of the Network with the help of NMS software installed is also the function of Zonal Operational Control Centre (OCC) that has to be manned round the clock on a continuous basis. It will include–

- Ensuring that primary and secondary data and voice channels are in working condition.

If your node is connected through two channels & one of them is down, you will not know the difference. However, with one channel down, you are in a very precarious position, as data entry will stop as soon as the second channel even flickers. It is, therefore, important for you to take active interest in knowing the state of a channel. This can be done through "pinging". Pinging is the name given to sending & receiving a test data packet from one computer to another remote PC/Router or to any intelligent device. However, you can ping only if you know the (IP) address of the remote PC or Router. List of IP addresses of your zone should be available with Operational Control Centre (OCC). You can ping by the following command:

Start Run ⟶ Ping ⟶ [IP Address of Device] ⟶ OK

For finding the channel uptime, you have to schedule the task of pinging, even if your Node is up. Ideally, every 4 hours, you should ping to adjacent Routers & note the result. This, compiled over the entire day, will give channel availability of each channel at your Node.

- Registering complaints for channels that are not working and following up for rectification. Liaison with both BSNL and Railways for the above.
- Routers have been configured to route data on a predetermined priority. Rerouting and load balancing will have to be done through OSPF (Open Shortest Pathfinder) on the NMS and need basis.
- Analysis of network failures for identifying problematic links for upgradation.
- Monitoring payment processes of rentals of communication channels.
- Trouble shooting for other equipment failures in association with central Operational Control Centre (OCC) and ordering its replacement from the spares.

Maintenance of equipment:

Regarding maintenance of equipments, Operational Control Centre (OCC) shall keep a record of hardware components provided at each location/site and their failures at zonal headquarters and its divisions. Repairs will be through maintenance contracts.

A PC breakdown (either Monitor or CPU or UPS) is crucial as it affects data entry. However, you must first make sure that there is no such problem, which cannot be fixed locally. Please check for power cord, operating system & RMS program. If all of these are there & still your PC does not respond, bring it to the knowledge of the Divisional HQ. At each site you have one extra PC, complete in all respects, to take care of such eventuality. Replace the defective PC with this stand-by. Finally, report the failure to the concerned vendor or as prescribed by the maintenance practice of that division/zone. Addresses of vendors should be readily available.

Operational Control Centre (OCC) should prescribe spare maintenance practices on their respective zones.

The following points should be kept in mind before prescribing any spare maintenance practice:-

- Uptime requirement of location
- Accessibility of vendor from a location
- Sourcing of spares may be done from a central point, ideally a big city, where vendor services are available readily.

In-house skills would be confined to troubleshooting and to replacement of equipment out of spares. NMS software also helps in troubleshooting. Vendors with whom AMC has been drawn and entered can then repair defective pieces.

Replacement of manual Information System:

Suspension of parallel manual system will be the biggest challenge. It has to be gradual. First of all, it will have to be explained to operations managers that value lies in using the application in an interactive mode. Dependence on fixed time reports should be minimized. Fixed time reports should be more in the nature of exception reports to reflect failures.

It would be prudent to prioritize this effort in the following order:

- Interchange
- Stock and Demand
- Loco inventory

Operational Control Centre (OCC) will, in consultation with PCOM, prescribe a schedule for identified manual reports and bring systems stability in terms of data capturing in those areas first.

Operational Control Centre (OCC) will also evolve a mechanism to analyze systems usage at every step and match it with expected returns. Returns can be in terms of savings in efforts, accuracy of information, avoidance of disputes, less correspondences and cross references, more time for planning operations, resultant customer satisfaction, enhancement in business achievement and productivity (redeployment achieved, overtime curtailed), reduction in work pressure amongst staff, less diversions, etc.

From the analysis of application by Operational Control Centre (OCC), it is expected that items for upgradation of application further will get identified. However, before undertaking development, Operational Control Centre (OCC) will weigh the justification of every new requirement vis-à-vis its return and only then forward it to agencies responsible for application development.

In service training:

It is very essential that concurrently a programme be made by each Railway to disseminate the learning to the rest of the cadre. The training should be

institutionalized taking the help of zonal training schools. The components of training will comprise exposure to revised ground procedures for data collection and maintenance, reporting tasks of the application and Operational Control Centre (OCC) functions.

The participation of all those in the field who are associated with operations taken together will only ensure sustained upkeep and usage of the system. The FOIS training should be made a part of the induction and refresher courses of TNC, GC, SM, TXR, Trains, Power, C&W and Commercial Controllers, Guards and Loco Pilots.

This training is essentially for understanding of procedures and application tasks.

In case of those personnel who have to man the Operational Control Centre (OCC) and perform its functions an extended module will be prescribed, in addition to training in procedures and application tasks.

Operational Control Centre (OCC) of each railway will nominate trainers from their existing cadre strength who, in turn will be trained by CRIS to establish training processes on their Railways and train others. Operational Control Centre (OCC) will thereafter monitor progress of training on their Railways and ensure that regularity is maintained.

18006: Miscellaneous Issues: Printing Reports:

All reports, which are available on display, can also be printed. You should decide as to which reports are most useful & which require printing.

You can print either the view shown (through F7) or you can choose which columns & rows you want (by clicking them) & then print your selection by pressing F11.

For printing, you should have a Dot Matrix Printer attached either to Network or attached to a PC & “Shared”.

You must plan in advance for your requirement of paper & ribbons.

Messaging Feature:

This is a very powerful communication tool that should be used for meaningful works only. Don’t allow it to become a general-purpose e-mail feature. Since the addressee is not a filter, the entire list of messages for a station increases exponentially. However, use it freely & liberally for communicating messages related to freight operations, FOIS messages & emergent non-personal messages.

Passwords:

The RMS package has a concept of passwords. For each user, who enters data, such passwords can be defined. Once a password is given by CRIS, you can change your password on your own by going to Access > Password. As a supervisor, you must also ensure that anyone who is going away from FOIS work (on transfer etc) should be struck off from the user list & his

password is disabled by CRIS.

Assigning passwords gives responsibility to the user. This password helps in keeping the security trail i.e. the reporting done carries the id of the user. Password management task is being passed on to the zones so that they can manage passwords on their own without getting CRIS involved. Besides RMS password, there is Windows password, which you use at the time of logging in to your PC: if you are using this password, then all the users of that device should know it.

18007: CHECK LIST FOR DAILY MAINTENANCE OF HVNET VSAT

PREREQUISITES:

1 Minimum 1KVA On line UPS - dedicated to VSAT
2 Dedicated Electronic earth less than1ohm
3 Earth to neutral Voltage should be less than 2volt
4 Air -conditioned dust free environment with clearance of at least 8" in front and rear of the indoor unit. This provides airflow and prevents overheating.
5 AC input requirements-230v+10%v VAC 47-63 Hz for PES
6 Grounding of VSATs antenna and unit is a must; resistance should be less than10ohm
7 AC input voltage to PES must be derived from UPS output only (Live to neutral 230 VAC Live to Earth 230 V Neutral to Earth O/V)
8 Do not allow moisture to enter the RF unit. A plastic tape should be put on all the Connectors at the ODU. A properly designed rain protection cover can also be used to prevent the same.

ON-OFF PROCEDURE:

1. Do not put off the power supply. Keep it continuously "on" because Hub is always polling each location for status and control signals must be received at any time from the Hub.
2. If PES is switched off and subscriber switches it on, in this case PES will take nearly 40 minutes to get ready for normal working provided it is ON continuously for that period.
3. Observation of the LEDs should be recorded during this period and it may be conveyed to HUB if PES does not come to normal position i.e. dots do not flash on all cards of PES.
4. Single phase 230 ohms 50Hz with input circuit breaker of 3amps for protection

PRECAUTIONS:

1. Do not disconnect the IFL cable from DIU without switching off the power supply. This may damage equipment.
2. Protect your antenna/FL cable/ODU from tampering by unauthorized person.
3. To prevent damage to the DIU, turn power off before

connecting/disconnecting any telephone; failure to remove power may damage the VDPC card.

4. Do not use rotary telephones with VSATs. Use only Touch tone (DTMF) telephones.
5. Do not place equipments, which produce dust, near the DIU (Certain copier of computer primers produce carbon dust, which can cause malfunction.
6. Prevent moisture from getting inside DIU
7. Limit the distance between VSAT's DIU to telephone instrument to 15 meters for proper operation.
8. For normal operation the VSATs should be displaying flashing dots in all the cards i.e. IFM, VDPC and MPC. Any other display is an abnormal condition.

In case of difficulty contact

HUB numbers: (To be taken from CRIS)

- Specify the display of all the three PES cards
  Note: Abbreviations are as below:-
  - PES= Power Earth Station
  - ODU= Out door unit
  - DIU= Digital Indoor Unit
  - IFM=Intermediate Frequency Module
  - VDPC=Voice Data Port Card
  - MPC=Multiport Port Control

Chapter-19
LINE CAPACITY

19001: Definition: The capacity of a line is expressed as the number of trains in both directions that can be run on a given section of the line.

19002: **Calculation of line capacity by Scotts' formula:** (a) Line capacity is theoretically calculated by the Scotts' formula which expresses the line capacity in terms of trains per day in both directions. The formula is as follows:

$$\frac{1440 \text{ (i.e. minutes per day)}}{T+t} \times \frac{70}{100}$$

(b) In this formula:

(i) T - Running time in minutes of a ruling train on the ruling section of the line.

(ii) t - Time in minutes normally required between the arrival and departure of two/opposite trains in a station, which for token working, is 5 minutes.

(iii) The "Ruling Section" or the Governing Section is the section between those two stations of the line with the longest running time of the "ruling trains". The "ruling trains" normally are the slowest moving through goods trains.

(iv) The 70% factor is an experience factor, which accounts for the impossibility of regular distribution of trains over the day, as it is not possible to run trains strictly one after the other, which is assumed while "calculating line capacity" at the theoretical line capacity.

(c) To calculate the line capacity of a single line section the figure derived by the above formula should be divided by 2.

19003: Limitations of the Scotts' formula: The Scotts' formula has the following limitations:

(a) It assumes as a rule that trains are running by turns up and down on the ruling section. It is, however impossible to arrange such a succession of trains on sections with mixed, passenger and goods traffic.

(b) It does not take into account the total length of the line for which the capacity has to be worked out. Experience shows that the longer the line, the lesser usually is its capacity, other conditions remaining the

same.

(c) The number and location of the long sections is another factor which is not taken into consideration. The more the number of long sections on a line, the less is its capacity.

(d) There is no mention in the formula of the importance of the number of crossing loops at stations or of number of lines or sidings at junctions, both of which factors affect the line capacity considerably.

(e) It does not take into account the effect of various signalling arrangements over line capacity. Operating time between two successive trains in Automatic section equipped with automatic block and on a non-interlocked section cannot be the same.

(f) It is also silent about the influence of different patterns of traffic on the line capacity over various sections.

19004: The calculation on Indian Railways: (a) The following is another formula which is largely used on the Indian Railways:

$$n \text{ (number of goods trains both ways)} = \frac{2x24x60 - P}{Ld+Lu+2t} \times \frac{60}{100}$$

(b) In this formula -

(i) "Ld" and "Lu" are the running times of the slowest down and up goods trains, respectively on the ruling section. "Slowest" word may be deleted and this line may be written as "Ld and Lu are the normal running times of the down and up goods trains on the ruling section because there is no criterion regarding slowest speed.

(ii) "t" is the station time which is assumed to be 3 minutes. 't' may be defined average 2 minutes due to change in modes of Block Working and interlocking.

(iii) "P" is the total running times in minutes of existing passenger trains on the "governing section". 'P' does not denote time allowances on Engineering or Traffic accounts

(iv) The 60% factor is an experience factor, which accounts for the impossibility of regular distribution of trains over the day, as it is not possible to run trains strictly one after another which is assumed while arriving at the theoretical line capacity. It may be defined as experienced factor of "working efficiency" which reflects on the degree of track utilization.

19005: Master charts: The above formulae provide only a rough estimate of line capacity. It is, however, best to realistically determine the line capacity of a section by actually plotting the paths of trains on a master chart. Passenger train paths should be plotted first and then goods train paths

should be interpolated so as to make maximum use of the line. While doing so, the terminal facilities should be taken into account. It is not best realistically to determine the line capacity because uneven time allowances in different passenger trains are given which affect the plotting of goods train paths.

19006: Various methods of increasing line capacity:

(a) To increase the capacity of a line, efforts should be made to reduce the value of the denominator in the formulae given above and increase, as much as is possible, the efficiency factor. The efficiency factor depends on the peculiarities of each railway and it is not possible to evaluate it mathematically. However, its influence on line capacity is very important. It is a measure of the deviation of the actual performance from what is planned. The first requirement to improve this efficiency factor is an intelligent forecast, which will give an accurate and true picture of the whole transportation business. Then again, all reasonable precautions should be taken to keep the effect of inevitable irregularities and interference as small as possible. It may be regrouped as,
   (i) With the help of heavy expenditure.
   (ii) Through close monitoring by management.

(b) The following are some of the methods of improving the capacity of a section:
   (i) Instilling in staff a sense of the importance of time.
   (ii) Having close and constant supervision.
   (iii) Reduction of stopping time of trains at stations by curtailing time in loading and unloading, shunting and marshalling of trains etc.
   (iv) Arranging as few crossings at stations as possible and arranging one of the trains crossing at a station to run through as far as possible, thereby increasing average speed.
   (v) Keeping a watch on temporary engineering restrictions which should be imposed for the absolute minimum period.
   (vi) Using more block trains.
   (vii) Subject to the length of loops on the section, running of double rakes.
   (viii) Keeping under constant review operating rules or practices which, after careful consideration are deemed to be unnecessarily conservative under present conditions.
   (ix) Improvement of facilities at wayside stations, such as those for:
      (1) attaching and detaching of wagons;
      (2) crossing of three trains; and
      (3) simultaneous reception of trains from opposite directions.

(x) Improving the facilities at terminal yards, e.g. the number of reception and departure lines, simultaneous reception and dispatch of trains from and to different directions, adequate length of shunting neck, stabling accommodation etc.

(xi) Resorting to the use of heavier trains requiring more powerful locomotive.

(xii) Using not only heavier trains and locomotive but also wagons of greater capacity. This will reduce the number of wagons to be marshalled and coupled and as such, speed up operations.

(xiii) Lengthening of loop lines at stations to cater to increased loads of trains. A limit to such lengthening is, however, set by the ruling gradient on the sections and the hauling power of the permitted locomotives.

(xiv) Reducing the length of block sections by providing additional crossing stations on single line and 'C' class stations on double lines.

(xv) Improving the existing standard of permanent way, bridges and gradients to permit higher speeds and heavier loads of trains. This also includes improvements to the existing turnouts to permit higher speeds.

(xvi) Improvement in the methods of signalling and inter-locking, such as:

(1) Provision of warners, where considered necessary and placing of signals in such a way that they are always in good view of the Loco Pilots.

(2) Grouping and interlocking of points at stations and centralizing of control as far as possible.

(3) Providing for multiple aspect upper quadrant semaphore or colour light signals to suit the different conditions of traffic.

(4) Wherever possible, housing of block instruments in cabins. This, in the case of single line, shall permit tokens being dropped and picked up opposite the corresponding cabin and thus the time required for block working shall start as soon as the engine passes the cabin. This will also save some time in observing the tail lamp and starting block working before the train stops.

It may be defined as housing of Block Instrument in cabins at large stations. Improvement also entails introducing token less block instruments for block working and installing panels for effective yard movements.

(5) Introduction of working by token less block instruments on

single line section.

(6) Remote control of outlying points and junctions between running lines adjacent to important stations.

(7) Use of automatic block signalling system on busy double line sections when justified by traffic density.

(8) Introduction of centralized traffic control to relieve serious bottlenecks on single line, where alternative methods short of doubling cannot meet the situation.

19007: Provision of new crossing stations and additional loops at crossing stations: The following general principles may be kept in view when proposals for provision of new crossing stations or additional loops at crossing station are made:

(a) All new crossing stations should be two line stations, i.e. one loop line in addition to the mainline.

(b) A new three line crossing station, or a third line at an existing two line station should be made when :

(i) the station is next to a terminating yard;

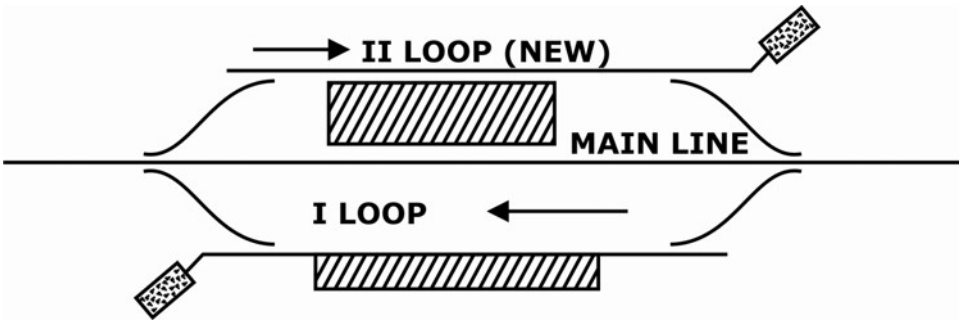
(ii) it is a watering station;

(iii) heavy local shunting is necessary;

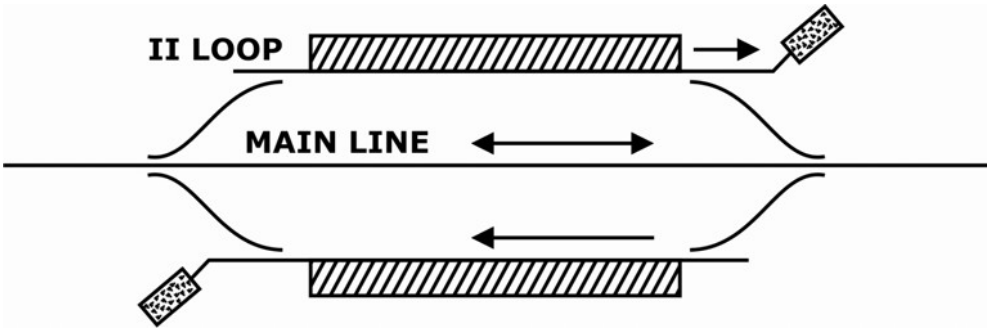
(iv) both the adjacent stations are provided with two lines only;

(v) One or both adjoining block sections are comparatively long.

(c) When an interlocked two line station is converted into a three line one, it is considered that it would be sufficient to provide simultaneous reception facilities only in o`ne direction and have the platforms as illustrated below



(d) Where this is not feasible due to local conditions, the platforms must be provided on the second line as shown below:



(e) The necessity for providing foot over bridge at such stations should be considered on the basis of volume of traffic handled at each station.

(f) At stations where new lever frames are provided, the lever frame should have enough spares to cater to the signaling requirements of a three line station, with facilities for simultaneous reception from both directions, so that these facilities can be provided at a future date, if required, without extension of the lever frame or any major alteration in the interlocking layout.

19008: Sectional congestion:

(a) It means that the normal flow of traffic over the section is retarded and the usual running of trains is affected. It may be a permanent feature due to insufficiency of running facilities resulting in the section being saturated with the work load or the line capacity may have been temporarily reduced due to certain causes.

(b) It is essential that the cause or causes of sectional congestion be carefully found out and necessary remedial measures applied quickly to prevent setback to operation.

Chapter-20

COMMAND, CONTROL AND COORDINATION OF EMERGENCY RESCUE OPERATIONS ON THE OPEN LINE

20001: Purpose:

(i) The purpose of this Standard Operating Procedure (SOP) is to delineate responsibilities and procedures for the control and coordination of all responses to emergency situations on the main line.

(ii) To provide step by step guidance on how to deal with incidents should they happen.

(iii) Particular note should be taken of the need to provide suitable training to keep staff aware of what needs to be done in the event of a serious incident.

1. Objectives of Incident Management Plan:

In order of priority, these are:-

(i) Save lives and alleviate suffering

(ii) Provide help to stranded passengers and arrange their prompt evacuation

(iii) Instill a sense of security amongst all concerned by providing accurate information

(iv) Protect Railway property

(v) Ascertain the cause of accident, preserve clues by cordoning off the incident site etc.

(vi) Expedite restoration of train operation

There is a difference between a disaster and an accident. All disasters need not be the outcome of train accidents, neither are all accidents classified as disasters.

Accidents are occurrences where safety has been affected.

Disasters are those situations, which cause acute distress to passengers, employees & outsiders and may even be caused by external factors and unless promptly managed, the distress levels are likely to increase with time.

2. List of serious incidents requiring use of this plan:

(i) Fire, smoke emission, explosion in railway premises, including trains

(ii) Derailment of a passenger carrying train

(iii) Collision of a train/trains

(iv) Security threats/Terrorist attacks, widespread violence, bomb explosion

(v) Release of Chemical or biological gas in trains, stations or tunnels
(vi) Natural calamities like cyclone, floods and earthquakes

3. Definitions:

In the context of Indian Railways, unusual events are classified as under:

(i) Incidents – which cause delay to trains
(ii) Accidents – which have the potential or do actually cause loss of life and/or injury and damage to property
(iii) Emergency/Serious Accidents/Disasters – these may or may not necessarily be the outcome of train accidents but have the potential to cause loss of life and/or injury to human beings, causing further death/injury and wide spread and prolonged distress to all those involved, unless tackled in an effective manner.
(iv) Disaster Management Team- A team of Railway officials earmarked to reach the incident site by first available means & take over site management at Zonal, Divisional and area/major station levels.

4. Scope:

This SOP is applicable to all IR personnel working on the Open Line.

5. Responsibility:

- The Assistant Operations Manager (Divisional Control Office) or designated Divisional Control Office Supervisor, is responsible for the overall control and coordination of emergency situations on the main line.
- The OCS (officer in charge site) is responsible for overall control and coordination of all activities at the incident scene under instructions of Divisional Control.
- Traction, Track and Structure, Signalling and Telecommunication, fire service & security personnel are responsible for providing technical assistance to the Divisional Control Office & OCS.
- Rolling Stock Department is responsible for providing technical assistance to the Divisional Control Office and OCS, as required and for managing site restoration work.
- Station Operations & Commercial personnel are responsible for making appropriate station announcements and providing information, rendering first aid, mobilizing medical & fire services & assistance from civil administration including police and providing all other assistance in alleviating suffering and hardship to passengers and others.
- The Guards in charge & Loco Pilots in the area affected by the

incident are responsible for:

- Providing their passengers with up-to-date and timely information regarding the situation's status and/or progress; and
- Operating their trains in compliance with applicable rules and procedures and Divisional Control Office instructions.

- Government Railway Police and Railway Protection Force personnel are responsible for securing the incident scene and for performing/directing investigation activities in compliance with existing procedures. (in case of incidents caused by criminal acts)
- The senior Police official at the scene is responsible for controlling and coordinating all police activities at all times. In doing so, this official has the final authority to determine when these activities are complete and shall coordinate these activities with the OCS and the senior Fire services officials.
- Security personnel will assist Civil/Railway Police; Fire services personnel, medical services or station staff, as directed by OCS.

6. General:

The following is the list of personnel authorized to act as Officer-in-Charge site (OCS). This list also indicates the probable change of command at the scene.

a. Train Superintendent or Guard of the affected train
b. Loco pilot
c. Station Manager/ Station Master
d. Rail Operations Supervisor or Traffic Inspector
e. Any Railway Officer either on duty, off duty or on leave, present at the site of incident
f. Members of Divisional Disaster Management Team

When none of the above mentioned personnel are present at the scene, the Divisional Control Office shall appoint an officer in charge at site, as directed by DRM, from the personnel available.

Guards in charge, Loco pilot and Station Manager must assume and carry out the responsibilities of the OCS until relieved.

The first Guard in Charge /Loco pilot on the scene, shall act as the OCS until he/she is relieved by the first senior personnel /Rail Operations Supervisor to arrive.

The Rail Operations Supervisor shall continue acting as the OCS until he/she is relieved by an authorized senior official or released by Divisional Control Office after another officer in charge at site has been designated.

However, it is the responsibility of the Divisional Control Office to

select the most qualified person, for the type of incident, to act as the OCS.

The mere presence or arrival of an authorized senior official at the scene shall not indicate his/her assumption of command as OCS. Such senior official shall remain in an evaluating capacity unless he/she specifically assumes command.

The method of managing an emergency situation will be in compliance with the applicable Zonal Railway Rules and Procedures contained in Accident Manual, Disaster Management Manual or as directed by the Divisional Control Office during incidents not covered by Rules or Procedures.

The OCS has the authority and the responsibility to command the presence of any personnel and equipment required at the scene and to command the removal of any unnecessary personnel or equipment from the scene. This does not apply to police or Fire Department personnel.

Entry into the incident area by the news media or other visitors must be authorized by the CPRO and shall be coordinated with the Divisional Control Office, Divisional Railway Manager (DRM), OCS and the Police.

When it is necessary to notify the Fire Services and/or to seek medical assistance, the following information shall be provided:

a. Identification of caller;
b. Nature of problem (give in plain English/Hindi e.g. fire, flood, smoke, injuries);
c. Type of assistance requested, be specific;
d. Specific location of the problem and the best access points.

20002: Procedure:

1. **The Chief Controller/Asst. Operations Manager of Divisional Control Office or designated Divisional Control Office Supervisor shall-**

a. Ensure that ARME & ART is turned out in time;
b. Appoint the initial officer in charge site(OCS);
c. Coordinate all field activities and requests through the officer in charge site(OCS);
d. Notify members of Disaster Management Team and all departments and personnel, as required;
e. Coordinate and direct the safe movement of all trains, to include those trains which may be involved in the incident;
f. Request Police /RPF and civil administration for assistance in critical stations for crowd control;

g. Keep Loco pilots and Station Managers informed of system status and instruct them to make appropriate announcements to their passengers;
h. Ensure that system-wide public address announcements are made frequently to provide patrons with up-to-date information concerning the Rail System status;
i. Coordinate and assist OCS with restoration activities;
j. Provide and obtain from OCS, frequent updates on events and
k. Inform Commissioner Rail Safety and local civil authorities as per procedures in vogue in the event of train accidents, like derailment, Collision, fire, terrorist attack etc. of a passenger carrying train or any other accident relating to train operation resulting in death and/or grievous injury (as per Provision of the Railway Act).

2. The Officer in Charge at Site (OCS) shall:

a. Ensure that the safety of passengers and personnel at the incident scene is maintained; ascertain that all injured and stranded passengers have been safely evacuated. Till evacuation is complete, necessary succour in the form of drinking water, tea & edibles are made available to stranded passengers.
b. Ensure that all personnel involved, at the scene, work efficiently to restore rail service as quickly and safely as possible;
c. Control and coordinate all field activities with personnel at the site of the accident.
d. Coordinate all police related activities and requirements with the senior police official at the site.
e. Coordinate activities with the senior Fire Department official at the scene and when available, provide the Fire Department Command Post with a knowledgeable employee, to act as a communications link to Divisional and Central Control and to the OCS.
f. Coordinate activities at the incident site and keep DIVISIONAL CONTROL OFFICE informed of progress;
g. Establish a command post at the incident scene, direct all inquiries and/or requests made by jurisdictional police officials, appoint individual (s) to provide public address announcements, at five (5) minute intervals, to passengers of the incident train and/or inside the incident station;
h. Direct all inquiries and/or requests made by the news media to the CPRO Office;
i. Maintain a chronological log of all events.

3. Station Operations/Commercial personnel shall:

- Make appropriate station announcements;
- Assist Police with crowd control and
- Make every effort to identify and retain knowledgeable witnesses or to obtain their testimony along with their address.

4. **Guards and Loco pilots shall:–**

a. Operate their trains in compliance with applicable rules and procedures and

b. Keep their passengers informed by making frequent announcements regarding system and delay status.

All Rail personnel at the incident scene shall honour the requests of and obey the directions of the OCS.

5. **Emergency Control in the Zonal Office:–**

Emergency Control shall be manned by designated officers as per procedure laid down. It shall take prompt action to inform concerned officers. Plan all assistance to the Division. Mobilize resources and man power.

Seek GM/PCOM's approval to relay information to Railway Board to regulate traffic on the affected line, on adjoining Divisions and Zonal railways, to include train cancellation, diversion, rerouting, road bridging and air lifting of stranded passengers.

CPRO will continuously brief media to inform passengers of the current status of the rail situation.

20003: DUTIES OF COMMERCIAL STAFF IN CASE OF ACCIDENT:

1. On receipt of information of accident from the Operating Emergency Control, following Officials of Commercial department at HQ will be informed by the Commercial Control of the headquarter:-

(Designations of HODs and Dy HODs may differ from zone to zone.)

(a) PCCM
(b) CCM/FM
(c) CCO
(d) CCM/Passenger Services
(e) Dy.CCM/General
(f) Dy.CCM/Catering
(g) SCM/General

2. On receipt of information of a train accident, nominated Commercial officials would proceed to the site of accident by the quickest available means.

In case of serious accidents involving passenger trains, CCO (in absence of CCO, CCM/ FM or CCM/PM or as decided by PCCM) will proceed to the site of accident. CCM/PS will remain in Commercial Control.

20004: Centers of Activity:

(a) Headquarter
(b) Divisional Commercial Control
(c) Site of Accident.

(a) Headquarter:

(i) Commercial Control will have DOT and railway telephones, FAX, photocopier machine and a PC with an Internet. The details are as under:-

Telephone Nos.

P&T	–	0532-2435357
Railway	–	035-23853/23854
Fax	–	0532-2435273 035-23888(Railway)
CUG Mobile	–	9794835988

(ii) Commercial Control office in Headquarter would be manned by officers on round- the-clock basis. In case of a serious accident of passenger carrying trains, CCM/PS will immediately come to the Control office. In his absence, CCM(FM) and Dy.CCM/G will come to the Control office. If Dy.CCM/G is not available, SCM/G will attend. Thereafter, Control duties will be assigned as per roster for manning the Control office round the clock. Besides regular staff manning commercial control, at least one officer and one inspector will remain in the control round the clock. Officer deputed will be responsible for proper functioning of the control.

(iii) Headquarter Commercial Control would collect the following information:

(a) Time and place of accident from the Operating Emergency Control.
(b) Details of dead/injured Passengers, rescue operations, help/assistance being rendered at the site of accident, enroute etc. from the divisional Commercial control/control at the site of accident.
(c) Details of specials being run to the accident site and officials accompanying from Operating Emergency Control.
(d) CCM/PS will get the reservation charts printed and supplied to control. In addition, the addresses, as per requisition slips, shall also be got collected by CCM/PS & supplied to Commercial control and Divisional Control.

(iv) Commercial control at HQ will maintain:-

(a) Telephone and FAX numbers of the control at accident site manned by Commercial officials.

(b) Names and phone numbers of hospitals where injured are admitted (i) with names of passengers (ii) location of dead bodies identified (iii) digital photographs of all injured and dead transmitted through computer network to be displayed at sites or telecast to all enquiry offices.

(c) Telephone and FAX numbers of enquiry offices that would have been set up at various stations, including at other Zonal Railways.

(v) Commercial control in the Headquarters office would constantly monitor the information relayed from the divisions and other railways regarding the dead and injured persons and enquiry offices opened at important stations.

(vi) Commercial control in the HQ office will monitor/coordinate regarding assistance required by the division from other divisions/other railways in terms of deployment of material, staff and officers.

(vii) In case of confirmation of death/injury, the Commercial control will inform the concerned division/railway (Commercial control) to convey the information to the family of affected passengers.

(viii) Maintain a log of events.

(b) Divisional Control:

(i) Control Offices will have DOT/Rly. Telephones, FAX, photocopier machine and a PC with an Internet connection. The details of telephones and faxes of all the divisions should also be kept.

(ii) Commercial Control in Division would be manned by officers on round the clock basis. In case of serious accident of passenger carrying trains, Sr.DCM and in his absence, DCM/Catering, where available, or one of the ACMs will immediately come to the Control. Thereafter, Control duties will be assigned as per roster for manning the Control office. Second senior most commercial officer of the division will work as incharge of the Commercial control.

(iii) Divisional Commercial Control would collect the following information from Divisional Emergency Control/accident site:-

(a) Time and place of accident from Operating Emergency Control office.

(b) Details of causalities – dead/injured and safe passengers from operating emergency control office.

(c) Details of specials being run to accident site and officials accompanying from Operating Emergency Control office; monitoring their arrangements.

(d) Details of rescue operations and assistance being rendered to

the affected passengers.

(iv) Information collected should be relayed to all concerned, including HQ Commercial Control, Enquiry Offices opened at stations through phone, fax, etc. without delay.

(v) Commercial Control in Division will maintain:
  (a) Telephone and FAX numbers of the accident site.
  (b) Names and phone numbers of hospitals where injured are admitted and dead bodies shifted.
  (c) Telephone and FAX numbers of enquiry offices that would be set up at various stations, including at other Zonal Railways.
  (d) Name of Commercial Officer(s) deployed in each hospital.

(vi) Divisional control will advise Headquarters commercial control regarding details of assistance required from Headquarters or the adjoining divisions.

(vii) Maintain a log of events.

(c) Site of Accident:

Sr. DCM or in his absence, DCM will attend site of accident and work as site incharge of the Commercial department.

I. Setting up of Control Office at the site:
  (i) Division would set up a control office at the site with telephone, FAX and Public Announcement System (PAS) to be manned by Commercial, Security and Medical departments.
  (ii) Announcement would be made for registering the names of injured passengers and the list would be verified by Doctors, to be relayed to the Control offices at the divisional and headquarter levels. The list would indicate the extent of injury viz. trivial, simple & grievous.
  (iii) Control office at the site will be manned by Assistant Commercial Officers on round the clock basis.
  (iv) The site control office would maintain a log book. Flow of information, both incoming and outgoing, would be recorded, along with the time and names of the officers / staff who were given information to keep track of chronology of events.
  (v) Commercial Officers/personnel at site will NOT interact with the press.
  (vi) All necessary arrangements for refund should be made, as per extant rules.
  (vii) A manual/guide be made available with train crew, like TTEs, AC Coach Attendants, AC Pantry Car Staff, which will inter-alia include DOs and DONTs for them in case of accidents.
  (viii) Commercial Control will ensure that at stations where trains are
    - Delayed,
    - Diverted or
    - Terminated.

additional alphabetical list of passengers on board with their current

status must be available and displayed at enquiry counters for quicker dissemination of information. It will be ensured by CCM/PS, Divisional Control and divisional Commercial Officers.

20005: Rescue Duties of Commercial Staff:

Sr. DCM will ensure the following functions:

(i) Sufficient number of TTEs/TCs and licensed porters in uniform would be rushed to the site. The required personnel would be mobilized from the affected division and the neighboring divisions by the quickest available means. For this purpose TTEs from the divisional squad should be utilized. Requirement of staff could be continuously reviewed and augmented depending on the assessment of the officer in charge of site.

(ii) Arrangements will be made for speedy dispersal of stranded passengers of the train(s) involved in the accident, as well as of trains regulated or terminated as a result of the accident, in association with the Operating Department. In case of non-availability of rail services, adequate arrangements should be made to disperse them by arranging road vehicles etc. This would be done by site incharge.

(iii) Depending upon the need, accommodation in hotels/Dharamshalas would be hired for accommodating passengers and providing resting facilities to officials working at the site.

(iv) Make arrangements to inform the next of kith & kin of the deceased/injured persons involved in accident. This will be done free of cost.

(v) TTEs of the affected train will not leave the site of accident till ordered by the site in charge.

(vi) Till a commercial officer from the division reaches the site of accident, the Train Superintendent or Conductor or senior most Ticket Checking staff will allot duties to each available ticket Checking/other Commercial staff/volunteers in a manner to ensure maximum help to passengers under the prevalent circumstances. This function will be taken over by a Commercial officer as soon as he reaches the site of accident.

(vii) Duties of ticket checking staff on board will be:

  (a) Collect Railway staff, Doctors and volunteers on the train or near the accident site for obtaining assistance.

  (b) Provide assistance to Guard in making quick assessment of assistance required.

  (c) To carry out the duties assigned to them by Guard/Senior official present at the site of the accident.

  (d) Take action to save lives, render First Aid and organise relief

operations with the available assistance.

(viii) In case of involvement of Goods Train, following action will be taken promptly:

(a) Arrangement of adequate labour by mobilising resources available at other stations as well as from the market locally, for unloading of material from the wagons involved in accident.

(b) Arrangement of adequate tarpaulins to cover the contents so that these are saved from rains, etc.

(c) Arrangement of gunny bags etc. for retrieval of loose materials lying at the site of accident.

(d) Consignor/consignee would be informed regarding involvement of their consignments in the accident, besides intimating forwarding/destination stations. The information will be conveyed through the Commercial Control of the division/HQ, as the case may be. Arrangements may also be made for delivery of the consignments at the site of accident, if they so desire.

(e) Arrangement of road transport for evacuation of the contents from the site of accident.

(f) To coordinate with the Operating branch for supply of adequate empty stock for transshipment /disposal of the contents.

(g) Till such time as the consignment involved in the accident is not removed/ transported, the same shall be made over to RPF Incharge for security purposes.

(ix) Staff using their personal mobile phones in connection with the accident will be eligible for a lump sum grant of Rs.200/- without any clerical work to be performed in accidents

(x) In case of bodies, which remain unclaimed/unidentified, the division shall get such bodies photographed by hiring a photographer. Each body will be given a number, which can be displayed on the body of the dead for subsequent identification.

20006: Safety of Passengers and their luggage:

(i) Separate tent for packages/bags and belongings of the injured and dead should be arranged and guarded with the help of RPF at site.

(ii) A list of each item with distinguishing marks should be made.

(iii) Luggage claimed should be handed over on the satisfactory proof of ownership.

(iv) Unclaimed items will be safely transferred to one of the stations and for this purpose, if need be, road vehicles will be utilized/hired. Their personal belongings are useful in establishing identity of deceased/ missing.

20007: Catering arrangements:

It will be ensured by the site incharge.

(i) Sr DCM will ensure that adequate eatables, water etc. are available at the site of accident in case of involvement of a passenger carrying train in an accident. This arrangement will be made for the passengers free of charge at the site of accident and at roadside station where the train involved in the accident is stabled temporarily.

(ii) Gas stoves, Gas cylinders, drinking water, provisions for preparation of meals etc. should be rushed to the site for left over stranded passengers and officials involved in rescue operations. This will be augmented later, if necessary. Sufficient cooks and catering staff from departmental catering or catering contractor would be ensured at the site for arranging tea, biscuits, packed meals like poories and vegetables to the stranded passengers and staff engaged in rescue and restoration.

(iii) Sr DCMs would prepare advance section-wise nomination of catering agencies both departmental and private for rushing to site.

(iv) To supplement Railway's catering arrangements, nearby Dhabas and hotels should be contacted and arrangements made for opening up stalls at the site.

20008: Hospitals:

Sr. DCM will ensure -

(i) One assistant officer each will be deputed in the hospitals to look after where injured passengers are admitted or dead passengers are kept. In case of non-availability of an assistant officer, one CMI/ inspector/Sr. supervisor will be deputed by Sr. DCM. All dead bodies must be photographed after wiping their faces to establish identity.

(ii) The nominated officer will work in close coordination with doctors and render required help.

(iii) Officer incharge of the hospital will assist kith and kin of the passengers involved, in disposal of dead bodies and release of injured passengers.

(iv) The deputed official will obtain details like name, address etc. of hospitalized/dead passengers. He will also obtain details of the injured and nature of injuries with the help of doctors and convey it to the divisional Commercial control.

20009: Payment of ex-gratia by Commercial Staff: Sr. DCM will ensure -

(i) Payment of ex-gratia at the site as well as in the hospitals will be arranged on the basis of the identification of injuries by the doctors.

(ii) Sr.DCM/DCM will ensure availability of sufficient cash for payment of ex-gratia.

(iii) CCO will also depute claims officials at the site/hospitals to assist the relatives of the injured/dead passengers regarding filing of claims for compensation.

(iv) If a few injured passengers/kith & kin of deceased involved in the accident have not been paid ex-gratia at the site of accident or in the hospital, arrangements should be made to pay the same at their residence by deputing officials of the division or seeking help of the other divisions/railway. Such payment will be witnessed by the Pradhan or Sarpanch or any other responsible official of the area.

20010: Enquiry offices at the important stations enroute:

This function will be ensured by the incharge available in divisional control.

(i) Emergency offices would be opened at important stations as per the route of the train. On the basis of need, enquiry offices would be opened at other important stations also.

(ii) All these enquiry offices should have DOT and Railway telephones with STD facility, Fax machine, photocopier and a PC with Internet connection. Identical telephone numbers will be preferred.

(iii) These enquiry offices would be manned on round the clock basis by deputing additional staff. It will be supervised by a Commercial officer, where feasible/commercial inspector/CIT.

(iv) These control offices should constantly keep in touch with the divisional Commercial Control.

(v) Emergency offices would display the list of dead and injured passengers at the notice board at stations.

(vi) Officers attending these emergency offices would not interact with the press.

(vii) Sr.DCMs will prepare their own contingency plan on similar lines.

(viii) Withdrawal of Money from station earnings:

Money withdrawn from station earnings will also be used for relief operations like purchase of items immediately required, hiring of vehicles and other equipments directly.

Chapter 21
DERAILMENT INVESTIGATIONS

21001: Accident investigation: This is a tool "to prevent recurrence". In most of the cases on Indian Railways, cause of the accident is not clearly established. This results in repetitive failures. Pinpointing the scientific causes of accidents, therefore, becomes a preventive strategy.

21002: Site investigation:

(1) Condition of track, with special reference to gauge cross level, super elevation. Gauge of the track to be checked under the load and for a distance of 45 meters on either side of point of mount, if cause is indisputably known, otherwise for a distance of 90 meters ahead of the point of mount. In case of sabotage or suspected sabotage, nothing to be disturbed except to rescue life till ok is received from police.

(2) A rough sketch showing the position of derailed vehicles marks on sleepers should be made. Point of drop/Mount to be indicated.

(3) Locomotive speed records/Graph.

(4) Condition of rolling stock, with special reference to brake power; marshalling of trains and engine details as also breakage of components like brake blocks under frame assemblies having caused obstructions.

(5) The position of block instruments, signals, points indicators.

(6) At stations with panel interlocking, position of switches & indicators to be recorded, preferably by two officers or two Sr. Subordinates of different branches and relay room to be sealed.

(7) Position of important relays.

(8) Seize & freeze all records as laid down in the Accident Manual.

(9) The statement of the concerned staff available at site, should be recorded for finding the cause of accident.

(10) To give the prima-facie cause of the accident with expected time of restoration.

(11) To check Marshalling of the train, with regard to anti-telescopic coaches.

(12) Arrange to take photographs from different angles to assist in reconstructing the scene of the accident.

(13) The details as given in the accident reporting form must be recorded for locomotive to produce before the Accident Enquiry Committee. The track and coach/wagon are to be examined jointly and the data and information collected are to be recorded, jointly signed by the Sr.

Subordinates available at the site.

Following operating features must be checked while investigating into a derailment:

- Speed of the train just before the accident.
- Uneven load/shifted load/load in all the vehicles must be checked to get an idea of loading and lashing/securing loads.
- Application of brakes.
- Brake power of the train and location of vehicles without brake power.
- Whether all hand brakes are in released condition.
- How was the train received or dispatched by the station master. Whether station staff adopted any short cut method of working.
- Sudden reversal of points.
- Details of S&T failure reported before the accident - how and when it was set right.

It is always useful to look into all aspects connected with the derailment. Sometimes, important clues get neglected due to preconceived ideas and it becomes very difficult to properly arrive at the cause of derailment.

Accidents involving collision, passing signal at danger, rolling back of a train etc. are generally caused by violation of train operation rules and it is not very difficult to trace the irregularities committed. The most difficult accidents, from the investigation point of view are the ones where the wheel leaves the rail.

Such accidents can be categorized in four types:

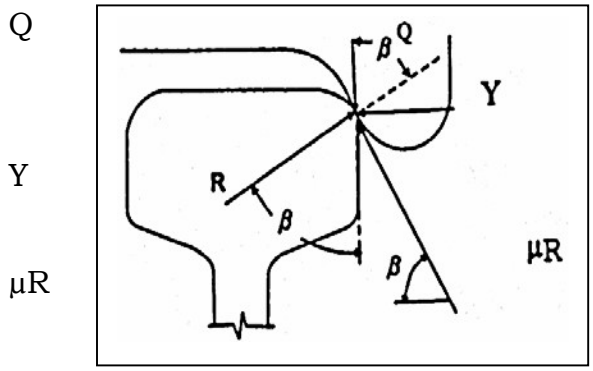
1. When one or both of the same wheel-set fall inside the track.
2. When the wheel derails without any mark on the rail table.
3. When the wheel derails with single flange mark on the rail table.
4. When a number of wheels derail with multiple flange marks on the rail table.

Type 1: When one or both wheels of the same wheel-set fall inside the track:

In such derailments the cause of accident is very clear, i.e., spread gauge or may be a remote possibility of shifting of wheel disc on the axle or breakage of axle or journal. It is generally seen that in such cases of wheel/wheels falling inside the track, the affected rolling stock is lifted with the help of jacks and the rolling stock can be lowered and moved on the same track.

In the case of spread gauge, special care has to be taken for recording the condition of track fittings. Loose keys, signs of rail-chairs shifting on the sleeper, condition of elastic clamps, tie rod cotters etc. must be carefully examined and recorded. If a wheel starts mounting the rail, its tread loses contact with the rail and the entire weight is shifted to this point of contact

on the flange. At this particular moment, the arrangement of forces is as follows:-



In the above figure, different forces shown are as follows:
Q: Instantaneous wheel load R: Reaction of rail
Y: Lateral thrust (flange force)
μR: Frictional force between rail and wheel flange (acts upward)
μ: Coefficient of friction
β: Flange angle
From the above simple model, following formula was derived by Nadal in1908:
$Y/Q \tan \beta - \mu / 1 + \mu \tan \beta$
The ratio Y/Q is called derailment co-efficient.
(While investigating into derailment, all track vehicle defects and features and operational aspects, which cause one or more of the above mentioned factors to occur, should be listed as possible contributory factors. The list of such contributory defects and features thus arrived at should be arranged in descending order of their assessed contribution. Thus, one can arrive at one or more causes of derailment.)

Type-2: When the wheel derails without any mark on the rail table:

In such type of derailments, no flange marks are found on the rail table. In majority of such derailments, following reasons may have caused the accident:

- Obstruction in the path of wheel.
- Breaking of vehicle suspension arrangement.
- Jamming of wheel, due to roller bearing failure.
- Mishandling of train by loco pilot.
- Wrong marshalling of vehicles, with no brake power kept together or heavy vehicles in the rear.

For investigation of such derailments, the accident site must be carefully inspected for foreign body, which might have caused an obstruction to the derailed wheel. Examination of train's brake power, position of zero brake

power vehicles and heavily loaded vehicles must be critically done. Additionally, loco speedometer chart must be checked to ascertain last brake application.

Type-3: When the wheel derails with single flange mark on the rail table:

This is the most interesting category of derailment and requires detailed examination of track, vehicles, loading condition and train operating conditions. First the wheel mount mark itself has to be properly ascertained. The length of flange mark gives a clue to reasons for derailment. The following factors must be considered after seeing the flange mark:

- Long flange mark suggests, that the wheel load reduced considerably for a long period.
- Short flange mark suggests, that the lateral thrust increased to a considerably high value.
- The weight of the vehicle and speed of the train at the time of accident affect the impression of flange mark on the rail.

In a number of cases, an empty derailed wagon had been pulled to a very long distance and the wheel mount mark was found, but disputed due to ignorance of the investigating officials. In all the cases, one must ascertain the first wheel drop mark and then trace back the mount mark. After locating the mount mark, next step is to match it, with the wheel that derailed first. For this matching of damages on sleepers and position of vehicles after derailment will have to be done.

After identifying the point of mount and drop, detailed examination and recording of track geometry, rolling stock parameters, condition of loads in derailed as well as non-derailed vehicles and operating conditions has to be done. This record reveals reasons for the accident. The analysis has to be done with a view to find out reasons for increase in thrust and reduction in instantaneous wheel load.

Type-4: When a number of wheels derail with several flange marks on the rail table:

In this category of derailment, the probable reasons for derailment can be as follows:

- Obstructions in the path of wheels.
- Disturbed track (work being done on the track or sabotage)
- Rail failure
- Serious track defect-twist misalignment or formation failure
- Buckling of track

In such cases, if there is no obvious reason, like obstructions or rail failure, track parameters are of particular relevance and sufficient care has to be taken in recording them. Reading of track geometry is of great importance

in establishing the behavior of vehicle, just before the derailment. In addition to the readings taken after derailments, records of previous maintenance (rail renewal, de-stressing etc.) must be perused to assess the amount of work done in the last few days.

21003: DERAILMENTS AT POINTS AND CROSSINGS:

(i) Points and crossings are meant for changing the route of a train. These have some discontinuities thereby making it a weak link in track structure. In a point there are two tongue rails connected together by stretcher bars and this assembly is called switch. A pull rod from some distance operates this switch. Today, most of the points are operated by motors and they have some interlocking arrangement. The interlocking for motor operated points is done with a lock bar and it has a detection device also to detect proper housing of points.

(ii) Tongue rails forming the switch are hinged onto the heel blocks in the rear. The bolts, provided for hinging the tongue rails, are kept loose for easy operation of switch. After the switch arrangement, another important part is the nose of crossing. Here all the wheels traverse the path shown by the switch.

(iii) Most of the derailments at points and crossings either initiate at the toe of the tongue rail or near the nose of the crossing. Whenever a derailment takes place on a point the following checks must be done:-
Gauge of point must be checked at four locations:

- 305 mm in advance of nose of tongue rail
- 152 mm inside the tongue rail for straight road and turnout.
- At heel of tongue rail for straight road and turnout.
- At middle of tongue rail for straight road and turnout.

(iv) The Gauge must be correct at all places except at the toe, where it may be 6 mm slack for housing the tongue rail.

(v) It can be appreciated that conditions created by 'slack gauge' are not permitted near the switch. IRPWM-1985, Para 237 t' (8) (a) and (b) is reproduced below:
Gauge and Super-elevation in turnouts-

(a) It is a good practice to maintain uniform gauge over turnouts.

(b) If gauge of track adjoining the points and crossings is maintained wider/tighter than the gauge on the points and crossings. The gauge on the adjoining track must be brought to the same gauge as in points and crossings and run out at the rate of 1 mm in 3 metres to the requisite extent. It should, however, be ensured that the same gauge as applicable to the points and crossings is maintained for at least one rail length on either side of point and crossings.

(vi) In case of derailment suspected to have started near the switch of the turnout, the following points need to be carefully examined:

- The condition of tongue rail-whether broken, chipped or bent.
- Whether the damage is old or new.
- Height of the tip of the switch from top of stock rail.
- Thickness of the tongue rail
- Any gap between the tongue rail and stock rail
- Any damage to stretcher bar
- In case of interlocked points, the slackness between the locking bar slot and slide should be recorded
- The condition of brackets holding the stock rail
- Whether the switch jumps up when a wheel passes on its heel.

(vii) If the derailment is suspected to have started near the crossing, the following points must be carefully checked:-

- Condition of nose-wear, breakage, chipped, bent
- Reduction in the level of nose as compared with wing rails.
- Clearance between wing rail and stock rail (near the nose) on both sides.
- Clearance between guard rail and stock rail
- Alignment of turn out to be measured for checking smoothness (with 6 metre chord at 1.5 metre intervals)

(viii) IRPWM has specified a check-list for complete examination of points and crossings:

There is one potentially dangerous structure called diamond crossing, which is generally not provided on the main line. A simple diamond crossing has four noses (two acute angle and two obtuse angle), which require a critical watch. Even a slight damage to these noses or disturbance to the clearance between stock rails and guardrails makes this diamond crossing unsafe. The problem is further compounded, if a diamond crossing has one or two slips also. The curvature of the slip is generally so high that these structure are not fit for speeds above 8 to 10 kmph. It is advisable to avoid use of these structures.

Some Important Defects:

(A) Permanent Way:

- Spread gauge
- Gaping in points
- Tipping of the toe of switch
- Worn out & broken tongue Rail
- Excessive clearances of check rail opposite to the nose of the crossing

- Loose or slack points connections
- Sharp curves with kinking alignments
- Worn out Rails
- Abrupt introduction of super elevation
- Super elevation not corresponding to speed of the train
- Buckling of track
- Shearing of fish plate bolts
- Subsidence of track
- Uneven Cross level
- Condition of Ballast
- Security fastening deficient/loose

Track defects have a vital role in the accident, therefore, it is very essential to check the various parameters of the track. The following parameters must be checked thoroughly to pin point the defects in the track:

(1) Gauge: It is the shortest distance between the two rails of the track.

Rail Gauge:

The standard gauge is 1676 mm

(2) Permissible Variations:

- Straight line 6 mm tight to 6 mm slack (± 6 mm)
- On curve with radius 350 Mtrs or more-6 mm tight to 15 mm slack (-6 to+15)
- On curve with radius less than 350Mtrs-Slack up to 20MM (correction slip No. Rly Bd. L.No. 94/CE/II/TSG/I Dt. 20/24-6-96 of P. Way, manual)
- Gauge sleeper to sleeper Variation -- 2mm

IRPWM Para 316(2) (a):

Cross-level of the track is relative level difference between the two rail tables measured perpendicular to the track at the same point. It includes the variation in the super elevation in case of curve cross level to be recorded on every fourth sleeper or 3 mts apart. The cross level reading helps in calculating the TWIST available in the track. TWIST is calculated in mm/ meters by using the following formula:

Algebraic difference of cross level at two points A & B in mm divided by Distance between points A & B in meters.

Ref. IRPWM - Para 316 (2) (C):

Twist should not be more than 3 mm/mt as per Railway Board letter no. 631W6/TK/I0/Dt 10.11.1964.

(3) Unevenness:

This defect of the track is not reflected in the gauge and cross level reading. Low joints, high joints, loose packing, sleepers and lifting of sleepers cause

this defect. Long sags are not taken as unevenness. It is recorded for left and right rail separately. It is measured in terms of difference in longitudinal levels over a fixed base. Unevenness gives rise to forced oscillations in a vehicle and can cause variations in the values of instantaneous Wheel load and lateral thrust. Para 607 of IRPWM classifies unevenness (measured on 3.6 Mts cord) above 15111m as category D.

(4) Versine and super elevation:

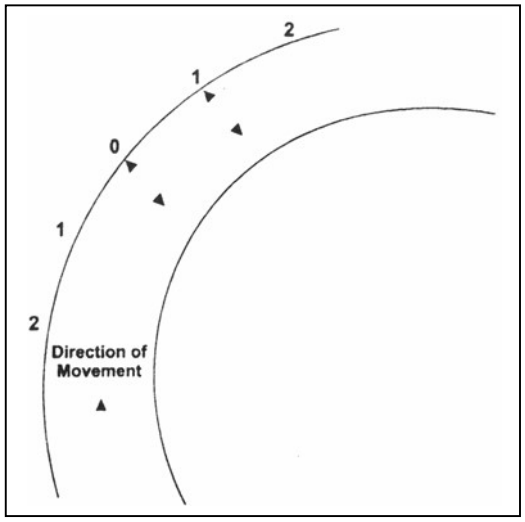
Versine and super elevation are measured for checking correctness of a curve. At the beginning and at the end of the curve, details of the curve are mentioned on the board. Radius of any curve is obtained by dividing 1750 mtrs, by its degree. Versine is calculated as:

V= 125.C2/R

R - Radius in meters

C - Cord length in meters

V - Versine



As per Para 421 (b)(i) of IRPWM, the station to station variation of versines of stations 10 Mts apart should not exceed 15 mm for more than 100 Kmph speed, whereas for speeds 100 Kmph or less than 100 Kmph it should not exceed 20 mm or 200/0 of the average versine of the circular portion, whichever is more.

The super elevation is calculated as:

$C = GV^2/127R$

C = Cant/Super elevation in mm. G = Dynamic gauge in mm

V= Speed in Kmph

Para 406 (d) of IRPWM specifies a maximum cant of 165 mm on group A, B and C routes and 140 mm on group D and E routes. The maximum amount of cant deficiency is also specified in para 406(2) as given below:

- For speeds in excess of 100 Kmph on group A and B routes for nominated rolling stock and routes with permission of Chief Engineer – 100 mm
- For broad gauge routes not covered by above – 75 mm

(5) Ballast:

It is a very important member in the track structure. It helps in maintaining track Geometry. The ballast resistance is affected by the following factors – Ballast - Size, Material, Shape, State of consolidation, Type of sleeper, Cushion at Formation.

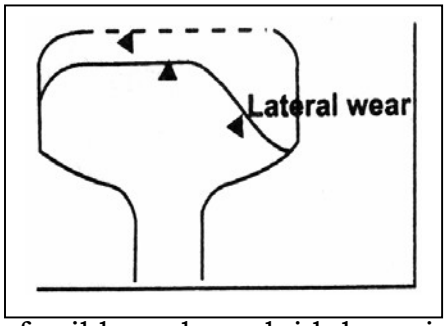
Para 263(2) of IRPWM recommends the Minimum depth of ballast below the bottom of the sleeper at rail seat as under:

Groups	Recommended Depth
BG Group A	300 mm
BG Group B & C	250 mm
BG Group D	200 mm
BG Group E	150 mm

(6) Rail:

The accident caused by rail fracture does not leave much room for investigation. The Fractured rail is to be tested to find out the nature of the failure. The visual inspection can reveal, whether the fracture was new or there was some old flaw in the rail.

For other derailments the rail is measured for its wear. The rail wears out mostly on the top surface and gauge face. Rail wear can be vertical, lateral or angular.



Angular wear
Profile of new rail
Vertical Wear

Worn profile:

The following limits of wear of rail have been laid down in IRPWM Para 302 (b):

Gauge	Rail Section	Vertical Wear
BG	60 Kg/Meter	13 mm
	52 Kg/meter	8 mm
	90R	5 mm

The following lateral wear limits have been given in para 302 (b):

Section	Gauge	Category of work	Lateral Wear
Curves	BG	Group A&B Routes	8 mm
Curves	BG	Group C&D Route	10 mm
Straight	BG	Group A&B Route	6mm

Straight	BG	Group C&D Route	8mm

(7) Sleepers:

If sleepers suffer any damage or loss in property, they can cause derailment. While recording the gauge and level readings the condition of each sleeper must be carefully observed, especially of sleepers near the point of mount.

(8) Rail Fasteners:

For different types of sleepers, the rail fasteners are different. Wooden sleepers - Dog spikes, Round head spikes, Steel keys Steel trough sleeper - steel keys, Prestressed concrete sleepers-- elastic clips with liners between the foot of rail and clip. Condition of all fasteners should be recorded while taking track reading.

(9) Creep:

This is a silent but very dangerous phenomenon of the track. Creep is a longitudinal displacement of track and is caused by

- Temperature variation causing expansion and contraction of the rail.
- The tractive forces of locomotive to push the rail backward.
- Braking forces of train trying to push the rail forward. The effect of the above forces is accelerated if the rail fasteners are not able to hold the rails properly to the sleepers or rail seat on the sleepers is a damaged or bad joint in the track without proper expansion gap.

Para 242 (6) of IRPWM specifies maximum amount of creep permitted as 150 mm. In LWR and CWR creep indication point are provided at a distance of 50 meters and 100 meters SEJ (Switch Expansion Joint) on either end of LWR/CWR.

(10) Buckling:

When a section of track buckles, about one or two rails length of the track leaves its place and moves sideways. This also happens due to the rise in temperature and other reasons similar to the creep. The buckling may be horizontal or vertical. Buckling normally happens in the 2nd half of the day, mostly when the track has absorbed maximum heat and also near the bridges, level crossings etc. where the track is firmly held in the ground.

(B) Defects of Rolling Stock:

(i) Defects in wheel and Axle, Broken & Hanging fittings
(ii) Defects in Bolster and Assemblies
(iii) Defects in spring gear, axle guard and trolley
(iv) Defects in Brake gear
(v) Excessive Clearance in side bearer, pivot etc.
(vi) Hot box/Roller bearing failure
(vii) Under frame and under frame members out of alignment

(viii) Poor brake power

(ix) Broken or disengaged Baffle plates in the empty/unloaded tank wagons

(x) Defective Draw gear, CBC gear and Buffing gear, Train parting & subsequent- collision - 'alliance 2' - couplets opening automatically.

Defects of Locomotives are very similar to defects of Rolling Stock.

CHAPTER - 22
CREW LINKS, LOCO LINKS AND POWER PLAN

22001: PROCEDURE FOR CALCULATING CREW REQUIREMENT OF A DIVISION USING CREW LINKS:

1. Running staff review shall be carried out after every six months for the period from April to September and October to March and to be completed by 31st December and 30th June respectively of each year.
2. Mail/Express/Passenger crew requirement should be worked on the basis of crew links, Holiday specials run in peak season during period under review should also be taken into consideration.
3. For goods crews the requirement to be worked out at the rate of 6 crew for one freight POL+30% leave reserve + 10% trainee reserve = 8.40 crew per POL. POL (POWER on line) considered for calculation will be for the peak month of the period of review provision for crew should be made separately for activities which can not be covered in power plan e.g. DMT, PQRS running with derated powers not covered in POL and empty coaching rake running with mail powers etc.
4. Shunter's requirement to be worked out @ 1 against 8 hrs. for each shunting pilot. Also rest giver @ 1 for 6 shunters to be demanded. 30% leave reserve and 10% trainee reserve to be demanded separately.
5. Requirement of Assistants will be same as that of pilots.
6. Similar six monthly review of Guard to be done by Sr. DOM/DOM.
7. For Goods Guard the requirement should be worked out at the rate of 5 Guards for one freight POL+30% leave reserve +5% trainee reserved = 6.75 Guard per POL. Provisions as per para 3 above should be made for goods guards also.
8. Running supervisors review should also be made with staff review @ 1 loco Inspector against 25 loco pilots or 50 shunters. No rest giver allowed. Leave reserve 12.5%
9. Running staff review duly signed by Sr. DME/Sr. DEE (in case of crew) or Sr. DOM (in case of guard) should be put up to Sr. DFM for vetting.
10. After accounts vetting and formal approval of the DRM, the proposal should be sent to HQ for further processing and sanction of GM. In HQ the sanction of GM should be obtained preferably in 15 days.

22002: POINTS TO BE KEPT IN VIEW WHILE PREPARING LOCO PILOT LINKS:

1. Loco pilot Crew links are prepared by CPRC/CTLC and got verified from the Personnel Branch. The objective of crew links is to ensure

optimum utilization of crew.

2. Train timings to be checked from the latest timetable.
3. Links to be prepared before promulgation of new timetable.
4. Maximum Duty hours in any one trip should not exceed 10hours.
5. Average duty hours in a fortnight should not exceed 104hours.
6. Minimum number of rests in a month should be 5 of 22 hrs., or 4 of 30 hours, including night in bed from 22 hrs. to 6 hrs. from sign "off" to sign "on".
7. Efforts should be made to include all the sections in the link to avoid giving learning road again and again.
8. Minimum out of station rest in case of less than 8 hrs. duty in the previous trip should be 6 hrs from sign "off" to sign "on". In case duty is 8 hrs or more than 8 hrs, then 8 hrs. rest to be given. In case of short trips of less than or equal to 5 hours then duty performed plus 1 hr. will be sufficient.
9. Minimum home station rest should be:
   (a) If duty performed in the last trip is less than 8 hrs. then 12 hrs.
   (b) If duty is 8 hrs. or more, then 16 hrs.
   (c) If staff is required to work train with less than the stipulated rest, then breach of rest allowance is payable to running staff.
10. Link having the maximum earning kilometerage should be worked by senior most loco pilots and so on.
11. Separate links should be prepared for superfast trains such as Rajdhani, Shatabdi Exp. Chronic late running trains should be kept in view to avoid link failures.

22003: POINTS TO BE KEPT IN VIEW WHILE PREPARING LOCOMOTIVE LINKS:

1. Loco/Power links are prepared by Headquarters office and circulated to the divisions. The objective of power links is to ensure optimum utilization of powers.
2. Train timings should be checked from latest time table.
3. Links to be prepared before commencement of new time table.
4. Efforts should be made to send the loco to home shed for servicing within the stipulated schedule time
5. Minimum possible out station halt should be provided.
6. Ensure loco is permitted to run on the sections at the max. permissible speed of the train.

22004: POWER REQUIREMENT (POWER PLAN):

1. To be prepared once in six months.
2. Average number of trains run on each section per day and average hours on road for last six months, duly signed by Sr. DME(P) and

Sr.DOM, to be prepared.

3. Formula: Section wise average freight POL for the last six months to be calculated as under:
   Bare POL = PDD + HOR + PAD
   (POL=Power on line; PDD = Pre departure detention; HOR=Hours on road; PAD=Post arrival detention)
4. 3.5 % further growth and 10% Bunching allowance to be demanded on Bare POL.
5. Loco's requirement for DMT, ART and other locos which remain in outage but are not added in POL for the purpose of calculation of average kilometers to be added in the bare requirement.
6. To arrive at total POL, last six month's average POL of shunting loco link WDS-4, WDS-5 pilots and Mail lie over to be added in the POL calculated above.
7. Mail/Exp./Pass. Loco requirement to be worked out on the basis of loco link. Add 10% for major repair allowance.
8. For shunting services, work out number of points for 8 hours shunting, demand 0.33 POL. Add 1 loco as overlap against 06 loco. Add 10% for major repairs.
9. Kms formula: Total kms earned on the average per day during last six months divided by average loco utilization.

22005: LOCO MAINTENANCE SCHEDULE:

(i) Conventional Locos:

Coaching Locos: (Railway Board Letter No.92/Elect (TRS)/138/5 Pt.-I, dated 18.01.2001 & Railway Board Letter No.9/Elect (TRS)/138/5/Pt.-II, dated 21.12.2001) :

Maintenance schedule	**Periodicity**	**Duration**
Trip Inspection(TI)	After 3000 kms or one trip, whichever is later	2 hrs
IA	40 $\pm$ 3days.	4hrs
IB	80 $\pm$ 3days	6 hrs
IC	120 $\pm$ 3days	8 hrs
AOH	12 months $\pm$ 15 days	6 days
IOH	36 months $\pm$ 1 month or 4 lakh kms (6 lakh for WAP-1/4 loco), whichever is earlier.	9 days

POH	6 years ± 3 months or 8 lakh kms. (12 lakh for WAP-1/4 loco), whichever is earlier.	28 days

Freight Locos:
Railway Board Letter No.92/Elect (TRS)/138/5/Pt.-I, dated 18.01.2001)

Maintenance schedule	**Periodicity**	**Duration**
Trip Inspection(TI)	15 days (Fitted with TAO TMs) 20 days (fitted with Hitachi TMs)	2 hrs
IA	45 ± 3 days	4 hrs
IB	90 ± 3 days	6 hrs
IC	135 ± 3 days	8 hrs
AOH	18 months ± 10 days	6 working days
IOH	54 months ± 1 month or 6 lakh kms, whichever is earlier	9 working days
POH	9 years ± 3 months or 12 lakh kms, whichever is earlier	28 working days

(ii) 3-Ph.ABB Locomotives:
(Railway Board Letter No.97/Elect (TRS)/440/18/44 (3Ph), dated 23.02.2007)
Coaching Locos (WAP5/ WAP7 Locos):

Maintenance schedule	**Periodicity**	**Duration**
Trip Inspection (TI)	3000 kms or one trip, whichever is later	2 hrs
IA	90 days.	6 hrs
IB	180 days	6 hrs
IC	270 days	8 hrs
MOH	18 months	6 workingdays

IOH	4.5 years± 6 months or12 lakh kms, whichever is earlier	11 working days
POH	9 years ± 6 months or 24 lakh kms, whichever is earlier.	28 working days

Freight Locos (WAG9/WAG9H Locos) (Diesel):

Maintenance Schedule	**Periodicity**	**Duration**
Trip Inspection (TI)	45 days	4 hrs
IA	90 days	6 hrs
IB	180 days	6 hrs
IC	270 days	8 hrs
MOH	18 months	2nd MOH
IOH	6 years ± 6 months or 12 lakh kms, whichever is earlier.	11 working days
POH	12 years ± 6 months or 24 lakh kms, whichever is earlier	28 working days

(iii) DIESEL LOCO SCHEDULE & DURATION:

Schedule	WDM2	WDM3A/B/C/D	WDM3A/B/C/D (30 days)	WDG3A	WDG3A (30days)	WDP1/3A	Duration
T-1	15 days	20 days	Trip -30 days	20 days	Trip-30 days	As per link	4 hrs.
T-2	30 days	40 days		40 days		30 days	6 hrs
M-2	2 Months	2 Months	2 Months	2 Months	2 Months	2 Months	8 hrs
M-4	4 Months	4 Months	4 Months	4 Months	4 Months	4 Months	16 hrs
M-12	12 Months	12 Months	12 Months	12 Months	12 Months	12 Months	4 days
M-24 (MOH)	24 Months	24Months	24 Months	24 Months	24 Months	24 Months	16 days
M-48 (IOH)	48 Months	48 Months	48 Months	48 Months	48 Months	48 Months	21 days
M-96 (POH)	96 Months	96 Months	96 Months	96 Months	96 Months	96 Months	30 days

(iv) ELECTRIC LOCOMOTIVE FEATURES:

S. No.	Description	WAM4	WAP1	WAP4	WAP5	WAP6	WAP7	WAG5 A/B	WAG5 HA/HB	WAG6	WAG7	WAG9	WAG9H	WCAM1	WCAM2	WCAM3	WCAG1	WCM5	WCG2
1	Supply System-AC(kV)	25	25	25	25	25	25	25	25	25	25	25	25	25/1.5 DC	25/1.5 DC	25/1.5 DC	25/1.5 DC	1.5 DC	1.5 DC
2	Continuous HP	3640	3800	5000	5440	5060	6120	3850	3850	6000	5000	6120	6120	3640/ 2930	4715/ 2916	5000/ 4600	5000/ 4600	4600	4200
3	Max.Speed (kmph)	120	130	140	160	160	130	80	80	120	100	100	90	120	120	105	100	105	80
4	Starting Tractive Effort (Tonnes)	33.8	22.4	32.4	26.29	30.8	32.88	33.5	33.5	46	44	46.89	52	33.84/ 23.2	33.5/ 26.0	40.2/ 26.8	43.5/ 30.0	39.6	35.6
5	Continuous Tractive Effort (Tonnes)	56	13.8	18.8	22.42	19	23.23	20.6	20.6	32	27	33.12	46*	16.8/ 22.6	23.8/ 24.6	26.8	31/30	27	30
6	Total Weight	112.8	108.3	112.8	78	113.2	123	118.8	118.8	123	123	123	123	112.8	117	121	128	120	132
7	Braking	D	D	A	A,R	A	A,R	D	D	A	A	A,R	A,R	D	D	D	D	D	D
8	Bogies Arrangment	Co-Co	Co-Co	Co-Co	Bo-Bo	Co-Co	Co-Co	Co-Co	Co-Co	Bo-Bo-Bo	Co-Co	Co-Co	Co-Co	Co-Co	Co-Co	Co-Co	Co-Co	Co-Co	Co-Co
9	Bogies Type	Cast	Cast	Flexi	Fab.	Flexi	Cast	Cast	Cast	Flexi.	Fab.	Fab.	Fab.	Cast	Fab.	Fab.	Fab.	Cast	Cast
10	Gear Ratio	15 62	21.58	23.59	17:35:67	23.58	20.72	17.77/ 15.62	18.64	16.63/ 20.75	16.65	15.77/ 21.107	21.107	16.61/ 21.58	15.62/ 21.58	18.64	16.65	18.64	18.74
11	No. of Traction Motors	6	6	6	4	6	6	6	6	6	6	6	6	6	6	6	6	6	6
12	Traction Motor	TAO659	TAO659	TAO659	6FXA-7059	HS-15250A	6FRA-6068	TAO-659	HS-15250A	ASEAL3 M450-2	HS-15250A	6FRA-6068	6FRA-6068 HT	TAO-659	TAO-659	TAO-659	HS-15250A	HS-15250A	TM-4939 A2
13	Axle Load	18.8	18.05	18.8	19.5	18.9	20.5	19.8	19.8	20.5	20.5	20.5	20.5	18.8	19.5	20.2	21.3	20	22

Chapter 23
GOVERNMENT RAILWAY POLICE

23001: Functions: **The main functions of Government Railway Police are:**

(a) To afford protection to the person and property of passengers;
(b) To maintain law and order at stations and in trains;
(c) To keep platforms clear of idlers, beggars and to keep a look out for suspicious persons, smugglers and persons travelling with arms without licence;
(d) To control transport plying for hire at stations and to enforce the regulations of railway authorities with regard to them;
(e) To bring to the notice of the proper authorities, railway or civil, all offences under the Railway Act, breaches of by-laws and all cases of fraud or oppression on the part of railway subordinates;
(f) To render all possible assistance to passengers and railway officials;
(g) To examine empty carriage on arrival at terminal stations for property left behind by passengers and
(h) To enquire into railway accidents.

23002: Jurisdiction:

The jurisdiction of Government Railway Police is confined to railway limits, i.e to all grounds and buildings within the railway fencing or boundary marks. Residential quarters are ordinarily treated as outside railway limits for the purpose of investigation of offences.

23003: Powers regarding investigation:

(a) All cognizable offences committed within railway fencing or boundary marks or on running trains, shall be registered and investigated by Government Railway Police; cognizable offences committed in or in close proximity of dwelling houses of railway servants shall be taken cognizance of and investigated by the District Police.
(b) Given below is a list of the more common cognizable offences:
    (i) Rioting;
    (ii) Impersonating a public servant;
    (iii) Escape from policy custody;
    (iv) Having in possession or delivering counterfeit coin, knowing it to be counterfeit;
    (v) Spreading infection;
    (vi) Murder;
    (vii) Culpable homicide not amounting to murder;
    (viii) Causing death by rash or negligent act;
    (ix) Attempt to murder;
    (x) Causing grievous hurt;

(xi) Attempt to commit suicide;
(xii) Causing hurt by means of poison etc. with intent to commit an offence;
(xiii) Wrongful restraint or confinement;
(xiv) Assault or use of criminal force to deter public servant from the discharge of his duty;
(xv) Assault or use of criminal force to a woman with intent of kidnapping and abduction;
(xvi) Rape;
(xvii) Unnatural offence;
(xviii) Theft;
(xix) Robbery;
(xx) Dacoity;
(xxi) Criminal breach of trust by a clerk, servant or a public servant;
(xxii) Receiving stolen property or voluntarily assisting in concealment of stolen property;
(xxiii) Cheating by in personation;
(xxiv) Cheating and dishonestly inducing delivery of property;
(xxv) Mischief;
(xxvi) Criminal trespass;
(xxvii) House-breaking;
(xxviii) Counterfeiting currency notes or bank notes;
(xxix) Using as genuine forged or counterfeit currency notes or bank notes;
(xxx) Possession of forged or counterfeit currency notes or bank notes;
(xxxi) Making or possessing instruments or materials for forging or counterfeiting currency notes or bank notes.

(c) In regard to non-cognizable offences, the Government Railway Police are not empowered to undertake investigations unless ordered to do so by a competent Magistrate.

23004: Powers regarding arrest: Section 54 of the Criminal Procedure Code authorises any police officer to arrest without warrant any person who has been concerned in a cognizable offence or against whom a reasonable complaint has been made or credible information has been received or a reasonable suspicion exists of his being so concerned.

23005: Procedure for arrest of railway staff: When the arrest of a railway servant is to be effected, whether by a police officer on his own authority or under orders from a Magistrate, such police officer shall, ordinarily, forward a request to the Divisional Railway Manager or other corresponding authority for the relief from duty of the person so arrested. If the immediate removal from duty of the employee is likely to endanger the safety of the travelling public or be a serious inconvenience to the railway, the arrest shall ordinarily be deferred until the relief is effected. Should it be necessary, however, to place an employee under immediate restraint, he may be arrested and permitted to continue on duty under guard.

23006: Conduct of Police Enquiries: Enquiries in which Railway servants are concerned either as accused or as witnesses should be so conducted as to interfere as little as possible with their railway duties. No person employed by the railway shall ordinarily be required by the Police to leave his duty for the purpose of investigation unless notice has been given to the proper railway authority and reasonable time allowed for his release.

23007: Appearance of Railway officials in court: Section 170 of the Criminal Procedure Code empowers an investigating police officer to take a bond from a railway servant for his appearance in court as an accused person, prosecutor or witness. Section 72 of the same Code does not justify a railway servant in refusing to give such a bond on the ground that he must be summoned through the Head of his office.

23008: Railway servants to assist police: Railway employees must render every possible assistance to the Police in the execution of their duty.

23009: Reporting of criminal cases to Railway Police: (a) In the following cognizable cases under the Railway Act the Station Master or other responsible railway official must ordinarily be the informant under Section 154 of the Criminal Procedure Code.

Section	**Offence**
100	Railway servant drunk on duty.
101	Railway servant endangering the safety of persons.
119	Person entering a carriage or room set apart for (females) women.
120	Passenger intoxicated or committing nuisance.
121	Obstruction to a railway servant in the execution of his duty.
126	Maliciously wrecking or attempting to wreck a train.
127 & 128.	Wilful act of commisson endangering persons travelling on the railway.
129	Rash or negligent act likely to endanger the safety of persons travelling.
130	Minors obstructing the line.

(b) Should the occurrence of a cognizable offence come to the notice of a police officer and the responsible railway official declines to give the information, the police shall proceed according to law bearing in mind that their action should cause the minimum of inconvenience to the

public in general and to railway employees in the performance of their legitimate duties.

(c) When a non-cognizable offence is committed, the Railway should take the initiative if an investigation by the police is desired.

23010: **Arrest by Railway servants:** (a) Sections 131 and 132 of the Indian Railways Act give power to any railway servant to arrest offenders for certain specified offences but in all cases where it is possible to call in the police, the arrest should be made by them and not by a railway servant.

(b) If any person is arrested by a Railway servant, he must be made over to the Police without delay but if the police decline to take over the offender, as they may reasonably do if in their opinion there is no reason to believe that he has committed any offence, he should either be released and a report sent by the railway servant to his departmental superior or the arrested person should at once be produced by the railway servant before the nearest Magistrate.

(c) When once a person has been arrested by the police, no railway servant has power to interfere in any way or order his discharge.

23011: Accidents: The Railway Police are empowered to investigate any accident occurring in the course of the working of a railway. For details see Appendix 'A' of the Accident Manual.

Chapter-24
RESERVATION OF CARRIAGES, SPECIAL AND MELA TRAFFIC

Reservation of carriages:

24001: Application: Applications for reservation of carriage/Tourist car and special trains should be sent to the Principal Chief Operations Manager, North Central Railway Headquarters, Subedarganj, Prayagraj, giving the required minimum/maximum notice, after depositing the necessary advance money as prescribed in the rules. In case the Railway Administration is not in a position to reserve and provide the desired coach/tourist car or to run the special trains due to paucity of coaching stock or some other reasons, the amount deposited by the parties will be refunded in full for which the application should be addressed to the Principal Chief Commercial Manager/N.C.R. Subedarganj, Prayagraj.

24002: Charges: For detailed information regarding terms and conditions and the charges due for various types of coaches/Tourist cars to be reserved and special trains to be run, reference should be made to rule No.305 to 317 and 401 to 408 of I.R.C.A. coaching tariff No. 26 Part I (Volume-I).

Note- Tourists are exempted from paying the deposit for reserved carriages provided:-

(a) They apply through recognised tourist Agents who should give a guarantee to the Railway.
(b) Their journeys are sponsored or recommended by Indian Embassies abroad.

24003: IInd class tourist cars:

(a) Second class tourist cars, specially designed to suit the requirements of marriage, pilgrim and excursion parties are also available for reservation. These tourist cars are stabled at different stations to minimise the empty haulage charges.
(b) Not more than one tourist car can be allotted to a party and the same will not be allotted for period exceeding 25 days.

24004: Haulage: If a particular type of carriage is wanted, the Railway will endeavor to provide the same from the nearest station, where such carriages are stabled and haulage charge will be levied as per rules.

Special and Mela Traffic

24005: **Details to be sent early:** As special measures are necessary to deal with heavy traffic on account of large fairs, religious or social or political gatherings, marriage season, holidays, tourism, exhibitions, test and tournamental matches etc., it is essential to have details concerning such

traffic as early as possible.

24006: Details required: Whenever such special traffic is expected, the Station Master should obtain the particulars noted below and any other information from the local authorities or from the organisers of the event and convey the same to the Divisional Railway Manager concerned, consulting the sectional transportation and Commercial Inspectors:

(a) Duration of the fair or gathering with:-
  (i) Probable dates of commencement and closing and
  (ii) Dates of peak traffic.

(b) Estimated number of the various classes of passengers both inward and outward.

(c) The probable requirement of additional coaching and goods stock.

(d) Approximate timings of arrival and departure of special trains.

(e) R.P.F., Police and Medical arrangements.

(f) Number of tickets required for station stock and for additional booking offices.

(g) Additional requirement for the supply of drinking water and refreshments to passengers.

(h) Particulars of additional staff required.

(i) Particulars of additional stores required.

24007: **DRM to keep Headquarters Office informed:** On receipt of this information, the Divisional Railway Manager will make all necessary arrangements and will provide necessary facilities to deal with the traffic. He should inform the Principal Chief Operations Manager of the exceptional anticipated traffic and seek necessary directions and orders. He should request the Transportation, Commercial and other departments of the Headquarters office for such assistance as may be beyond his control. Except where otherwise authorised, augmenting of trains and running of special trains shall only be done on the specific sanction of the Principal Chief Operations Manager.

24008: Mela Station and the station working rules:

(a) Whether a new station is opened or the existing one remodelled, local peculiarities largely affect the scheme of construction but the main principles in each case are to give:-
  (i) On the Outward Journey:-
    (1) Adequate facilities for quick disposal of trains after unloading.
    (2) Adequate facilities for access from platforms.
  (ii) And on the return journey:-
    (1) Adequate facilities to ensure a quick supply of trains with due regard to the sectional capacity.

(2) Adequate facilities for access to platforms and for regulating the crowds.

(b) After the Mela yard has been laid out or the plan of the same has been approved the T.I. (M) of the section shall be asked to prepare the Station Working rules which must be submitted to the Senior Divisional Operations Manager within the period specified by him.

24009: Transportation Arrangements: The following are some of the points to be kept in view for the proper handling of Special or Mela Traffic:-

(a) Block huts or crossing stations may temporarily be opened to provide greater sectional capacity to permit more trains being run. To get the maximum capacity of a single line section, flow or partial flow system is the best to adopt.

(b) As far as possible and practicable the principal Mela station should be of the terminal type.

(c) The platform at such a station should be long enough to hold at least two rakes, say of 12 bogie search.

(d) Since the newly opened crossing stations are usually non-interlocked, it would be a time saving and safe device to post Station Masters at the outermost facing points and at the station and these SMs be required to exchange Private Numbers of train movements.

(e) If a fair covers a large area, an Area Control may be established which may be connected with the principal points.

(f) As coaching stock is required in a large number, careful planning in this direction is necessary. Some of the expedients to meet the requirements are: -

(i) Asking for assistance from other railways for the Defence Department;
(ii) Cancellation of certain trains on certain non-Mela section;
(iii) Withdrawal of certain coaches from certain trains on non-mela sections;
(iv) postponing of POH attentions and
(v) extensions or diversions of trains or through service coaches to the Mela area.

(g) Initially trains may only be augmented and then diversions or duplications of trains or running of special trains may be resorted to, if and when necessary. Ordinarily a greater number of specials with all second class coaches should be run than upper class specials.

(h) Surplus rakes may be kept at adjoining stations (where the flow of traffic is not heavy), so that they may be commissioned into service when required.

(i) If passenger traffic is expected to be very heavy, it may be worthwhile imposing drastic restrictions on goods traffic and partial restriction on

coaching traffic, viz. Restriction on the booking of reserved and inspection carriages.

(j) During dispersal, the running of specials may be arranged on the following basis:
   (i) Certain slow stopping trains may be run for local short distance passengers.
   (ii) A few fast trains, stopping at large stations only, may be run for long distance passengers.
   (iii) For passengers coming from a greater distance but from roadside stations, a few other specials may be run which may stop at large stations only up to a certain point and then stop at all stations.

(k) Every endeavour must be made to run the Mela Specials to the Scheduled timings.

(l) Control must be kept in touch with regard to the general movement of passengers and the information given to the control must be prompt and accurate.

24010: Other arrangements:-

(a) Special arrangements must be made at large stations for directing passengers at busy periods to avoid over-crowding of circulating areas, platforms and trains.

(b) The A.S.M. Main should be directly connected with telephone with such points as loco shed, control, various enclosures and control towers.

(c) It is necessary to install loud speakers and Public Address system at suitable points for publicity, directions to pilgrims and instructions to staff stationed at distant points.

(d) Well-trained and experienced staff should be selected, preference being given to men who regularly attend such event. If necessary, additional experienced staff of Transportation, Commercial, Security, Stores, Electric etc. branches should be selected or may be borrowed from other Railways or fresh staff recruited.

(e) Clear and concise instructions should be given to the staff concerned, so that misunderstanding and errors may be avoided.

(f) The importance of minimum interference with ordinary traffic facilities should be realised. Regular travellers generally take the view that it is unjust to put them to inconvenience for the sake of the pleasure seeker.

(g) In case of Melas and congregations which recur, the actual working should be clearly studied each time after the event in order to apply the experience gained for future working. It is advisable to prepare a comprehensive note on the subject for future guidance.

(h) Schedules should be carefully arranged in order to secure the fullest possible use of rolling stock, engine power and staff available.

(i) Arrangements should be made to ensure free traffic movement, in order to avoid crowds being held up at barriers awaiting access to trains.

(j) Actual operation of traffic at terminal stations and other important points should be closely watched by responsible officers, so that immediate action may be taken in the event of emergency.

(k) Closest possible co-operation with organisers of the event should be maintained with a view to removing mutual difficulties.

(l) During assemblage and dispersal of passengers, care must be taken that doors of all carriages are properly fastened and that the passengers do not travel on foot boards of carriages.

24011: Supervision:

(a) The supervision of the whole arrangements must be proper and when necessary, one or more officers and inspectors should be detailed for the purpose with specific functions, one of the officers coordinating the entire supervision.

(b) On completion of dispersal, the officer/official in-charge of the arrangements must submit a complete report to the Divisional Railway Manager, with a copy to the Principal Chief Operations Manager.

24012: Advise of running:-

(a) Advise of the running of special trains will be issued to all concerned by the Principal Chief Operations Manager or the Divisional Railway Managers concerned either by a special time table or by a urgent message. The advice issued by the Divisional Railway Managers should include the Divisional Railway Managers of all other divisions over which the train will run and should be endorsed to the Principal Chief Operations Manager.

(b) In the case of train required to proceed over other railways, full particulars must be advised to operating officials of the railways concerned by urgent message, a copy of which should also be addressed to Principal Chief Operations Manager of this Railway.

24013: Special time tables: - Guards and Loco Pilots of trains, when deputed to work a train for which a special time table has been issued, should be supplied with copies of such special time tables.

Chapter -25
MILITARY MOVEMENTS

25001: This chapter is to be read in conjunction with the I.R.C.A. Military Tariff No.6.

25002: Coaching Stock for Military Movements:- (a) Coaching vehicles required for military trains or for the transport of military personnel to reserved carriages are drawn either from general service stock or from military stock, the latter being controlled by Mil rail, Additional Directorate General (Strategic Movements) Branch, Integrated Headquarters of Ministry of Defence (MOD) (Army), Sena Bhawan, NewDelhi-11.

(b) The types of military coaching stock in use and the codes allotted to each type are given in Appendix F of the I.R.C.A. Military Tariff No.6

25003: Military Block Rakes.-(a) A certain number of block rakes consisting partially of military stock and partially of general service stock are earmarked for military personnel trains. These rakes are under the control of Mil rail.

(b) Military block rakes are normally marshalled as follows:-

Engine		
MS	1	Codes may be de-coded
MF	1	
M	3	
ML	1	
M	3	
MF	1	
M	1	
SLR	1	

25004: Military Carrying Capacity: -

(a) The carrying capacity of general service carriages when occupied by troops is given in Rule 9 of the I.R.C.A. Military Tariff No. 6

(b) The carrying capacity of a Military car is 80 Seats/ Berths

25005: Goods Stock for Military Movements: - Goods stock is normally provided by the Railway. However, Milrail controls a certain number of Military DBKM/BOM/MBFU/ MBWT/BWTB/BFAT and Ramp wagons.

25006: Military Train Time-Table: - Time Tables for military personnel, store and vehicle trains are issued from time to time by the Headquarters Office. Like the working time tables they are meant for the use of Railway staff only. The paths provided for the various trains are based on the requirements of the Defence Department. The timings do not allow for crossings between 'UP' and 'DN' military trains and such crossings are required to be arranged by Station Master or by the 'Control', according to rules.

25007: Loads of Military Trains: - The maximum load permitted for military trains on various sections of the Railway is given in appropriate Military Train-Time Tables. Appendix 'C' of the I.R.C.A. Military Tariff No. 6 gives the same information for the Indian Railways.

25008: Ordering of Military Trains: - (a) Requisition for military trains indicating the composition of the trains and the paths to which they should run are placed on the Principal Chief Operations Manager by Milrail. Orders regarding the running of the trains are then issued to all concerned by the Principal Chief Operations Manager.

(b) The following codes are used for the various types of military trains:-

P	–	Personnel
SP	–	Combined personnel and Baggage
CP	–	Combined personnel and Animals
VP	–	Combined personnel and Vehicles
C	–	Live-stock and other Animals
V	–	Vehicles
S	–	Stores
L	–	Petrol, Oil and Lubricants.

25009: Non-adherence to Time-Tables: Military trains may be detained at the starting station or en route to suit the needs of the Defence Department. In such cases the Officer-in-Charge of the train must give a memorandum to the Guard of the train detailing the delays and the Guard must attach this memorandum to his Journal so that the necessary debit may be raised by the Railway against the Defence Department.

25010: Halts for Meals: In the case of military trains running late, halts for meals as authorized, must be arranged in consultation with the Officer-in-Charge of the train.

25011: Military Personnel in Reserved Carriages: (a) Arrangements for the movement of military personnel in reserve carriages may be made by attaching them to Passenger/Mail Express trains by the Principal Chief Operations Manager on receipt of a requisition from Milrail.

(b) The maximum number of reserved military vehicles that can be attached

to train carrying passengers on various railways is given in Appendix 'C' of the IRCA Military Tariff. List of trains on NCR may be given.

25012: In-reports, Out-reports and Passage-reports : To enable milrail to keep a watch on the movements of military coaching stock, particulars of such stock running by ordinary trains or by military trains must be advised to milrail by Station Masters of starting, terminating and interchange stations. This advice must be sent by FAX–supported urgent message in the following form:-

	For Military trains	For military coaches on passenger trains
Out report (by starting Station)	..... special. ..... (Numbers) comprising. ..... bogies and. .....wagons total load. ..... four wheelers left at. .....hrs for. ..... destination Military stock..... (Military number of each vehicle) other stock..... .....(total number of each type).	....(Description & Military No) Left loadedby. .....empty (Train No & date). for. ..... destination.

Passage Report (by Interchange Stations)	Special. .....(number) ex. .....(Starting station to. .....(destination station) left. at. .....hrs.	.....(Description & Military No) booked ex..... (starting station) booked to..... (destination station) left loaded/empty by.....(Train No. & date).
In Report (By Destination Station)	For Military trains ..... special. ..... (Number) ex. ..... (starting station) arrived at. ..... hrs. Military stock..... (Military number of each coach). Other stock..... (Total No. of each type)	For military coaches on passenger trains. ....(Description & Military No) booked ex..... (starting station) arrived loaded/empty by .....(Train No. & date).

25013: Destination Station to stable military stock pending orders from Milrail- Military stock arriving at destination by military or ordinary trains must be stabled till orders for working it away are received from Milrail.

25014: Recovery of cost of damages.-The cost of damages to coaching stock occupied by troops or by animals belonging to the Defence Ministry must be recovered from the Officer-in-Charge of the Military train in accordance with Rule 28 of the I.R.C.A. Military Tariff.

Chapter 26
SHUNTING BY SHUNTING ENGINES/ PILOTS AND TRAIN ENGINES

26001: Shunting Engine programme:

(a) As far as possible, permanent arrangements for daily shunting engine requirements should be made. Where a permanent shunting engine programme cannot be made, the number of engines required and the period for which they are required should be arranged from day today.

(b) A minimum notice of 3 hours must be given to the Section Engineer (Loco) for turning out a shunting engine. A similar notice must be given for cancellation.

26002: Shunting Certificates: -

(a) Shunting Certificates are to be issued by Station Masters or Yard Masters to Loco Pilot of engines for the time occupied in shunting by regular shunting engines and by train engines before and after working trains as well as during the train run. Detailed instructions for the issue of shunting certificates are given in the following paragraphs.

(b) Shunting certificates must be filled in and signed personally by the Station Master or Yard Master on duty and stamped with the station stamp. Detailed remarks must be given in the remarks column to account for any period during which an engine remained inactive.

(c) All shunting certificates must be kept in the personal custody of the Station Master or the Yard Master, as the case may be. Shunting Certificate books must be page numbered before use.

26003: Shunting locos and shunting kilometres-

Shunting hours and shunting kilometres are worked from the shunting certificates in the statistical branch of the headquarters office and the shunting hours are converted into shunting kilometres in the following manner :-

(i) The kilometre of regular shunting engine is to be reckoned at 8 kilometres an hour for the time engines are used for shunting. The kilometrage for fraction of an hour for such engines is to be calculated at the rate of one kilometre for every 8 minutes or part of 8 minutes.

(ii) The kilometrage of Diesel/Electric shunters is to be reckoned at 12 kilometres an hour for the time the Diesel/Electric Engines are used on shunting services. The kilometrage for fraction of an hour for such engines is to be calculated at the rate of one kilometre for every 5

minutes, or part of 5minutes.

(iii) In the case of shunting done on sidings over 0.80 kilometres in length or above, the siding engine kilometres are to be worked out at an average rate of 16 kilometres for Diesel and Electric Engines, per siding engine hour and for fractions of an hour at the rate of 1.3 kilometres for every 5 minutes or part thereof in the case of diesel and electric engines.

Shunting by Shunting Engines:

26004: Engine Exit from shed but not used or used for less than 3 hours: - If an engine is lit up by order of the Traffic Department but not used or used for less than 3 hours, the Loco Department should be given credit for a minimum of 3 hours; the time actually occupied in shunting being covered by a shunting certificate and the extra time required to make up the minimum allowance being entered in the engine ticket.

26005: Shunting engine laid by in traffic yard for short period: - When a shunting engine is laid by in a traffic yard for short periods (not exceeding 3 hrs.), insufficient to justify the return of the engine to its shed, the time for which it is laid by should be treated as shunting hours and included in the shunting certificate.

26006: Shunting engine employed as train engine etc. –

(a) When an engine ordered for shunting is used for a train of any kind or for ballasting, piloting or in any other way, a shunting certificate must not be given provided that the ballasting, piloting etc. commences at the time at which the engine was originally ordered to commence shunting. If, however, the engine is first used for shunting and subsequently employed on some other service, a shunting certificate for the period actually occupied in shunting must be issued.

(b) If a shunting engine works short trips with a train such as a workman's train or a shuttle service beyond the limits of the traffic yard, it must be treated as a train engine for the time so occupied; no shunting certificate is to be issued for such periods.

26007: Shunting in non-traffic premises: When an engine is used for shunting in a yard other than a traffic yard, the shunting certificate must be countersigned by an official of the department concerned.

26008: Shunting in long sidings: In the case of shunting in sidings 0.80 kilometre or above in length, the shunting certificate must show the name of the siding.

26009: Interruption of Shunting owing to reception of trains etc.: If shunting has to be stopped owing to the reception of another train in the yard etc.,

the period for which shunting is so suspended must be included as shunting time.

Shunting by Train Engines:

26010: Loco Pilot not to refuse shunting: Drivers must perform whatever shunting they may be called upon to do. If, however, they consider that such shunting is avoidable, they must report the matter in their engine tickets.

26011: Shunting at engine changing stations: Train engines may be called upon to shunt for the following periods at starting and terminal stations:-

	Passenger and Mixed Train Engines	**Goods train Engines**
Before departure from or after arrival at engine changing stations where shunting engines are available.	Upto 15" for their own trains.	Upto 30" for their own trains.
Before departure from or after arrival at engine changing stations where shunting engines are not available.	Upto 30" for their own trains.	Upto 60" not necessarily for their own trains

A shunting certificate covering the period the train engine is actually employed in shunting must be issued by the Station Master.

26012: Shunting on the run: For shunting performed by train engines on the run, the first 15 minutes are to be ignored and a shunting certificate issued for the remaining time, fractions of 15 minutes being treated as 15 minutes.

26013: Detentions before departure and after arrival for reasons other than shunting: Similarly, if a train engine is detained in a traffic yard after the arrival of its train for a period exceeding 15 minutes, no shunting certificate is to be issued but the detention must be shown on the engine ticket.

Chapter - 27
STATION STORES

Tools and Plants:

27001: Supply:

(a) Indents must be prepared in quintuplicate on the combined requisition and issue-note form: One copy being retained as the station record and remaining 4 copies being sent to the Sr. Divisional Operations Manager (General)/Divisional Operations Manager (General). After the indent has been scrutinized and countersigned by an officer of the Operating Branch, these 4 copies shall be forwarded to the Divisional Material Manager (DMM) concerned.

(b) When supplying the articles indented for, the Divisional Material Manager (DMM) will return one copy of the indent to the station after filling up the issue-note portion. The indenting Station Master must, on receiving the material, enter the Issue-note particulars in the office copy of the indent and forward the issue-note in original to the Sr. Divisional Operations Manager (General)/Divisional Operations Manager (General).

27002: Inventory of Dead Stock:

(a) An up to date ledger record of tools and plants must be maintained on the prescribed form of Inventory of Dead Stock, each article being allotted a separate page or set of pages.

(b) Particulars of receipts, transfers and issues must be entered in this register promptly. In the case of transfers, a note must be made in the remarks column indicating the authority on which the transfer was effected.

27003: Check of tools and plants on relief of Station Masters.-When a Station Master is relieved of his duties on transfer or leave, a list of tools and plants must be prepared by him in duplicate, both copies being signed by the relieving and the relieved Station Master, explanations for every deficiency or damage being recorded. One copy of the list must be sent to the Sr. Divisional Operations Manager (General)/Divisional Operations Manager (General) and the other retained for record.

27004: List of tools and plants: Station Master must display in each room a list of tools and plants provided in that room.

27005: Tarpaulins:

(a) Each tarpaulin issued to a station shall be painted on all the four

corners with the code initials of the station, the divisional serial number and the letters 'NCR'.

(b) Tarpaulins, when not in use, must be neatly folded and stored so as to be protected from fire, damp and white-ants. They must be examined and aired once a week.

27006: Movable Property: The following articles are to be treated as movable property:-

(i) Brake van lamps;
(ii) Locks;
(iii) Destination boards;
(iv) Spare loose couplings;
(v) Breast bars;
(vi) Wagon sheets;
(vii) Lashing ropes;
(viii) Lashing chains and
(ix) Buckets.

27007: Record of Movable Property:

(a) Whenever movable property is dispatched to or received from any station, full particulars of the transaction must be recorded in a register of Movable Property. Each item should be allotted a separate page or set of pages in his register.

(b) Movable Property belonging to a station must, in addition, be accounted for in the same way as other tools and plants.

27008: Loose Breast Bars and other movable property dispatched in vehicles to foreign lines:

(a) When loose Breast Bars and other movable properties are fitted to foreign line vehicles or to N.C.R. vehicles going to foreign lines, the Station Master of destination station must be instructed by FAX and written advice by the sending Station Master to return them to the depot station from where they were obtained. A copy of the written advice must be sent to the Train Examiner as well as to the Station Master of the junction station with foreign line. The Train Examiner will make an entry to this effect in the joint examination report and the Station Master in the movable property register. On return from the foreign lines, these will be dispatched by the Station Master of the junction station to the Station originally issuing them and the particulars of their receipt and dispatch recovered in the movable property register. If the Breast Bars and other movable articles are not received back within a month, the matter must be reported by the Train Examiner and the Station Master to the Divisional

Mechanical Engineer concerned.

(b) **Non-return of breast bars and other movable properties by foreign lines:** On receipt of such reports, the Divisional Mechanical Engineer will write to the concerned official on the neighboring foreign line, pointing out the non-return of the breast bars and other movable property and asking him to accept the bill for the cost of the same, which will also be sent at the same time. Should the foreign Railway still fail to prove the return of the breast bars/other movable property or to accept debit for their cost within two months of the actual date of dispatch, the matter will be reported to the Headquarters Office, giving full particulars.

(c) **Return of foreign line breast bars and manger to parent line:** As breast bars and manger do not form part of the equipment of foreign railway covered wagons suitable for the carriage of live-stock, they will be treated as movable property. Station Masters receiving foreign railway wagons loaded with live stock, the breast bars and mangers of which are not fixtures must, after the animals have been unloaded, remove all breast bars and mangers from the wagons and return them by first train, by the quickest route, to the junction Station Master at which the wagons were received on the outward journey. They must be booked under a free invoice and a remark showing particulars of receipt must be made on the invoice for the guidance of the receiving junction. The junction Station Master will, on receipt, send the breast bars and manger to foreign line station from which the wagons were received loaded, booking them under a free invoice. All transactions must be recorded in a register in the same way as other movable property.

(d) **Loading of return foreign line breast bars:** Return breast bars and mangers must be loaded in road vans with other goods, if direct loaded vehicles are not available. On the outward journey, junctions receiving foreign railway cattle or horse wagons loaded with live-stock for stations on N.C.R., the breast bars and mangers of which are not fixtures, will record particulars of receipt, i.e. number of vehicles, number of breast bars and mangers and station from which received, in the register. Junction and engine changing stations must note in the vehicle summaries, opposite the entry of the vehicles containing livestock, the number of breast bars and mangers that are in each vehicle. Junction stations at which such vehicles are received, will be held responsible for seeing that the breast bars and mangers are received back from destination stations, a written advice being sent calling for their return, if not received within a reasonable time.

Consumable Stores

27009: Supply:

(a) The scale of every item of consumable stores is fixed and supplies are made at fixed intervals by the Stores Department.

(b) When extra supply of any consumable store is required, an indent should be prepared in the same way as for tools and plants, full justification being given for the additional requirement.

27010: Record: An up to date record of all consumable stores must be maintained in the prescribed register of Consumable Stores. Transactions must be recorded daily at large stations nominated by Divisional Railway Manager and monthly at other stations.

Stationery and Forms

27011: Supply of Numbered Books:

(a) Numbered Books are supplied quarterly: The indents must be prepared in duplicate on the prescribed form, one copy being retained for record and the other being submitted to the Superintendent, Stationery. When complying with the indent, the Superintendent, Stationery, will return his copy of the indent to the indenter after filling the particulars of Numbered Books supplied. The Station master of the indenting station must examine the class and progressive numbers of the books and acknowledge their receipt on this copy and return it within one month of its receipt to the Superintendent, Stationery, taking care to record in the remarks column, complete particulars of any discrepancies between the actual receipt and the supplies advised on the form. Irregularities in Numbered Books (money value books) regarding printing, gathering, numbering etc. should also be pointed out at the time of verifying indents.

(b) The indenters should, in the event of surplus stocks with them, prepare the prescribed form in triplicate giving particulars of books returned by them and should also mention the date on which the last number was used to enable the Superintendent, Stationery to get the accounts verified. The particulars of dispatch should also be advised to the Superintendent, Stationery to facilitate that officer to arrange timely delivery.

27012: Supply of durable Articles:

(a) Various durable articles are listed in para 1124 of the State Railway Code for the Stores Department. The following may be indented by Station Masters:-

(i) Baskets, wastepaper;
(ii) Binders (loose leaf);
(iii) Bells, official call;
(iv) Blotters, wooden;
(v) Bloting pads;
(vi) Brushes;
(vii) Clips, paper;
(viii) Ink-pots;
(ix) Knives, desk;
(x) Pad, self-inking;
(xi) Pen racks;
(xii) Pin Cushions;
(xiii) Rulers;
(xiv) Scissors;
(xv) Trays, tin, office;
(xvi) Weights, paper;

(b) Indents for durable articles should be made on the Assistant Controller, Stationery, the procedure being similar to that prescribed for tools and plants.

(c) In the case of new supplies, the indent must be accompanied by a certificate to the effect that the articles indented for are required to replace unserviceable articles. The letter must be returned to the Divisional Material Manager (DMM) concerned under the advice note, with number and date quoted in the indent. The number and date of the indent must similarly be shown on the advice-note.

27013: Six monthly supply of stationery and forms:

(a) All items of stationery and forms, with the exception of numbered books and durable articles, are supplied six monthly by the Superintendent, Stationery on indents submitted annually by stations according to the programme issued from time to time.

(b) Indents for stationery and forms must be made on prescribed forms in duplicate and sent to the Stationery and Forms Inspector, who will make any modifications that appear necessary and after getting both copies countersigned by an Operating Officer, return one to the indenting station and forward the other to the Superintendent Stationery.

(c) Supplies received from the Superintendent, Stationery, must be compared with the relevant indents and discrepancies, if any, reported to the Stationery and Forms inspector within 14 days of the date of their receipt.

27014: Emergent Supplies of Stationery and Forms:

(a) In case a Station Master runs short of stationery or forms before the six-monthly supply is due, he must submit an emergent indent explaining the reasons for the demand.

(b) In case of stationery, emergent indents must be prepared in quintuplicate. One copy being retained for record and the remaining 4 being submitted to the Stationery and Forms Inspector, who will have them forwarded to the Superintendent, Stationery. One copy of the indent will be returned by the Superintendent, Stationery, to the indenting station with the issue-note portion filled in. This copy must be forwarded to the Sr. Divisional Operations Manager (General)/Divisional Operations Manager (General) after the issue-note particulars have been recorded in the Stationery Accounts Register.

(c) Emergent indents for forms must be prepared in duplicate, one copy being retained for record and the other being sent to the Stationery and Forms Inspector, who will arrange to forward it to the Superintendent, Stationery. When complying with the indent, the Superintendent, Stationery will record the supply particulars in an issue note, two copies of which will be forwarded to the indenting station. Receipt of the forms in question must be acknowledged on one of these copies, which should then be returned to the Superintendent, Stationery; the other copy must be submitted to the Sr. Divisional Operations Manager (General)/ Divisional Operations Manager (General).

27015: Record of Stationery and Forms:

(a) A ledger record of the receipt and consumption of numbered books must be maintained, care being taken to see that the serial number of every book received or issued for use is entered in the register.

(b) A record of stationery must be maintained in the Stationery Accounts Register.

Returned Stores

27016: Advice-notes: Whenever stores have to be returned to a Stores Depot, an advice-note in respect of the articles concerned must be prepared in seven foils. One foil is to be retained for record and the remaining six submitted to the Sr. Divisional Operations Manager (General)/Divisional Operations Manager (General). The particulars of the advice-note will be entered in the Register of Advice Notes maintained in the Divisional Office and the serial number of the entry recorded on all six copies, which will thereafter be returned to the station concerned. The serial number given by the Division

will be entered by the Station Master on the station copy of the advice-note and the six foils disposed off, as follows:-

(i) One foil will be forwarded to the Sr. Divisional Operations Manager (General)/ Divisional Operations Manager (General) for transmission to the Stores Accounts Officer concerned;

(ii) The remaining five foils will be submitted to the Divisional Material Manager (DMM) concerned.

27017: Unserviceable tools and plants: When any article becomes unserviceable, a report must be made to the Sr. Divisional Operations Manager (General)/Divisional Operations Manager (General) who will arrange for the article to be examined by an Officer/Inspector and certified as unserviceable, if beyond repair. The article must then be returned to the Divisional Controller of Stores concerned by Stores Delivery Train or Van, an advice-note being at the same time submitted to the Sr. Divisional Operations Manager (General)/Divisional Operations Manager (General), as prescribed in para 27016 above.

27018: Surplus Stores: The Sr. Divisional Operations Manager (General)/ Divisional Operations Manager (General) will issue orders regarding the disposal of surplus stores. If such stores have to be returned to the Stores Branch, the procedure prescribed in para 27017 above for unserviceable tools and plant must be observed.

27019: Empty Containers: Empty tins, wooden packing cases, bottles, cases, baskets and bags in which stores have been received must be preserved and returned once a month through the Stores Delivery Clerk to the stores depot concerned. A list of empties returned must be prepared in triplicate on the prescribed form and all three copies got signed by the Stores delivery Clerk. One copy must be retained for record, one handed over to the Stores Delivery Clerk and three submitted to the Sr. Divisional Operations Manager (General)/Divisional Operations Manager (General).

Inspections

27020: Yearly check of tools and plants: In order that an independent check may be exercised on the stock of tools and plants at stations, the Divisional Office will have yearly count undertaken at each station and will depute Head Stores Clerks, Inspectors or Relieving Station Masters to perform this duty.

Chapter-28
EQUIPMENT OF TRAINS

28001: Braking System: To control speed of trains, four types of braking systems are in use-

1. Mechanical as Hand Brake
2. Hydraulic which is used in Automobile Engines (DSL Engine)
3. Electric as Dynamic braking system (Electric Engine)
4. Pneumatic, which is of two types:
   (a) Air Brake System
   (b) Vacuum Brake System

Automatic Vacuum Brake

28002: Principles:

(a) This brake obtains its power from atmospheric pressure, which is the pressure exerted by air against a body, from one side of which air has been withdrawn either in part or in whole.

(b) Atmospheric pressure, which is 14.7 lbs. per square inch at sea level, progressively decreases on higher altitudes for the purpose of the Automatic Vacuum Brake, however, atmospheric pressure is roughly taken as 15 lbs. per square inch.

(c) This brake stops the train by the application of the brake blocks to the wheels tyre just as is done with the ordinary hand brake, but the power which operates the brake is derived from the pressure of the atmosphere acting on one side of a piston in a cylinder, against a partial vacuum on the other.

28003: The Train Pipe:

(a) The vacuum is created by the Locomotive and the train pipe is connected to the bottom of the Ejector and runs underneath the engine and every other vehicle on the train. The train-pipes of the engine, the tender and the vehicles are coupled together by means of rubber hose pipes and universal coupling, the rear hose pipe of the last vehicle and the front hose pipe of the engine being sealed off by placing them on the dummy plug. The joints between the couplings are made air-tight by means of rubber washers.

(b) The Vacuum Brake Cylinder:

(i) The vacuum Brake cylinder of each vehicle is connected to the train pipe by means of cylinder hose pipes which are very much like the train hose pipe but smaller in diameter. The piston is a loose fit in the cylinder and is fitted with a rubber ring known as

the Rolling ring which rolls between the piston and the cylinder when the piston moves up or down, making a frictionless air-tight joint. Three small holes are drilled through the wall of the piston and on the passage connected with these holes is a small Ball-Valve which permits, air to be drawn out of the space above piston, i.e. from cylinder Barrel & Vacuum chamber space, but does not permit any air to get into this Barrel. The piston rod extends through the base of the cylinder where the air tight packing and guiding arrangement is provided, and works the brake blocks through a brake shaft to which it is connected.

(ii) The space below and above the piston is connected to the train pipe through a release valve and hose pipe syphon. This valve (called Release valve) contains two passages, one large and one small. The large passage, which is always open, leads to the space below the piston while the small passage, which is normally closed by a rubber diaphragm attached to release valve spindle leads to the space above the piston. A spindle (called release valve spindle) extending outside the Release Valve body, permits the rubber diaphragm to be lifted from its seat by the operation of a lever attached to it to equalize the top and bottom pressure in the cylinder.

(iii) An improved type of Brake cylinder known as the 'F' type has been designed to facilitate the examination and renewal of the rolling ring etc. and is fitted with a double Branch Release valve. It functions in exactly the same way as the 'E' type cylinder does, but instead of a dome on top, there is a separate reservoir connected to cylinder serving as vacuum Reservoir. A bottom pan enables the piston to serve as vacuum Reservoir. A bottom pan enables the piston to be removed from the cylinder without its body being dismantled.

(c) **The Loco Pilot's Vacuum Gauge**: This gauge has two pointers. The one on the left indicates the amount of vacuum in the train-pipe which runs the whole length of the train and the other on the right, the amount of vacuum in the vacuum chamber of the engine and tender only. When the brakes are applied, only the left hand pointer indicates a drop in the vacuum. Any fall in the right hand pointer indicates that there is a leakage of air either from outside into the chamber space or there is a leak from the train side to the Chamber side in the engine and tender Brake-cylinders.

(d) The Guard's Van valve and vacuum Gauge:

(i) This valve is fitted on a vertical extension of the main train pipe in the Guard's compartment. It consists of a round Dome and a double head valve which has one top head fitted with a diaphragm, the head resting on the vertical extension of the train-pipe. Through the steam of the valve runs a small hole establishing communication between the brake pipe and the round dome.

(ii) When the Loco Pilot makes a gradual application of the brake, the vacuum in the round dome is destroyed as quickly as that in the train pipe and the valve remains seated on the vacuum gauge pipe. When, however, a sudden application of the brake is made, vacuum is destroyed quickly in the brake pipe, but owing to the small hole in the double-head valve, the vacuum in the round dome is not destroyed so quickly. The momentary higher air-pressure on the train pipe side, therefore, lifts the valve admitting air into the train pipe and augmenting the braking action at the rear end of the train, as soon as the pressure in the train pipe and the round dome become equalised, the valve closes by gravity.

(iii) The valve is also fitted with a hand-lever (called Van Valve Handle) so that the Guard can, when necessary, apply the vacuum brake from his compartment. The Van valve handle when operated lifts the valve from its seat and allows the air to enter and destroy the vacuum. In the Westing house type, the van valve handle operates the valve through a rotating perforated disc which regulates destruction of vacuum.

(iv) The round dome is fitted with a vacuum gauge which has a pointer indicating the amount of vacuum in the train pipe.

28004: Applying the brakes: To apply the brakes, the Loco Pilot moves his handle from the 'Running' position towards the 'ON' position, thus admitting as much air as he considers necessary through the air disc to the train pipe and thence to the bottom of each cylinder. This air lifts the piston and causes the brake blocks to be pulled against the wheel. For a quick emergency stop, the handle is moved to the place marked "ON'. As long as the Loco Pilots handle is between the "Running" and 'ON' position, the brakes will remain on.

28005: (a) Releasing the brakes: To release the brakes the Loco Pilot first pushes his handle into the position marked RELEASE to create vacuum quickly. When about 10" of vacuum has been created, the Loco Pilot puts his handle into the "Running" position which allows the small ejector to create the remainder of the vacuum. In this way vacuum is created quickly and

economically.

(b) The handle of the empty/loaded boxes on Box wagons should be set against the "empty" position when the wagon is empty or when it is loaded partially or when it is loaded with light materials like bamboo etc. so that the gross weight of the Box wagon is not likely to exceed 29 tonnes. The handle of the Box wagon should be set against "loaded" position when the Box wagon is fully loaded or if the gross weight is above 29 tonnes.

(c) The Station Master or the commercial staff responsible for unloading or loading of the wagons should also ensure that the handle of the empty/loaded box is correctly set after unloading or loading and issue a certificate to the guard regarding this.

28006: Releasing brakes of a detached vehicle: When a vehicle is detached from a train, the brakes remain 'on' due to there being air below the piston and vacuum above. In order to release the brakes, the release valve lever is pulled so that communication is established between both sides of the piston. This equalizes the air pressure on both sides of the piston which, there upon, falls to the bottom of the cylinder by gravity.

28007: Train parting: If a coupling breaks and the train parts, the hose pipes become uncoupled. When this happens, air rushes into the train pipe and thence enter the bottom of the cylinders and the brakes are fully applied, bringing both parts of the train to a stand. It is on account of this action that this brake is called "Automatic".

28008: Brake power:

(a) Every vehicle on a Mail, Express and passenger train must be fully vacuum-braked with the vacuum brake system in working order,

(b) All vehicles on mixed and Goods trains must be equipped either with vacuum brakes or with train pipes and the proportion of piped vehicle, including those with ineffective vacuum cylinders, must not exceed the percentage mentioned below. Piped vehicles must be so marshalled that there is at least one active vacuum braked vehicle between every two piped vehicles.

Maximum permissible percentage of piped vehicles and those with ineffective vacuum cylinders is 15%.

28009: Amount of Vacuum to be Maintained: Except on ghat section for which special rules are laid down, the following amount of Vacuum should be maintained in trains fitted with vacuum brake throughout:

Type of Service	In Engine	In Brake Van	Average
Mail/Exp.	53 CM	47 CM	50 CM
Passenger	50 CM	44 CM	47 CM
Goods	46 CM	38 CM	42 CM

Note: (i) The above mentioned vacuum level applies to both the tractions.

(ii) Whenever a coaching train runs initially as passenger and subsequently as Express Service, vacuum levels of such rakes will be maintained as those prescribed on Mail/Exp. Trains.

28010: Precautions before starting:

(A) Check of Locomotive brake system: The Loco Pilot must ensure before leaving shed with engine that Expressor/exhauster and the Locomotive brake system are in good working order.

1. If the required vacuum level is not maintained, then defects of Diesel Engine must be checked through these tests:
   (i) Obstruction Test: Extract one end of Hose pipe and reverse it. If vacuum creates more than 8 cm, then obstruction in system.
   (ii) Efficiency Test: If 8 mm leak plate is inserted then loco will show 53 CM vacuum.
   (iii) For dual braked diesel locomotives, the difference of vacuum level is 5 cm (i.e. 53 cm on 8 mm leak plate and 58 cm on dummy).
   For pure vacuum braked locomotives, the difference of vacuum level is 3 cms (i.e. 53 cms on 8 mm leak plate and 56 cms on dummy)
2. To eliminate possibilities of defects of Diesel Locomotives before starting from loco shed and at the time of creating vacuum in yard, above checks must be done.
3. It is a general phenomena that as load of train increases, vacuum level decreases, this also depends upon the type of Engine and rear load.
4. Without presuming defect in Engine, if less vacuum is created, then the following tests may be done-
   (a) Either Engine may create 45 cms vacuum on 12 mm leak plate/or
   (b) That will create 53 cms vacuum on 8 mm leak plate but on zero mm leak plate i.e. on dummy plate, rate of vacuum drop must be within limit of 8 mm leak plate. Train Engines which create an auxiliary vacuum (58 cms) on dummy and 53 cms on 8 mm leak plate don't fulfill requirements of long load trains because vacuum of such train will drop below 45 cms.

(B) Check the Train before start in the following cases:

(i) At the originating or engine changing station, where there is no train examiner, the Guard and Loco Pilot must jointly check the brake power of the train and visually examine the load for detecting any unsafe wagon.

(ii) At train examining stations, the Train Examiner shall ensure, that the vacuum brake system is in working order and the brake power of the train is satisfactory and within prescribed limit. However, the Loco Pilot shall exercise vacuum leak test to safeguard against vacuum trouble on the run.

(iii) Loads stabled at road side station :

(a) Whenever a through goods train is stabled at a road side station where train examining facilities are not available, the Loco Pilot should hand over the brake power certificate to the Station Master for safe custody.

(b) When the train is to be subsequently cleared, the brake power certificate will be handed over to the Loco Pilot of the outgoing train.

(c) After that, it will be the responsibility of the Guard and the Loco Pilot working the train to ensure that the train has adequate brake power and is safe to run in all respects, before starting.

(iv) Starting a train from Non-Train examination Station or wayside Station after being stabled (including for traction change) or after handling in Goods shed or a siding:

(a) Whenever such a train has to be started from a Non-Train examination Station, the guard and loco pilot of the train shall create requisite amount of vacuum/air pressure on the engine and brake van. In case, the vacuum/air pressure is less than the prescribed level, the loco pilot shall cautiously run the train at a speed at which he can control the train till such time he has conducted the brake feel test.

(b) The brake feel test shall be conducted at the earliest to ensure that the train has adequate brake power to run in a safe manner at normal speed.

(c) In case the incoming train has come with a valid BPC and the rake integrity has not been disturbed beyond permissible limits, the Loco Pilot shall make adequate vacuum and start the train at a cautious speed or at a speed at which he can control the train till he conducts the brake feel test and then proceed normally.

(d) In case the brake power certificate is invalid, the train shall be worked up to the next Train examination station in the direction of movement.

(v) Whenever a load, stabled for more than 24 hours (including for traction change) or whatever time prescribed by the authorized officer at specified stations, is started, following action shall be taken, in addition to the above:

(a) At nominated / prescribed Stations / locations, the authorized staff or traffic staff duly trained, will examine the train from both sides before start, to detect presence of loose or missing fittings etc. that may endanger safety.

(b) In case of other stations/locations, the guard and loco pilot shall examine the train by walking along the entire length of the train, guard on the one side and the loco pilot on the other side, to detect any loose or missing fittings etc. that may endanger safety.

Note- The above items (a) and (b) are not applicable for the loads having valid BPC for the Outgoing examined rakes, like CC, Premium, Agni, King, Rocket etc. in such cases, only the Station Master will record the particulars of the BPC in a register maintained at the station.

(vi) In case the Loco Pilot is unable to create adequate pressure to run the train, even at a restricted speed in either of the situations, (iii), (iv) or (v), mentioned above, the Loco Pilot along with the guard will conduct a joint guard/Loco Pilot check in the Proforma given as under and the Proforma shall be signed by the Loco Pilot and the guard; one copy of this shall be handed over to the Station Master.

Standard GDR Format for Post Loading/Post Tippling/Unloading Checks by the Guard and Loco Pilot and for Stabled Loads more than 24 Hours.

Joint Check Memo of Goods Train by Guard and Loco Pilot.

(Old OPRS-22/MV-5 No....., Date....., Issuing Station/Railway.....)
Station/Railway ....., Date .....
Train No. & Description ....., Total Load .....
From ....., To .....
Loaded at ....., or Tippled/ Unloaded at .....
Engine No. ....., Time of Engine on Load .....
Ready Report at ..... (time)
Vacuum/Air Pressure in Engine ..... Cm-Kg/Cm2, in Brake van Cm-Kg/Cm2

(A) We the under signed have checked the train, walking on either side of the train and confirm that -

1. All CBCs and Air Hoses are properly coupled and locked. - Yes/No.
2. All the Angle Cocks are in open condition. - Yes/No.
3. The last Angle `Cock is in closed condition. - Yes/No.
4. Empty/Loaded device handle is in proper position. - Yes/No.
5. There is no loose fitting/hanging parts like spring push-pull rod, Brake Beam, safety brackets, Brake Blocks etc. which may endanger safe running of the train. - Yes/No.
6. Hand Brakes are released. - Yes/No.
7. All Doors/Hoppers/Covers of wagons are closed and locked/secured. - Yes/No.
8. Checked continuity of air pressure/vacuum before starting. - Yes/No.

(B) In case of invalid BPC-

(1) As per SR 4.31/2 following items should be checked also-
   i) Total number of cylinder.....
   ii) No. of operative cylinders.....
   iii) No. of inoperative cylinders.....
   iv) Percentage of Brake Power .....

(2) The rake is to run up to next examination point for the stock in the direction of movement.

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(Signature of Loco Pilot) (Signature of Guard)

Loco Pilot's Name..... Guard's Name.....

(This memo should be prepared in 3 copies, one copy to be kept with Loco Pilot, one with the Guard and one will be given by the Guard to Station Master/Yard Master)

At locations where TXR is not available, various conditions in which GDR checks have to be conducted by crew along with the prescribed Performa to be filled by train crew post such checks are as under –

1. After Loading/back loading of a rake
2. After tippling
3. After rake is stabled for more than 24 hours
4. If BPC is invalid

Various staff involved to ensure the activities and responsibilities as given below:

A. Guard & Loco Pilot (CREW):

- Henceforth GDR check will be required to be done in all cases of unloading/loading of rakes, irrespective of method of loading/unloading as well as type of BPC, so as to ensure all the doors and fitting of wagons have been properly secured and there is no possibility of them turning loose on run.
- Closure of doors should always be checked by train crew before drawing out a rake from a terminal as part of the prescribed GDR check. Updated Performa to be filled up after GDR check is enclosed herewith.
- Closure of doors should also be checked and ensured during GDR check and same recorded in the GDR memo.

B. Operating and Commercial staff on duty at Sidings/Terminals:

- Release memo of rakes should be accepted by operating/commercial staff only after proper closure of doors has been ensured by the siding/handling agencies.
- This may be explicitly mentioned in the release memos.
- In case it is not feasible to close the doors in the terminal due to doors defects, it should be certified by the railway officials posted in the terminal and C&W attention provided for closing such doors at an operationally convenient location.
- Operating staff concerned shall assure themselves that GDR check has been done before drawal of the rake and GDR memo has been signed as prescribed.

C. Mechanical Dept. Staff:

- TRAIN EXAMINATION YARD STAFF: At the time of rake examination by C&W staff for issue of a fresh brake power certificate, proper closure of doors should be ensured and this should be explicitly mentioned in the brake power certificate issued for all wagon types having doors, like BOXN, BCN, BBRN, BCACBM etc.

  The examination gangs should clearly endorse by hand or by Rubber Stamp the following – 'All doors checked & found working'.
- POH SHOPS, ROH DEPOTS & SICKLINES: During repair/overhaul it shall be ensure that all defects and deficiencies are attended to properly.

Note (1) This certificate is valid up to next TXR examination station where the train

will be offered for examination.

(vii) For this purpose the Loco Pilot will create at least 46 cm. of vacuum on the engine and 38 cm. in the brake van. The Guard, on seeing 38 cms. of vacuum in the brake van, shall show Red Hand signal to the Loco Pilot to destroy the vacuum.

(viii) Load stabled in Yard:

(a) At train examining points, if a goods train, which has been examined by C&W staff, does not leave within 24 hours of examination and certification, the load should be again offered and re-examined by JE/SE(C&W).

(b) The brake test should be carried out again on re-ordering by vacuum exhauster/train engine and fresh certificate issued before departure.

(c) Timely notice of re-ordering should be given to JE/SE (C&W) and all concerned will ensure that the train re-starts punctually at the re-ordered departure time.

(ix) **Change in Composition**:

(a) Whenever, wagons are attached to or detached from a train at a station, the Guard and Loco Pilot should check the train after such change, to ensure adequacy of brake power.

(b) If the number of wagons to be attached is more than 10, they should be examined by the JE/SE (C&W) staff before attaching and a fresh brake power certificate should be issued. This limit can be increased in case of Air Brake loads depending upon creation of adequate Air pressure in the engine and Brake

(c) If the JE/SE (C&W) staff are not available, the fresh brake power certificate should be issued at the next train examining station in the direction of the movement.

(x) In case the requisite amount of vacuum is not available, the Loco Pilot and the Guard must try to locate and rectify the leaks on the vacuum system of the train. Leaks are usually traceable to:

(a) Damaged hosepipes.

(b) Hose pipe coupling not properly connected.

(c) Hose pipe couplings of the last vehicle and the front hose pipe of the engine not properly placed on the dummy plugs.

(d) Damaged or deficient rubber washers.

(e) Loose clips holding hose pipes on Swan Necks.

(f) Junctions of iron pipes secured by means of worn out threads.

(xi) **Checking Brake Power of Trains Before Starting:** OPRS-22/MV-5 shall be maintained separately for Guards and Loco Pilot for goods trains only. These forms shall be prepared in duplicate by carbon process by the train examining staff and presented for signatures to the Guards and Loco Pilots of all trains at:

(a) Starting stations.
(b) Engine changing stations and;
(c) Train Examining stations where the Loco Pilot makes a specific complaint on the reverse of OPRS-22/MV-5 in his possession, issued to him by the Train Examination station with regard to the working of the vacuum brake.

Note: - (1) For passenger trains, one book should be maintained for Guards and Loco Pilot, OPRS-22/MV-5 should be prepared in triplicate by carbon process.

(2) In case of change of train crew en-route, the Loco Pilot /Guard taking over the train must take over OPRS-22/MV-5 relating to his train under acknowledgement to the Loco Pilot/Guard who is being relieved.

(xii) Particulars of vacuum recorded on OPRS-22/MV-5 shall be obtained from an actual vacuum test conducted either with the train engine or a vacuum exhauster.

(xiii) The Train Examiner shall, prior to the arrival of the train engine, fill in the following particulars in the OPRS-22/MV-5 books and sign in full -

(1) Serial No.
(2) Train No.
(3) Date
(4) Load.

The three columns relating to active cylinders, Rolling cylinder and piped vehicles should be filled at the time of testing the train with vacuum exhauster or as recorded at the time of its incoming Examination (Passenger rakes only) or as noted, when tested, by the train engine. The Guard and the Loco Pilot shall ensure (from the entries of OPRS- 22/MV-5) that the No. of active cylinders and piped vehicles are within the prescribed limit.

(xiv) After creation of the required amount of vacuum, the OPRS-22/MV-5 book will be presented separately to the Guard and Loco Pilot, who will fill in the following particulars and sign both copies of the form:

1. Engine No.
2. Time of attaching on load.

3. Time vacuum ready, and
4. Amount of vacuum on the gauge (Guard will mention the amount of vacuum in the rear brake van while the Loco Pilot will mention the amount of vacuum on engine gauge).

(xv) Both the Guard and Loco Pilot will retain the carbon copy of OPRS-22/MV-5 and return the book with original copy intact to Train Examiner/C&W staff.

(xvi) The Guard and Loco Pilot's copy of the OPRS-22/MV-5 will be attached to the Joint Train Journal.

(xvii) If a Loco Pilot or a Guard, after leaving the originating station or at engine changing station, experiences any vacuum trouble, he should record the complaint on the reverse of the form OPRS-22/MV-5 in his possession and make it over to the JE/SE (C&W) at the next Train Examining Station. The JE/SE (C&W) will record the defects rectified and carefully file the same. A fresh certificate on form OPRS-22/ MV-5 shall be issued by the Train Examiner to the Guard and Loco Pilot as detailed in earlier paras.

(C) Check of the number of Vacuum-braked vehicles:

(i) At train examining stations, the Train Examiner shall be responsible for ensuring that the number of vehicles with active brakes operative from the engine is in accordance with para 28008 & 28009. At stations where Train Examiners are not provided, this responsibility shall devolve on the Guard and the Loco Pilot.

(ii) The Guard must record in his Journal as well as in the engine ticket the number of vehicles fitted with automatic brakes operative from the engine and the number of piped vehicles.

(D) The Guard shall not give the signal to start unless he has satisfied himself regarding the brakes of his train and the Loco Pilot shall not start unless he is satisfied that all the brake blocks are not binding on the tyres.

(E) At train originating station or engine changing station where JE/SE (C&W) is available, the Brake continuity test is to be carried out by JE/SE (C&W), otherwise by Loco Pilot and guard. Whenever there is change in train composition by attaching or detaching of Rolling stock at road side stations or a stabled load is started the Loco Pilot and guard should test the Brake continuity and prepare joint certificate in 3 foils i.e. one for Loco Pilot, one for guard and one for station record.

28011: Precautions during the journey:

(a) **Defective Vacuum Brake:** If the Guard of a train, fitted with vacuum

brakes, finds that the gauge on his van shows less than the required vacuum (unless he is satisfied that this is caused by an application of the brake), he must be prepared to apply his hand- brake and advise the Loco Pilot of the defect, at the next stopping station. He must also report the incident in the journal and send a message to the next train examining station ahead to rectify the defect on arrival of the train.

(b) **Failure of Vacuum Brake:** In case of failure of the Automatic Vacuum Brake during the journey, when the defect cannot at once be remedied, the train may proceed cautiously to the next convenient station where the defective vehicles can be re marshalled, detached or otherwise dealt with, the speed of the train being so regulated as to enable the Loco Pilot to have full control of the train by using the hand-brakes. In all such cases, the Guard must be on the alert and assist in stopping the train, with the hand- brake, when necessary. The Guard must also send a wire to the next train examining station ahead for the Train Examiner to attend to the defect.

(c) **Defective Brake Cylinder:** If a vacuum cylinder becomes defective during the journey and it is inconvenient to detach the vehicle, the cylinder should be isolated by disconnecting the cylinder hose pipe from the release valve, plugging its mouth and tying it to the frame of the vehicle. If, however, by doing so, the brake power falls short of the minimum prescribed in para 28009 the Guard must be ready to assist the Loco Pilot in controlling the train by applying the hand brakes.

(d) **Pinning down hand brakes:** Whenever the Loco Pilot requires additional brake power, the Guard must pin down the hand brakes of as many pipe vehicles as the Loco Pilot may consider necessary.

(e) **Checking of Vacuum Brakes after detaching and attaching:** Before starting from a station where any vehicle has been attached or detached, the Loco Pilot and the Guard must satisfy themselves that the Automatic Vacuum Brake is in proper working order and is operative on the requisite number of vehicles.

(f) **Check of Brake Power ON RUN:** Every Loco Pilot, after leaving an engine changing or train examining station or whenever shunting operations have been done on the train, should make a service application of brakes by destroying a few inches of vacuum in order to get the “feel” of the brake power of the train and he should take into consideration this available brake power while controlling his train. Time lost due to this check application of brakes should be made up on the run.

(g) **Testing Vacuum Brake before descents and stoppages:** Loco Pilot, must test the vacuum brake before descending steep declines.

(h) **When descending gradients :** In controlling trains on descending long and heavy grades, Loco Pilots are cautioned against allowing the vacuum above the pistons, to fall too low, which it will do unless periodically restored by blowing up with the Large Ejector. The destruction of vacuum above the pistons, owing to leaks, is always taking place during the continuous application of the brake while descending long down grades and it is of the utmost importance that the vacuum above the pistons should be restored by the use of the Large Ejector. But before using the Large Ejector, the speed should be reduced to allow for the increase of speed which will take place when the Large Ejector releases the brakes. Care should be taken that the speed during the release of the brakes is not allowed to increase beyond a safe limit. Neglect of this rule may lead to a situation of runaway.

(i) **When standing on gradients :** The fact that after the brake has been applied, the vacuum above the pistons gradually decreases, owing to leaks and that in less than half an hour the brakes may leak off together, must not be forgotten, when a train is brought to a stand on a gradient steeper than 1 in 200. In all such cases measures must be taken to guard against the possibility of a runaway. All hand brakes must be applied and if the grade exceeds 1 in 100, one pair of wheels of every third vehicle must be spragged. When ready to start, a proper vacuum must be created and the vacuum brake applied before the hand brakes are released and the sprags removed. Guard should carry the sprags on steep gradient sections.

(j) **Smooth stopping:** When approaching a station at which the train has to stop, the Loco Pilot must destroy at least 5" of vacuum at once. Just before the train comes to a stand, however, the Loco Pilot should put his handle into the "Running" position to release the brakes slightly, in order to prevent a sudden jerk.

(k) **Guards applying Vacuum Brake:** When a Guard has to apply brake in an emergency, he should operate his van valve handle in such a way that about 5" of vacuum is destroyed at once. Thereafter, if necessary, he should apply further vacuum gradually.

(l) **When Double-heading or banking:** (i) when a second leading engine is employed to pull a train (and not a banking engine pushing it), the Loco Pilot of the first leading engine will be held responsible for the working of vacuum brake. The Loco Pilot of the second leading engine must, however, in case of emergency, assist in stopping or reducing the speed of the train by applying the hand brake, as may be required, but he must not maintain or re-create vacuum.

(ii) When additional engines are employed to push a train, the Loco Pilots thereof must not interfere with the working of the vacuum brake, which shall be under the control of the leading engine Loco Pilot as laid down in sub-para (i) above, except in case of a run back, when the rear most assisting engine Loco Pilot automatically becomes the leading Loco Pilot. In such a case, the Loco Pilot of the assisting engine which has become the leading engine, should open his small ejector while the leading engine Loco Pilot (which has become assisting) should close his small ejector, otherwise the assisting engine will be releasing the brakes applied by the leading engine.

(iii) Whenever a ghat section comprises either descending or ascending gradients only and not both in the same direction, the banking engine should be attached as under.

(1) On descending gradient - in front of the train.

(2) On ascending gradient - in the rear of the train.

(iv) Loco Pilot of all additional engines shall, at all times, keep the handle of the vacuum Ejector in the "Running" position and the small ejector must be closed.

(v) In case the Loco Pilot of the engine in rear requires in an emergency to attract the attention of the leading engine Loco Pilot, he shall give a whistle signal as laid down in General Rule 4.46.

(m) When alarm chain is pulled or hose pipe is disconnected, the disc at the end of the coach should be returned to normal position (thereby closing the clappet Valve) by Asstt. Loco Pilot before train is restarted. Similarly hose pipe disconnected should be reconnected by Asstt. Loco Pilot.

In coaches of long trains (over 12 bogies), where conductor, Guard or Coach Attendants or TTEs are posted, immediate steps will be taken by them to set right the alarm chain apparatus. Asstt. Loco Pilot will provide technical assistance to conductor, Guard etc., if needed.

28012: Other Precautions:

(a) In all cases where the vacuum brake is displaced by the hand-brake and the train worked non-vacuum during the journey, the change and the place with Kms where it took place must be noted by the Guard in his journal in the engine ticket.

(b) It is the duty of Train Examiners to rectify any defects in the Vacuum Brake system of passing trains when requested to do so by Guards or Loco Pilot. If the defect cannot be rectified, the vehicle or vehicles concerned must either be detached or labelled to the Train Examiner of the terminal station for attention.

(c) When detaching or attaching vehicles, the Loco Pilot must destroy the vacuum in the train pipe in order to facilitate uncoupling and coupling.

(d) Each Diesel and electric engine Loco Pilot will carry five spare rubber washers and the Diesel Loco Pilot will carry one spare hose pipe (complete with clamps). He must make them over on request to the Train Examiner, Guard or Station Master and obtain a receipt for them. This receipt shall be given to the Section Engineer (Loco), Shed In charge, who shall recoup the number shown thereon.

(e) Each Guard in charge of a wholly or partially vacuum braked train must carry two spare rubber washers.

(f) Staff disconnecting or connecting hose pipes must not have in their hands any waste or cloth which might be drawn into the hose pipe by suction.

(g) Hose pipe couplings must be properly secured on the dummy plugs provided for the purpose.

(h) Vacuum brake cylinders are to be considered effective only if the travel of the piston is within the limits of 9 cm. and 12.5 cm. when a full application of the brake is made. If the travel is less than 9 cm. the brake blocks will not clear the wheels properly when the brake is off and, if it is more than 12.5 cm. the reduction of Vacuum above the piston will weaken the brake power.

NOTE: Piston travel of BCX/BOX when empty is 13 cm. and when loaded is 18 cm.

28013: Rules for Ghat Section: See Appendix 'E' of G&SR book.

28014: Examination of trains before starting:

(a) The station or Yard Master at all coaching and goods maintenance stations must not give permission to start any train originating from and marshalled at those stations until they have received report on Form T/431 (Part-C) from the Train Examiner to the effect that the train is fit to proceed. The Train Examiner will, after examining the train, return Part-C to the Station Master. He will retain Part-B of the form as his record. The SM will attach Part-C of the form to the corresponding counterfoil form Part-A.

(b) In case of coaching stock shuttling between two points less than 240 kms. A part from each other, issue of T/431 will not be necessary on each trip and in such cases, the stock will be offered for C&W Examination on Form T/431 at the maintenance station on the completion trip or after expiry of the validity of MV-5/OPRS-22.

FIRST AID BOXES

28015: Description/Supply:

(a) It shall be made of metal with a felt lined lid fittings well down over the sides so as to be dust proof and should be of a size and pattern approved by the Chief Medical Officer.

(b) Obsolete and sub-standard First Aid Boxes should be gradually withdrawn and replaced with approved ones through the usual manner of procurement from the Stores Department.

(c) Initial supply of First Aid Boxes for all Departments is to be made by the Chief Medical Superintendent through the Divisional Medical Officer concerned. The Chief Medical Superintendent should keep a 10% reserve of the total number of First Aid Boxes required on the Divisions.

(d) Replacement of complete First Aid Boxes after the initial supply will be arranged by the Station Master of Guard's H.Q. stations from the stores Department in the usual manner of procurement.

(e) First Aid Boxes supplied should be sealed by a wax seal bearing clear imprint of the Divisional Medical Officer concerned. This is important to ensure correct maintenance of First Aid Boxes. Divisional Medical Officer will, therefore, ensure that the seal is properly affixed.

(f) The Station Master who receives the First Aid Boxes from DMO will have the name of the Division, Headquarter station and serial number painted thereon.

28016: Use:

(a) Every Guard in charge of a train carrying passengers shall carry a First Aid Box. These boxes will be supplied initially by the Station Master of Guard's HQ station to the Guards as part of their personal equipment. It will be their responsibility to recoup from the Station Master of their Head Quarter station any item that may have been consumed so as to ensure that the contents of the First Aid Box are always complete.

(b) The Station Master of Guard's Head Quarter station will keep a reserve stock of all items of the First Aid box, the quantum of the reserve stock to be kept in respect of each item being determined by the respective Station Master taking into account the average issue, say, over a period of three months.

(c) The Station Master will maintain a register for the purpose of keeping a record of the various items issued to each Guard. For this purpose, a couple of pages in the register will be allotted to each Guard, so that it could be known at a glance as to which items have been issued to each Guard from time to time. The Guard's signatures will be obtained each time he recoups the contents of his First Aid Box from the reserve

stock maintained by the Station Master. The Station Master will recoup his reserve stock once every month from the Sr DMO/DMO at his Headquarter stations. Sr DMO/DMO will indent these items and recoup their stock as usual.

28017: Maintenance and Replenishment:

(a) It will be the responsibility of the Guard to ensure that the boxes are maintained properly and deficiencies are replenished promptly. A Railway Officer, while checking the Guard's equipment, will inspect the First Aid Box, as available with the Guard on duty and in running rooms and ensure that the contents of the First Aid Box are correct as per list. In case he detects any deficiency, he will direct the Guard to have the deficiency replenished from the station master concerned and make a report to Sr DOM (G) for necessary action.

(b) A guard working a train carrying passenger or labourers and provided with a First Aid Box, must also have with him a First Aid book while working such train, which will be supplied by HQ station.

(c) Since such staff only as are qualified in First Aid shall use the First Aid Box, they are expected to know the various uses of the medicines provided in the Box. The following instructions which are kept in the First Aid Box are given for ready reference in case of minor injuries:

(i) A scratch or slight wound: Treat every scratch or slight wound immediately. Apply tincture of iodine over the broken surface once and allow to dry. Do not attempt to wash the wound at all. Apply a 'sterilized dressing'. A bandage can be applied over this dressing, if necessary. Do not touch the part of the sterilized dressing which is put next to the wound. Blood poisoning or septic infection of a wound is caused by introducing germs into it. A sterilized dressing should, therefore, always be used as it is free from germs. Iodine sterilizes the wound and makes any dirt harmless. Hands are never free from germs and should never touch the wound or the part of the dressing to be applied to the wound.

(ii) A burn or scald: Cover the injured part with a dry 'sterilized' dressing according to size. Do not use any oil ointment. Do not prick a blister, except under medical advice.

(iii) A foreign body in the eye: Instill a drop or two of liquid paraffin in the inner side of the lower lid. The eye can then be covered with a pad (e.g. a clean handkerchief folded), which should be gently bandaged on. Seek the advice of the doctor at once. Do not try to remove any particle which cannot be brushed away. To relieve pain give one analgesic tablet by mouth and another after 2 hours,

if necessary.

Portable Control Telephone and Emergency

28018: Control Telephone Equipment (For electrified Section):

Part of Passenger train equipment-

(a) Portable Control Telephone forms a part of brake van equipment in all Mail, Express and Passenger trains over controlled sections and emergency control telephone in electrified sections. These are to be used in cases of accidents and other emergencies with a view to getting medical and other relief in the shortest possible time. It is supplied to the Guard, by the Telecommunication Maintainer on duty or any other official, specially authorised by the Divisional Railway Manager at the starting station.

(b) Guards working such trains must make it a point to ensure that their brake vans are equipped with portable control Telephone Equipment and emergency control telephones in Electrified sections complete in all respects. The Guard of the train as soon as he detects the absence of the Portable control Telephone set, emergency control telephone set and accessories, should immediately issue a message to control as well as Station Master of the nearest junction station who will then ensure supply of the same by contacting the Telecommunication Maintainer /Telecommunication Inspector at the nearest station where spare portable control Telephone sets & emergency control telephones are provided.

(c) The equipment should be sealed at the starting station in the presence of the Guard of the train. Two copies of the certificate to the effect that the equipment is complete in all respects and in good working order shall be prepared by the Signal and Telecommunication staff as per prescribed proforma. One of these copies shall be kept in the portable control telephone & emergency control telephone equipment box before sealing. The other copy will serve as office record of the Telecommunication official concerned.

(d) Portable control equipment/Emergency control telephone must be passed on from Guard to Guard and finally handed over to the Telecommunication Maintainer on duty or any other Official specially authorized by the Divisional Railway Manager at the station up to which the train is scheduled to run. Each guard taking over the train en-route, must sign for the Portable Telephone equipment/ Emergency control telephone in the Rough journal Book of the relieved Guard and the guard making over the equipment to the Telecommunication Maintainer on duty or any other official specially authorized by the Divisional Railway Manager at the destination station must obtain the

latter's signature in his Rough Journal Book.

(e) Guards and Loco Pilot in charge of Mail, Express and Passenger trains must be qualified to use the Portable control Telephone/ Emergency control telephone and must be in possession of the necessary certificate of competency.

28019: Description: The portable control Telephone equipment consists of:

(a) A sealed wooden box containing a portable control type telephone in a leather case and a rig chart in a bound volume showing diagrammatically the position of the control wires on the particular section.

(b) A set of 3 poles with connectors and flexibles. The equipment shall be stenciled with the code name of the Headquarters station, a distinguishing number and the service on which and the stations between which the equipment is scheduled to run.

(c) Emergency control telephone equipment in case of electrified area consists of sealed wooden box containing control telephone with a 6 pin plug which is to be inserted in the emergency socket provided along the track at interval of 0.9 to 1.2KM.

28020: How to use:

(a) The rig chart must be studied to observe the position of the insulators carrying the control wires on the telegraph alignment. Wherever the position of section and Deputy Control wires is clearly indicated by painting of the relevant portions of the telegraph bracket with the colour code (i.e. for section 'red', for deputy 'green') Rig chart may not be provided.

(b) The three poles must be connected together telescopically to suit the height of the control wires. The two prongs provided on the topmost poles should then be hooked to the two control wires and the loose ends of the flexibles attached to the poles should be connected to the terminals marked L1 and L2 on the portable phone.

(c) The hand set key should be pressed to speak. When the call is over, the line wires should be disconnected and the hand set replaced in the box. Taking care to see the cord is not wound over the hand set and that the key does not remain pressed, the leather case and the box should now be closed. The leather case should not be removed from the wooden box.

(d) The Guard or the authorised person using this telephone can check the performance by pressing the key and blowing into the mouthpiece when a sound will be heard.

(e) All equipment, including the poles, should be handled with extreme care.

(f) In electrical areas, emergency socket boxes are provided along the tracks at interval of 0.9 KM to 1.2 KM. Portable emergency telephones are to be plugged into the emergency socket boxes for establishing communication with the traction power controller in emergency. Sockets for emergency telephones are also provided near signal cabins, sub sectioning and sectioning posts, insulated over laps and feeding posts.

(g) When there has been an occasion to use the portable phone/emergency control phone, an all concerned message should be sent giving details regarding work, place, reasons etc. which necessitated its use and action should be taken to have the box resealed.

28021: Inspection:

(a) Telecommunication Inspectors are required to examine Portable Control Telephone/ Emergency Control Telephones once a month and Chief Telecommunication Inspector once in six months.

(b) Separate Signal and Telecommunication staff are posted at various places, wherever justified. They are entrusted with the specific responsibility of checking portable control Telephone/emergency control telephone equipment on trains passing through, terminating or starting from the stations, ensuring that these telephone are in working order.

Fire Extinguishers

28022: Fire Extinguishers:

(i) Every Guard in-charge of a train carrying passengers must carry two fire extinguishers in the brake-van. In addition, each mail van on the train must also have two fire extinguishers.

(ii) The initial provision of fire extinguishers on brackets in brake vans and mail-vans shall be the responsibility of the Train Examiner at the starting station.

(iii) Train Examiners at all starting and terminal stations must inspect fire extinguishers before the departure and after the arrival of each train. They must have in stock a sufficient number of refills to recharge any extinguishers that may have become exhausted or defective. When recharging extinguishers, the instructions supplied with the re-fills must be followed. The station name and the date of recharging must be stenciled on each extinguisher.

(iv) (a) The train examiner at the starting station will place the fire extinguishers in the Guard's brake-van and the Guard must sign for it in a special register to be maintained for the purpose after satisfying

himself that the fire extinguisher is intact and has been recharged within due date. Each guard taking over the train en route will sign for the extinguisher in the relieved Guard's rough journal book. The guard who works the train to the terminal station will then make over the extinguisher to the train examiner, who must be ready to receive it. The train examiner must sign for the extinguisher in the Guard's rough journal.

(b) At terminal stations, where there are no train examiners, fire extinguishers shall be taken over from guards of incoming trains and made over to guards of outgoing trains by the Station Master on duty. A record of each transaction will be maintained by the Station Master.

(c) Fire extinguishers provided in trains proceeding to other Railways must remain in the brake vans and be made over to the other Railway Guard in the usual way, who will acknowledge in writing the receipt of the extinguisher to safeguard against its loss.

(d) In the case of fire extinguishers provided in military and other special trains proceeding to other Railways, it shall be the duty of the train starting station concerned to give a message to the destination stations for the return of the fire extinguishers.

(e) If the train examiner or Station Master of the terminal station does not receive a fire extinguisher from the Guard of an incoming train, the matter must be reported to the Divisional Railway Manager. A similar report must be made by a guard who does not receive a fire extinguisher from the starting station.

(v) Fire extinguishers shall be tested and recharged every year or immediately after use.

Emergency Lighting Kit Boxes

28023: Emergency Lighting Kit Boxes:

(i) Emergency lighting kit boxes are provided in the Guard's compartment by Train Lighting staff so that in case of accidents in the night, some lighting of the area is provided with the help of 110V batteries available on the train before the arrival of ART. All guards have to take thorough training for installing and connecting the search lights and hand lamps provided in this emergency lighting kit box.

(ii) Emergency light equipment boxes will be stocked by the train lighting depots where the primary maintenance of rakes is based. The Train lighting staff on duty will issue the equipment boxes to the Guard of the train under a proper hand over and take over memo. The guard will hand over the equipment box to the train lighting staff either at the terminating station or at the inter-change station, if the train

extends to the other Zonal railways. This will also be done under clear hand-over and take-over memo. The train lighting staff will go to the Guard's compartment for this purpose on arrival of the train.

(iii) The train lighting staff will be responsible for checking the contents and sealing the equipment boxes. Periodical check about proper functioning of equipment shall also be done by the train lighting staff at least at intervals of three months each. The check results shall be maintained in a proper register.

(iv) At the Guard changing station on North Central Railway, the equipment boxes will be properly handed over from one Guard to the other through the guard journal.

(v) For purpose of identification each emergency box would be serially numbered giving the serial number and the home station.

(vi) The loss of the emergency lighting equipment boxes at the stocking station will be the responsibility of the train-lighting staff. The loss of the lighting equipment boxes in the train and its non-return by the Guard to the train lighting staff, will be the responsibility of the Guard. In case a box is not returned by the Guard to the train lighting staff, the matter will be reported by the train lighting staff to Sr DEE(G) who will immediately report the matter to Sr DOM. The Sr DOM will investigate for the loss, sanction the write off if no staff is found responsible or debit the cost of the box to the Guard if the latter is held responsible. The Sr DEE(G) will order for the immediate replacement of the lost equipment boxes and raise the debit of the cost and of the loss against the Guard of the concerned train, if no write off sanction is received from the Sr. DOM within three months of the loss.

(vii) Officers of the Electrical and Operating Departments will make frequent checks of the above boxes along with the records maintained for this purpose, so that they are maintained in good order.

Chapter-29
MISCELLANEOUS

29001: PERIODICAL MEDICAL EXAMINATION:

(These Rules may read in conjunction with amendments carried out from time to time)

Periodical Re-examination of serving Railway employees: Para 514(IRMM)

In order to ensure the continuous ability of Railway employees in class A-1, A-2, A-3, B-1 and B-2 to discharge their duties with safety, they will be required to appear for re-examination at the following stated intervals throughout their service.

(A) Category A-1, A-2, A-3:

(i) At termination of every period of four years, calculated from the date of first medical examination for appointment, until they attain the age of 45 years and then every 2 years until the age of 55 years and thereafter annually, until the conclusion of their service.

(ii) If an employee in medical category "A" has been periodically medically examined at any time within 2 years prior to his attaining the age of 45 years, his next medical examination will be held 2 years from the date of last medical examination and subsequent medical examination every 2 years until 55 years age and then annually thereafter until retirement.

(B) Category B-1 & B-2: **On attaining the age of 45 years and thereafter at the termination of every five years.**

Classification of Staff (Para 510 IRMM):

For the purpose of visual acuity and general physical examination of candidates and of serving Railway employees, the non- Gazetted Railway services are divided into the following broad groups and classes.

Groups Classes: 'A' Vision tests required in the interest of public safety:

A-1	Footplate staff, Railcar drivers and Navigating staff (For footplate staff see Para 520 IRMM).
A-2	Other running staff, shunting staff, Points men, Station Masters and other staff in operative control of signals.
A-3	Loco, signal and transportation inspectors, staff authorised to work trolleys, yard supervisory staff, Road motor drivers and gate keepers on level crossings.

29002: CATEGORISATION OF OPERATING STAFF:

Failures of train passing staff cause resulting serious accident and bring down the reputation of Railways. In this connection, a proper system of maintaining and up-gradation of staff involved in train passing duties is instituted.

In view of the human element being important role in safe train operations, categorization of operating staff is required to be done into A, B, C & D categories. The detailed guidelines issued by Rly. Board are as under-

OBJECTIVE:

- Better and effective monitoring of especially inefficient/identified staff.
- Creating awareness of his own safety category for necessary improvement.
- To closely monitor and initiate necessary action particularly in case of C&D category staff for up-gradation

Method of Categorization:

(1) Categorization will be based on performance for the last six months. The important parameters to be taken into account while analyzing the performance of the employee along with weightage of each is given below. 100 marks are allotted to judge overall performance, as under:

- Knowledge of rules – 25marks
- Alertness and observance of rules – 25marks
- Safety record – 15marks
- Leadership & management – 15marks
- Discipline – 10marks
- Appearance & neatness – 10marks

(2) Staff shall be graded on the basis of total marks obtained as under –

- Category “A” – 80 and above
- Category “ B” – 50 to 79
- Category “C” – 26 to 49
- Category “D” – 25 and below

Note: Alcoholic staff must be categorized under "D" category, irrespective of marks obtained by them in other aspect of working.

(A) System of Gradation will be as under:

SMs will grade - All group "D" staff (Pointsmen/ Gatemen)

Supervisory SS/SMs /TIs will grade- All group "C" staff, including ASMs, AYMs, Shunting Masters, Switchmen, Cabinmen, Lever men.

AOM (G) will grade - Supervisory SS/SMs & TIs

To ensure that the system is fair and objective, the categorization done will be checked and countersigned by the next higher authority within six months.

(B) System of Monitoring:

(i) A register shall be maintained at the station, indicating the category given, based on marks obtained and duly acknowledged by the concerned staff.

(ii) Top sheet should be kept in the register, indicating staff wise and category wise chart.

(iii) Separate page shall be allotted for the 'C' & 'D' category staff.

(iv) Record details regarding appointment, grade, categorization, review of categorization and steps taken regarding counselling/training/ refresher/safety camp and D & AR action etc. for upgradation.

(v) All-out effort shall be made for up-gradation of staff by initiating all possible steps, record of which must be available in the register.

(vi) List of 'C' & 'D' category staff shall be kept under close watch by all inspecting officials and action taken recorded in the register.

(vii) Performance of the employee shall be recorded after every six months and checked by a higher authority once a year.

(viii) All lapses brought out during the inspection shall be recorded in the register by SMs, obtaining acknowledgement of staff.

(ix) Staff classified as 'D' category shall be monitored on a monthly basis. Staff classified as 'C' category shall be monitored on a quarterly basis.

(C) System of up-gradation:

- Input of knowledge, counselling, monitoring shall be done by the next higher authority.
- Safety counsellors must make special efforts for up-grading categories 'C' &'D'
- Attempt shall be made for up-gradation by the next higher authority giving a suitable action plan.
- 'C' &'D' categories must invariably be deputed for safety camp / crash training course and Safety Supervisors shall personally ensure this aspect.

- Inputs given in six months shall be indicated in tabular form in the register and reviewed by the Sr. DOM (G)/ DOM(G) every year.
- Awareness and lapses of 'C'&'D' category staff shall be discussed in each meeting with necessary steps taken for up-gradation.
- 'D' category staff may be directed for the refresher course at frequent intervals with the permission of Sr DOM/G or DOM/G, based on the competence and knowledge seen during the time of analysis.

(D) Inspections: **During inspections, supervisors/officers shall comment on the categorization of staff.**

(E) Advice to Staff: Details of A, B, C & D classification/categorization/review of staff must be notified to the concerned staff under acknowledgement. A register shall be kept in the personal custody of SS being maintained and handled by SS personally.

(F) Awards & Objectives:

1. C & D category staff improving to the level of 'A' category within six months may be issued with appreciation letter.
2. Staff who have constantly maintained themselves in category 'A' should generally be considered for annual safety award.
3. Categorization of staff needs to be considered while filling up annual confidential report.
4. Staff not improving despite adequate attempts need to be viewed seriously and may be considered for retirement as per rules.

29003: General Instructions:

1. Responsibility of supervisors/Depot In charge:

- It will be the personal responsibility of Depot Incharge, Supervisor/TIs also to ensure that the categorization is done strictly on merits/demerits as per procedure in each case with the view to have a realistic assessment of performance.
- Categorization shall be primarily based on field performance and observation of proper procedure.
- They will also responsible for incorrect or unrealistic categorization.
- In case, staff under 'C' & 'D' category cannot be up-graded in spite of necessary inputs/steps taken, a detailed report must be submitted for suitable action, indicating steps taken for up-gradation.

2. Staff should be motivated for up-gradation.

3. Categorization of staff may be considered during transfer, promotion, D & AR action/Registration for transfer etc.

4. Staff must be aware of their present status of categorization. Supervisors/ SSs/ TIs to ensure this aspect.

29004: HOURS OF WORK & PERIOD OF REST-2005 (HWPR-2005): CLASSIFICATION:

All Railway servant governed by the HWPR are classified under any one of the following heads:

(i) Continuous, (ii) Intensive, (iii) Intermittent, (iv) Excluded

(i) CONTINUOUS: The employment of all railway servant shall be deemed to be "Continuous" which are not classified as "Intensive" or "Essentially Intermittent" or "Excluded".

(ii) INTENSIVE: When it is so declared by the Head of the Railway on the ground that work is of a strenuous nature involving continuous concentration or hard manual labour with little or no periods of relaxation. The period of rest, inaction or relaxation does not aggregate 6 Hrs or more in a cycle of 24 Hrs. or in any shift of 8 Hrs, he does not get a period of inaction, rest or relaxation of at least one hour, in the aggregate. (RB No. E (Adj) 8C-L-1A, dated09.07.79)

(iii) ESSENTIALLY INTERMITTENT:
When it is so declared by Head of the Railway on the ground that his daily duty hrs. Include period of inaction aggregating 06 hrs. or more, including at least one period of not less than one hour or two periods of not less than half an hour each, during which the Railway servant is on duty but there is nothing to display either physical activity or sustained.
Such staff cannot be permitted to leave their place of work during rostered duty hours to have their meal with them during the period of inactivity.

(iv) EXCLUDED:
The supervisory staff hold a position of responsibility, having duties of a supervisory character, from the nature of their work & position comparatively free to adjust their hours of duty or work during such hrs. Confidential Capacity, Armed guards, Staff of Rly. School etc. shall be treated as "Excluded"

CLASSIFICATION OF NEW POSTS:

1. In case where no post exists previously at particular stations, the staff should be classified on the basis of classification of similar posts at the adjoining or any other station on the section where conditions of work are similar.
2. In case such a post already exists at the station and additional post is sanctioned to complete 24 hrs. cycle, the additional Railway servant should be classified in accordance with the hours of duty required of each individual post having regard to the work-load.
3. In case, where no such post exists on the division, the staff should

ordinarily be classified as "Continuous" as a tentative measure and the factual job analysis should be conducted immediately to have the final Classification determined and fixed. In cases where additional posts are required to be created under Quantum of work and are to be allowed provisional "Essentially Intermittent"/ "Intensive" classification, according to the work-load of the post, till final sanctions may not be issued or post manned till sanction of the competent authority i.e. GM personally be obtained for allotment of Provisional sanction on the submission of necessary data based on general examination of the work-load.

HOURS OF WORK & PERIOD OF REST:

Under RLT award the hours of work will consist of 42 hrs a week in case of "Intensive Work", 48 hrs a week in case of "Continuous" & "Essentially Intermittent work." In addition to this, time required for preparatory and complementary (P&C) work for those categories of workers who are required to do such work.

In case of "EI", additional hours of work which will be as follows:

Gateman "C", caretaker of rest House, saloon attendant, worker posted at road side station in "EI" roster who are provided with residential quarters within 0.5 KM of their place of duty.

Rest of "EI" Worker - 24 additional hrs. a week.
- 12 additional hrs. a week.

Road side station: The station which is not.

- An important junction station.
- A station with marshalling yard.
- An important terminal station
- A station from which trains are ordered as a regular measure.
- A station where there is separate goods office under a CGC.

Duty roster hours and rest hours:

Summary for hrs of work:

Classification of staff.	**Hrs. of work in case P&C work is less than 15 minutes.**	**Hrs. of work in cases P&C work is assessed to be 15 minutes & above.**	**Statutory limit.**	**Period of Rest**

"Continuous"	8 hrs a day or 48 hrs. a week	8½ hrs a day or 54 hrs. a week where P&C work is assessed to be 15 minutes & above but less than 45 minutes.	54 hrs./ week or 108 hrs./ fortnight.	Rest shall not be less than 30 consecutive hrs. including a full night for running staff at least four period of not less than 30 or at least five periods of not less than 22 consecutive hrs. each including a full night. As above.
"Intensive"	6 hrs. a day or 42 hours a week	--	45 hrs. /week or 90 hrs./ fortnight.	Rest shall not be less than 30 consecutive hours including a full night.
"Essential Intermittent" (a) Gatemen "C", care taker of rest house, saloon attendant, worker posted at road side station who are provided with residential qtrs within 0.5 Km. from their place of duty.	12 hrs a day or 72 hours a week	--	75 hrs./ week.	Rest shall not be less than 24 consecutive hours including a full night.
Excluded	No hours of work prescribed for excluded worker.	---	--	Rest of not less than 48 consecutive hrs. each month or a rest not less than 24 consecutive hours each fortnight.

29005: PERIODS OF DUTY AND REST OF RUNNING STAFF:

1. Running Staff (Traffic & Loco):

(a) As a general rule, running staff should be classified as "Continuous"

(b) Running staff can also be classified as "Essentially intermittent", if their work load warrants such a classification

2. **Limitations of hours of work:** The statutory limit for the hours of employment of running staff classified as "Continuous" has been fixed at 54 hours a week on the average in a month.
3. **Duty Hours:** In the case of Loco and Traffic running staff duty hours should count from signing 'ON' to Signing 'Off'.
4. **Time for signing "Off" and signing "ON":** The time allowed to the Loco and Traffic running staff for signing "ON" and signing "OFF" as indicated below should form part of their duty hours.

For Loco Pilots and Assistant Loco Pilots:

(a) At stations where trains originate or at Loco changing stations, crew shall sign 'ON' in the shed 45 minutes before their engine is due to leave shed or scheduled/expected departure of the train.

(b) Where the shunter and engine turner are provided for taking over Locos from shed and attaching on load, the crew should sign 'ON' 15 minutes before scheduled/expected arrival of the train.

(c) At intermediate station where trains are stopped for change of crew, the crew shall sign 'ON' 10 minutes before scheduled/expected arrival of the train.

(d) The crew shall sign 'Off' 15 minutes after arrival of train or engine in shed.

For Guards:

(a) Mail/Express, Passenger Guards: 30 minutes before the departure of a train for signing 'ON' and 30 minutes for signing 'Off' after arrival of the train.

(b) For Goods Guards:

  (i) At stations where trains originate, Goods Guard shall sign 'ON' 30 minutes before the scheduled/expected departure of train and sign 'Off' 30 minutes after arrival of the train.

  (ii) At intermediate station, where trains are stopped for Guard change, the Guard shall sign 'On' 15 minutes before the scheduled/expected arrival of the train and sign 'Off' 15 minutes after the arrival of the train.

NOTE: At nominated intermediate stations where the goods train is stopped for crew change only, the train should start within 5 minutes after arrival of the train. Such Stations/Yard will be nominated by the authorised officer of the Zonal Railway.

5. **Waiting at a place of duty:** The time during which an employee is waiting at a place of duty and not resting should be included in the hours of employment since the employee is awaiting for such suitable work as the administration may assign to him.
6. **Travelling on duty:** In the case of a running staff, full credit should

be given for the time spent in travelling spare, provided such staff travel beyond 8 Kms. and that travelling facilities are provided viz. crew rest van.

7. **Travelling of spare crew:** With regard to spare crew travelling in crew vans or in reserved accommodation, no credit need be allowed either for halts at stations or when the train is in motion, as they are supposed to be on rest for the whole of the period.
8. **Continual night duty:** In the case of Loco and traffic running staff, continual night duty should not normally exceed six nights at a stretch.
9. **Away from Headquarters:** Loco and traffic running staff should not normally be away from headquarters for more than 3 or 4 days at a stretch.
10. **Periodic and compensatory rest:** The Loco and Traffic running staff may be given 4 periods of rest of not less than 30 consecutive hours each or five periods of not less than 22 consecutive hours each in a month in partial modification of the weekly rest of 30 consecutive hours recommended for continuous workers. Such rest should be given at Headquarters and should always include a night in bed. It should be given as far as possible once every 10 days. To enable staff to make advantageous use of periodic rest, it is desirable that they should be advised of this before its commencement as far as possible.
11. **Rest of running staff:** Rest for running staff should be based on total duty which should be reckoned from signing 'ON' to signing 'Off" and should be as under:
    (i) Rest at Headquarters.
        (a) For duty of less than 8 hrs. – 12hrs.
        (b) For duty of 8 hrs. or more - 16hrs.
    (ii) Rest at out station: They should be allowed 8 hrs. rest of running duty of 8 hrs or more. (Staff may sign for rest to the extent of 6 hrs, if they so desire).

NOTE:

(i) "Running duty" means duty performed from the actual departure of the train from the starting station till the actual arrival of the train at the destination.

(ii) In either case a person should not be called upon to work under 6 hours of rest, except when unavoidable necessity arises, as in the case of accidents or breakdown.

(iii) When a Railway servant performs duty of less than 8 hours referred to in (i) (a) above and the duty performed is less than five hours, the Minimum outstation rest may be less than 6 hours but should not be

less than the total duty plus one hour.

12. **Rest at Headquarters and out-station when working short trips:** The interval between trips shall be treated as "duty", if it is equal to or less than one hour plus time allowed for train or engine attendance after the last trip plus time allowed for train or engine attendance before the next trip, this period being increased at the discretion of the Railway Administration, where local conditions, such as distance of running room from the traffic yard, etc. warrant such an increase.
13. **Duty at a stretch:** In the case of Loco and traffic running staff, running duty at a stretch should not ordinarily exceed 10 hours and they should be entitled to claim relief after 10 hours, provided they have given two hours notice for relief. For the purpose of computing duty at a stretch, time should be calculated from the actual departure of the train.
14. **Permission to Leave Headquarters Station:**
    (i) No essential staff, whether "Off" duty on weekly rest or on leave, should leave their Headquarters station without the permission of their immediate superior. Staff connected with the working of trains are liable to be called on duty at any time and before leaving their home they should, therefore, leave intimation behind as to where they may be found in the event of necessity.
    (ii) The grant of periodic rest does not include permission to leave station. Such permission must be applied for in the usual manner and will be subject to such restrictions as are considered necessary by the immediate superior in the interest of work.
15. **Over time:** General instructions regulating the payment of overtime to staff are given in Chapter VIII of "Hours of work and period of rest and rule regulating provision of Leave Reserves".
    When due to exigencies of service (Circumstances in which overtime is worked are explained in para 98 of Hours of Employment Regulations and Rules regulating provision of Leave Reserves) "Continuous" worker are required under specific authorisation to work beyond the prescribed rostered hours of work under HWPR, they are eligible for payment of overtime according to the prescribed averaging period.
16. **Calculation of hours of duty when booked for other than regular work:**
    The running staff, when booked for the under-noted duties, should be credited daily with the number of hours as shown below in juxtaposition against each duty in the running staff hours of duty register:

(a)	Vision Test	7 hrs. 25 minutes.
(b)	Attending Enquiries	---do---
(c)	Attending Court	---do---
(d)	Attending School for Refresher Courses/ Safety Camp.	---do---
(e)	Attending Divisional Office	---do---
(f)	Booked off for clearing correspondence	---do--- (Credit should be allowed if booked staff are not working on that day. Such cases should be very rare).
(g)	Attending meetings of institutes, Welfare and Debt Committees, Staff Benefit Fund and staff load fund Committees and Staff Council.	7 hrs. 25 minutes
(h)	Learning Road	Actual period from "Signing On to signing Off "
(i)	Station duty	Actual period for which Kept on waiting duty.
(j)	Territorial Army	7 hrs. 25 minutes.
(k)	Suspension	7 hrs. 25 minutes a day subject to maximum of 48 hrs. per week after regularization of the suspension period either as duty or leave.

17. Calculation of overtime: Running staff will be eligible for overtime in respect of additional hours incurred on duty in accordance with "HWPR" as may be in force from time to time laying down the maximum hours of their duty and rates prescribed therein.

Payment of overtime work: The payment of overtime work done by them will be made as under:

(a) For overtime work done by them between the limits of 'Rostered hours', payment will be made at 1.5 times the ordinary rate of pay.

(b) For overtime work done beyond the statutory limits, payment will be made at twice the ordinary rate of pay.

Rostered hours for the purpose of regulating payment of overtime: In case of Running staff other than those who work on fixed roster, the

deemed rostered hours will be 104 hrs. in a "two weekly" averaging period. In the case of running staff, the overtime will be calculated on "two weekly basis" i.e. between rostered hours and the statutory limit at 1.5 times the hourly rate and beyond 108 hrs., at 2 times the hourly rate.

Credit of time spent on leave for the purpose of overtime: Rostered hours should be adjusted in proportion to the days of leave/absence. For example, say actual rostered hours of a staff eligible for overtime on 2 weekly basis are 102 hours for a period of 10 days and he was on duty during the remaining days of the 2 weekly period and actually put in 38 hrs. of work. During the period he remained on duty (i.e. actual working days and of rest, if any) he should have put in 102- 102X10/14 = 30 hrs. of work. Therefore, he is entitled to overtime for 38-30 = 8hrs.

In calculating overtime allowance, no separate credit will be given for the day of rest. Adjustment in respect of the period of unauthorized absence subsequently regularised should be made on the same basis as mentioned above.

In case of running staff, this will be irrespective of whether they work in running or non- running posts, but where the actual duty hours in non-running duties are available in records. Such duty hours will be taken into account where running staff are posted in Stationary post in which overtime accrues on a daily basis. The concerned employee will earn overtime on two weekly basis.

18. **Other Travelling Staff:** The term "Other Travelling staff" applies to Special Ticket Examiner, conductors, van porters etc. Such staff should generally be classified as "Continuous".
19. **Limitation of hours of work:** The statutory limit for the hours of employment of other running staff classified as "Continuous" has been fixed at 54 hours a week on the average in a month.
20. **Waiting at a place of duty:** Provisions of para 5 equally apply in the case of other running staff classified as "Continuous".
21. **Duty Hours:** The duty hours of the other travelling staff include:
    (i) The time from 'Sign on' to 'Sign off', in the case of conductor, TTEs sleeper coaches, parcel delivery clerks, van train clerks, Electric fitters, Safai Wala on running trains, Mid-on Generator staff, AC Coach attendants, AC Incharge and 1st class coach attendants.
    (ii) The time for taking over and making over.
22. **Temporary exemption from periodical rest and rostered hours of employment.**
    (a) Whenever it becomes necessary to grant temporary exemptions from grant of periodic rest specified in section 71-D (1) of the Indian Railway Amendment Act. 1956 and rule 6 of the Rules

made there under subject to the limitation laid down in Rule (8) and to extend the hours of employment specified in section 71-C (1) to 71-(3) in the circumstances specified in section 71-C (4) formal orders should be issued to this effect and register on the form (Specimen at appendix "J") maintained to record the period of such exemptions.

(b) The following officers are authorised to grant temporary exemptions referred to in (a) above:

1. Principal Chief Personnel Officer on behalf of General Manager (Full power)
2. Divisional Railway Manager, Dy. Chief Mechanical Engineer (Workshop) (Full power).
3. Divisional Officer, Subordinate in-charge of Stations, Sheds or other places of work:

(a) Full powers under Section 71-C (4) subject to exception in the notes (1) and (2) below.

Note: (1) In case of casual leave and recognised leave also, power may be delegated, provided that in case of subordinates in charge, it is delegated only to those who are authorised to grant such leave subject to the conditions of availability of relief.

(2) In case of pressure of work the powers of exemption under section 71-C(4) can be delegated to Senior scale Officers only in circumstances other than those, specified below in which case the powers to make exemptions have been delegated to Senior Subordinates:-

(i) In case of sickness
(ii) late running of special trains
(iii) sudden and unauthorised absence of staff and
(iv) late arrival or non-arrival of relief.

(b) In case of accident, actual or threatened or when urgent work is required to be done to the Railway or to rolling stock or in any emergency such as wash aways, derailments, etc. which could not have been foreseen or prevented, staff must be allowed to remain at their posts without any formal orders of the competent authority for so long as required, even if it is beyond their rostered hours of work.

Note: In this rule, the corresponding sections of the hour of employment (Amendment) Act. 1956 have been substituted for those quoted in item (36) of the Delegation of Powers to Principal Officers etc. with a view of make it up to-date.

23. Booking:

(a) Running staff must, as far as possible, be booked for duty on the principle of 'first in first out' due regard being paid to the class of trains which they are qualified to work. Each station where guards are headquartered and each crew lobby must for this purpose maintain a roaster in which running staff must, on arrival with their trains or engines sign their names and enter the time of their arrival.

(b) When a guard, Loco Pilot or Assistant Loco Pilot is to be sent spare by a train, the man due 'out' first must be booked to work the train and the man next for duty booked as "spare". On arrival at destination, the man arriving "spare" must be considered first for duty and the man who worked the train second for duty.

(c) In the case of two men arriving with trains or engines at the same time, the one who has been longer on duty must be booked out after the other.

(d) Men of the Common Roster returning from privilege or sick leave shall be booked out with the first train after midnight following the date on which their leave expires. The names of men of the same Roster returning from casual leave, shall be placed at the bottom of the roster as soon as they report themselves for duty and they shall be booked out in their turn.

(e) Men of permanent link on returning from any leave shall be booked to work the first train of his link that is being worked by a non-link man even when the non-link man is from the relieving list. In case there being two or more trains being worked by non-link men on that day, the permanent link man shall replace the junior most man. Ultimately the junior most man among those temporarily put on higher link shall be withdrawn.

24. Changes in booking:

(a) Running staff shall not exchange their duties without first obtaining permission from the competent official lincharge.

(b) Should a member of the running staff fail to report for duty in time or be taken ill after being booked, the Station Master or Lobby Incharge, as the case may be, must send for the man next in turn for duty according to the roster and recast the roster.

(c) At stations where Station Duty Guards are posted, the Station Duty Guards must be ordered to take the place of an absentee guard and the guard next for duty on the roster be placed on station duty.

(d) Whenever a roster has to be re-cast, all concerned must be

advised in good time of the revised bookings.

25. Duty Roster and Duty Lists :

(a) Duty rosters showing the train each guard is to work, must be kept in the Station Master's office every morning and evening. Similarly duty rosters for Loco Pilot and Assistant Loco Pilot must be pasted every morning and evening in crew lobby.

(b) Duty rosters relating to running staff whose headquarters are at other stations must also be pasted up in the Running Rooms.

(c) Fixed links of guards, Loco Pilots and Assistant Loco Pilots working trains according to such links as prescribed by the Divisional Railway Manager shall be displayed in the Station Master's office/crew lobby and Running Rooms. Any temporary change in the fixed link shall be notified to the guards, Loco Pilots and Assistant Loco Pilots by the Station Masters and Lobby Incharge.

29006: JOINING TIME:

(i) It will be granted to Railway Servants on transfer in public interest.

(ii) It is not admissible in the case of temporary transfer for a period not exceeding 180 days. Actual transit time in the case of journey on transfer/tour shall only be allowed.

(iii) Joining Time shall commence from the date of relinquishment of charge of the old post if the charge is made over in the (F/N) or the following date, if the charge is made over in the (A/N).

(iv) Joining time shall be calculated from old HQ in all cases including where a Railway Servant receives his transfer order or makes over charge of the old post.

(v) Not more than one day of joining time shall be allowed to a Railway Servant to join a new post within the same station or which does not involve change of residence from one station to another station. Same station will be interpreted to mean the area falling within the jurisdiction of the municipality of corporation, including a suburban notified area.

(vi) In cases involving transfer from one station to another station and also involving change of residence, the Joining time shall be, Formula for each payment in lieu of LHAP.

(vii) Allowed with reference to the distance between the old Headquarter to New Headquarter. By direct routes as indicated in the following schedule.

(viii) When holidays followed (S) journey time the normal joining time may be deemed to have been extended to cover such holidays.

Up to 1000 Kms. 10 days.

More than 1000 Kms. but less than 2000 Kms. 12 days.
More than 2000 Kms. 15 days.

(ix) Extension of joining time beyond the limit indicated above, may be granted up to the maximum limit of 30 days by the HOD in HQ office and by DRM in Division and beyond 30 days by the Railway Board.

(x) The total period of joining time should be approximately equal to 8 days for preparation plus reasonable transit time plus holiday, if any, following the extended joining time.

(xi) While computing the transit time allowance could be made for the time unavoidably spent due to duration of transport arrangement caused by strike or natural calamity.

(xii) Reading in leave account with unutilized joining time when Railway Servants joins the new post without availing of the full joining time the numbers of days of joining time as admissible under these rules subject to the maximum of 15 days reduced by the number of days actually availed of shall be credited to his leave account as LAP. It will be credited subject to the usual restriction leave account.

29007: THE RAILWAY SERVICES (CONDUCT) RULES, 1966

1. Short title:

(a) These rules may be called the Railway Services (Conduct) Rules 1966.

(b) They shall come into force at once.

2. Definition : In these rules, unless the context otherwise requires–

(a) 'Government' means, in relation to–

(i) gazetted officers holding posts in the Railway Board, the President;

(ii) other gazetted officers, the Railway Board;

(iii) non-gazetted officers, in the Railway Board, the Secretary, Railway Board;

(iv) other non-gazetted officers in offices directly under the administrative control of the Railway Board, the Heads of the offices concerned and

(v) other non-gazetted officers, the General Managers of the Railway Administrations concerned:

Provided that for purposes of sub-rules (2) and (3) of rule 5, sub-rule (i)of rule 8, sub-rule (i) of rule 10, rule 12, rule 14, **sub-rules (1) of rule 15,** sub-rule (3) of rule 16, sub-rule (1) of rule 19 and rule 21, 'Government' means the Railway Board in the case of all non-gazetted railway servants.

(Authority: Railway Board's letter No. E (D&A) 2006/GS 1-9 dated 01.12. 2006)-ACS NO.-101

(b) "Railway servant" means a railway servant as defined in rule 103 (43*) of the Indian Railway Establishment Code.

*Railway Servant means a person who is a member of a service or who holds a post under the administrative control of the Railway Board and includes a post in the Railway Board. Persons lent from a service or post which is not under the administrative control of the Railway Board to a service or post which is under such administrative control do not come within the scope of this definition.

Explanation – A railway servant whose services are placed at the disposal of a company, corporation, organisation or a local authority shall, for the purposes of these rules, be deemed to be a railway servant notwithstanding that his salary is drawn from sources other than the Consolidated Fund of India.

(c) "means of family" in relation to a railway servant includes–

(i) the wife or husband, as the case may be, of the railway servant, whether residing with the railway servant or not but does not include a wife or husband, as the case may be, separated from the railway servant by a decree or order of a competent court;

(ii) son or daughter or step-son or step-daughter of the railway servant and wholly dependent on him, but does not include a child or a step-child who is no longer in any way dependent on the railway servant or of whose custody the railway servant has been deprived by or under any law;

(iii) any other person related whether by blood or marriage to the railway servant or to the railway servant's wife or husband and wholly dependent on the railway servant.

Railway Ministry's decision: The son/daughter will come within the purview of this rule only if he or she is dependent upon the Railway servant. (E (D&A) 77 GS1-13 dated – 14.07.1977)

3. General – (1) Every railway servant shall at all times-

(i) maintain absolute integrity;

(ii) maintain devotion to duty;

(iii) do nothing which is unbecoming of a railway servant;

(iv) commit himself to and uphold the supremacy of the Constitution and democratic values;

(v) defend and uphold the sovereignty and integrity of India, the security of the State, public order, decency and morality;

(vi) maintain high ethical standards and honesty;

(vii) maintain political neutrality;

(viii) promote the principles of merit, fairness and impartiality in the

discharge of duties;

(ix) maintain accountability and transparency;

(x) maintain responsiveness to the public, particularly to the weaker section;

(xi) maintain courtesy and good behavior with the public;

(xii) take decisions solely in public interest and use or cause to use public resources efficiently, effectively and economically;

(xiii) declare any private interests relating to his public duties and take steps to resolve any conflicts in a way that protects the public interest;

(xiv) not place himself under any financial or other obligations to any individual or organisation which may influence him in the performance of his official duties;

(xv) not misuse his position as railway servant and not take decisions in order to derive financial or material benefits for himself, his family or his friends;

(xvi) make choices, take decisions and make recommendations on merit alone;

(xvii) act with fairness and impartiality and not discriminate against anyone, particularly the poor and the under-privileged sections of society;

(xviii) refrain from doing anything which is or may be contrary to any law, rules, regulations and established practices;

(xix) maintain discipline in the discharge of his duties and be liable to implement the lawful orders duly communicated to him;

(xx) maintain confidentiality in the performance of his official duties as required by any laws for the time being in force, particularly with regard to information, disclosure of which may prejudicially affect the sovereignty and integrity of India, the security of the State, strategic, scientific or economic interests of the State, friendly relation with foreign countries or lead to incitement of an offence or illegal or unlawful gain to any person;

(xxi) perform and discharge his duties with the highest degree of professionalism and dedication to the best of his abilities.

(Authority - Railway Board's letter No. E (D&A) 2014 GS1-3 dated 12.01.2015). ACS no.125

(2) (i) Every railway servant holding a supervisory post shall take all possible steps to ensure the integrity and devotion to duty of all railway servants for the time being under his control and authority;

(ii) no railway servant shall, in the performance of his official duties or in the exercise of powers conferred on him, act otherwise than

in his best judgement except when he is acting under the direction of his official superior;

(iii) the direction of the official superior shall ordinarily be in writing and where the issue of oral direction becomes unavoidable, the official superior shall confirm it in writing immediately thereafter and

(iv) a railway servant who has received oral direction from his official superior, shall seek confirmation of the same in writing as early as possible, whereupon it shall be the duty of the official superior to confirm the direction in writing.

Explanation I – A railway servant who habitually fails to perform the task assigned to him within the time set for the purpose and with the quality of performance expected of him shall be deemed to be lacking in devotion to duty within the meaning of clause (ii) of sub-rule(1).

Explanation II – Nothing in clause (ii) of sub-rule (2) shall be construed as empowering a railway servant to evade his responsibilities by seeking instructions from or approval of a superior officer or authority when such instructions are not necessary under the scheme of distribution of powers and responsibilities.

Railway Ministry's decision: In the light of the provisions of Rule 3(2)(ii) it is impressed upon all Railway servants that–

(i) Oral instructions should not, as far as possible, be issued by senior officers to their subordinates;

(ii) if the oral instructions are issued by any senior officer they should be confirmed by him in writing immediately thereafter;

(iii) if a junior officer seeks confirmation to the oral instructions given by the senior, the latter should confirm it in writing, whenever such confirmation is sought;

(iv) a junior officer who has received oral orders from his superior officer should seek confirmation in writing as early as practicable;

(v) whenever a member of the personal staff of Minister communicates an oral order on behalf of the Minister, it should be confirmed by him in writing immediately thereafter;

(vi) If junior officer received oral instructions from the Minister or from his personal staff and the orders are in accordance with the normal rules, regulations or procedures, they should be brought to the notice of the Secretary or the concerned Members of the Railway Board or the Head of the Department, as the case may be, for information.

(vii) if a junior officer received oral instructions from the Minister or from his personal staff and the orders are not in accordance with

the norms, rules, regulations or procedures, they should seek further clear orders from the secretary, the concerned Member of the Railway Board or the Head of the Department, as the case may be, about the line of action to be taken, stating clearly that the oral instructions are not in accordance with the rules, regulations, norms, or procedures. (No. E (D&A) 78 GSI-9 dt.14-12-1978).

3 A. Promptness and Courtesy:

No Railway servant shall–

(a) in the performance of his official duties, act in a discourteous manner;

(b) in his official dealings with the public or otherwise adopt dilatory tactics or willfully cause delays in disposal of the work assigned to him.

3 B. Observance of Government's policies:

Every railway servant shall, at all times–

(i) act in accordance with the Government's policies regarding age of marriage, preservation of environment, protection of wildlife and cultural heritage;

(ii) observe the Government's policies regarding prevention of crime against women.

(Authority: Railway Board's letter No. E (D & A) 95 GS1-5 dt.14.09.1995)

3 C. Prohibition of sexual harassment of working women:

(1) No Railway servant shall indulge in any act of sexual harassment of any woman at any workplace.

(2) Every Railway servant who is incharge of a work place shall take appropriate steps to prevent sexual harassment to any woman at the workplace.

Explanation. - (I) For the purpose of this rule,-

(a) "sexual harassment" includes any one or more of the following acts or behavior (whether directly or by implication) namely:-

(i) Physical contact and advances or

(ii) a demand or request for sexual favours or

(iii) making sexually coloured remarks or

(iv) showing pornography or

(v) any other unwelcome physical, verbal, non-verbal conduct of a sexual nature.

(b) the following circumstances, among other circumstances, if it occurs or is present in relation to or connected with any act or behaviour of sexual harassment may amount to sexual

harassment:–

(i) implied or explicit promise of preferential treatment in employment or

(ii) implied or explicit threat of detrimental treatment in employment or

(iii) implied or explicit threat about her present or future employment status or

(iv) interference with her work or creating an intimidating or offensive or hostile work environment for her or

(v) humiliating treatment likely to affect her health or safety.

(c) "workplace" includes,–

(i) any department, organisation, undertaking, establishment, enterprise, institution, office, branch or unit which is established, owned, controlled or wholly or substantially financed by funds provided directly or indirectly by the Central Government;

(ii) hospitals or nursing homes;

(iii) any sports institute, stadium, sports complex or competition or games venue, whether residential or not used for training, sports or other activities relating thereto;

(iv) any place visited by the employee arising out of or during the course of employment including transportation provided by the employer for undertaking such journey;

(v) a dwelling place or a house."

(Authority - Railway Board's letter No. E (D&A) 2014 GS1-4 dated 12.01.2015) – ACS No.124

4. Employment of near relatives of railway servants in Company or firm enjoying Government patronage:

(1) No railway servant shall use his position or influence directly or indirectly to secure employment for any member of his family in any company or firm;

(2) (i) No Group A Officer shall, except with the prior sanction of the Government permit his son/daughter or other dependent to accept employment in any company or firm with which he has official dealings or in any other company or firm having official dealings with the Government:

Provided that where the acceptance of the employment cannot await prior permission of the Government or is otherwise considered urgent, the employment may be accepted provisionally subject to the permission of the Government and the fact of such acceptance shall at once be reported to the Government.

(ii) A railway servant shall, as soon as he becomes aware of the acceptance by a member of his family of an employment in any company or firm, intimate such acceptance to the Government and shall also intimate whether he has or has had any official dealings with that company or firm:

Provided that no such intimation shall be necessary in the case of a Group 'A' Officer if he has already obtained the sanction of or sent a report to the Government under clause (i).

(3) No railway servant shall in the discharge of his official duties deal with any matter or give or sanction any contract to any company or firm or any other person, if any member of his family is employed in that company or firm or under that person or if he or any member of his family is interested in such matter or contract in any other manner and the railway servant shall refer every such matter or contract to his superior officer or authority and the matter or contract shall thereafter be disposed of according to the instructions of such officer or authority.

5. Taking part in politics and elections:

(1) No railway servant shall be a member of or be otherwise associated with, any political party or any organization which takes part in politics nor shall he take part in, subscribe in aid of or assist in any other manner, any political movement or activity.

(2) It shall be the duty of every railway servant to endeavour to prevent any member of his family from taking part in, subscribing in aid of or assisting in any other manner any movement or activity which is or tends directly or indirectly to be subversive of the Government as by law established and where a railway servant is unable to prevent a member of his family from taking part in or subscribing in aid of or assisting in any other manner, any such movement or activity, he shall make a report to that effect to the Government.

(3) If any question arises whether a party is a political party or whether any organization takes part in politics or whether any movement or activity falls within the scope of sub-rule (2) the decision of the Government thereon shall be final.

(4) No railway servant shall canvass, otherwise interfere with or use his influence in connection with or take part in, an election to any legislature or local authority. Provided that–

(i) a railway servant qualified to vote at such election may exercise his right to vote, but where he does so, he shall give no indication of the manner in which he proposes to vote or

has voted;

(ii) a railway servant shall not be deemed to have contravened the provisions of this sub-rule by reason only that he assists in the conduct of an election in the performance of a duty imposed on him by or under any law for the time being inforce.

Explanation. – The display by a railway servant on his person, vehicle or residence of any electoral symbol shall amount to using his influence in connection with an election within the meaning of this sub-rule.

Railway Ministry's decision – (1) Railway servants wishing to join the Bharat Sevak Samaj should obtain prior permission from the Head of the Department. This permission will not, however, absolve them from the observance, at all times, of the rules and instructions relating to the conduct and behaviour of the Railway servant.

(E (D & A) 64 GS1 dated – 27.05.1964.)

Railway Ministry's decision – (2) The Railway servants should not only be impartial but they should appear to be impartial in relation to the elections. They should not take part in any election campaign nor should they canvass. They should always take scrupulous care not to lend their names, official position of authority to assist one group as against another. Any disregard of these instructions will be considered as serious act of indiscipline. Their attention is drawn to the provisions in section 134 – A of the Representation of the People Act, 1951 which reads as under:

If any person in the service of the Government, acts as an election agent or a polling agent or a counting agent of a candidate at an election he shall be punishable with imprisonment for a term which may extend upto 3 months or with fine or with both.

(E (D & A) 66 GS1-15 dt. 27.12.1966)

Railway Ministry's decision – (3) Political neutrality of Railway servants—It is essential that Railway servants should not only maintain political neutrality but should also appear to do so and they should not participate in the activities of or associate themselves with any organization in respect of which there is the slightest reason to think that the organization has a political aspect or with organisations banned by the Government.

[E (D & A) 69 GS1-25 dt. 31.01.1970].

(NS Policy/19 dt. 11.03.1976).

6. Joining of Associations or Unions by Railway Servants: No railway servants shall join or continue to be a member of an association or union the objects or activities of which are prejudicial to the interests of the sovereignty and integrity of India or public order or morality.

Note: It is not permissible for a gazetted railway servant to join any association of non-gazetted railway servant like a Railway Employees Union. When a non-gazetted railway servant who is a member of a Railway Employees Union is promoted to gazetted rank, either in an officiating or permanent capacity he shall resign his membership of such Union. If, however, the officer concerned satisfies the General Manager of the railway concerned that by such resignation he will lose financially or otherwise under any beneficent scheme organized by such Union such as death or accident insurance, he may be permitted to continue as an ordinary member but not as office bearer or representative of that Union. The responsibility for satisfying the General Manager in this respect will rest with the officer concerned.

7. Demonstration: No railway servant shall engage himself or participate in any demonstration which is prejudicial to the interests of the sovereignty and integrity of India, the security of the State, friendly relations with foreign states, public order, decency or morality or which involves contempt of court, defamation or incitement to an offence.

Railway Ministry's decision – (1) Where peaceful and orderly meetings or demonstrations are held during the lunch interval without obstructing in any manner the free passage to and from the office, there would be no objection to the holding of such meetings or demonstrations nor would the participating staff render themselves liable to disciplinary action thereby. The same position will apply in respect of peaceful and orderly meeting and demonstration during half an hour interval prior to the start of working hours and the half an hour interval succeeding the close of working hours.

Railway Ministry's decision – (2) The position regarding the scope of this Rule is clarified as under:

(i) Demonstration, meetings and processions, which are orderly and peaceful and are held outside office premises and outside working hours, should not be interfered with.

(ii) The wearing of badges while at work should not be interfered with unless the badges have inscriptions or slogans which may offend against the interests of the sovereignty and integrity of India, the security of the State, friendly relations with foreign states, public order, decency or morality or which may amount

to contempt of court, defamation or incitement to an offence. The colour of the badge or arm band should not be considered in any case.

(iii) Demonstration or the raising of slogans or other such disorderly conduct should not be permitted within office premises and disciplinary proceedings should be started against those found indulging in such action within office premises.

(No. E (D & A) 63 GS1-3 dt. 27.04.1964.)

Railway Ministry's decision – (3) It will be in order to take disciplinary action in respect of demonstration anywhere, even far away from office premises and at any time even on a holiday, resorted to by a railway servant, even in the capacity of a Trade Union worker, if that activity could be proved to be one falling within the prohibitive activities listed in this rule.

(No. E (L)66 UT 1-79 dt. 12.01.1966.)

Railway Ministry's decision – (4) Peaceful and orderly meetings and demonstrations held during lunch intervals of during half an hour interval prior to the start of working hour and the half an hour interval succeeding the close of the working hours, without obstructing in any manner the free passage to and from the office do not infringe the provisions under this rule.

(No. E(L) 77 UT 1-79 dt. 26/28.07.1967.)

Railway Ministry's decision – (5) The principle of 'No work no Pay' should not be circumvented in any way including by grant of leave to a railway servant for the period of absence caused due to participation in a strike.

(No. E(LR) II77 ST 1-126 dt. 15.07.1978.)

Railway Ministry's decision – (6) If an application for casual leave is presented by a railway servant specifically for the purpose of participation in a demonstration, it is open to the competent authority to refuse casual leave for this purpose. If in spite of refusal and employee absents himself from duty, he can be treated to have been unauthorisedly absent, with all the attendant consequences of unauthorised absence.

(No. E (G) 79 LE 1-10 dt. 19.06.1980.)

8. Connection with press or other media :

(1) No Railway servant shall, except with the previous sanction of the Government, own wholly or in part or conduct or participate in the editing or management of, any newspaper or other periodical publication or electronic media.

(2) Nothing in sub-rule (1) shall apply in case a Railway servant in

the bonafide discharge of his official duties publishes a book or participates in a public media.

(3) A Railway Servant publishing a book or participating in a public media shall, at all times, make it clear that the views expressed by him are his own and not that of Government.

(Authority: Railway Board's letter No. E (D&A) 95 GS 1-6 dated14.09.1995)

9. Criticism of Government : No railway servant shall, in any radio broadcast, telecast through any electronic media or in any document published in his own name or anonymously, pseudonymously or in the name of any other person or in any communication to press or in any public utterance, make any statement of fact or opinion–

(i) which has the effect of an adverse criticism of any current or recent policy or action of the Central Government or State Government ;

(ii) which is capable of embarrassing the relations between the Central Government and the Government of any State or

(iii) which is capable of embarrassing the relations between the Central Government and the Government of any foreign State:

Provided that nothing in this rule shall apply to any statement made or views expressed by a railway servant in his official capacity or in the due performance of the duties assigned to him.

Railway Ministry's decision: Serving Railway employees, if they, in their individual capacity or in their capacity of office bearer of association (including federation/unions of railway employees) or editor/publishers office bearers of journals issued by such association (including federation/union) pass resolutions making statement and/or expressing opinion on issues which involve violation by the individual employees of this Rule become liable for disciplinary action.

(E (D&A) 68GS1-6 dt. 24.06.1968.)

10. Evidence before Committee or any other Authority:

(1) Save as provided in sub-rule (3) no railway servant shall, except with the previous sanction of the Government, give evidence in connection with, any enquiry conducted by any person, committee or authority.

(2) Where any sanction has been accorded under sub-rule (1), no railway servant shall in the course of giving such evidence criticise the policy or any action of the Central Government or of a State Government.

(3) Nothing in this rule shall apply to–

(a) evidence given at any enquiry before an authority appointed

by the government, Parliament or a State Legislature or

(b) evidence given in any judicial inquiry or

(c) evidence given at any departmental inquiry ordered by authorities subordinate to the Government.

11. Communication of Official Information: Every Railway servant shall, in performance of his duties in good faith, communicate information to a person in accordance with the Right to Information Act, 2005 (22 of 2005) and the rules made thereunder:

Provided that no Railway servant shall, except in accordance with any general or special order of the Government or in performance in good faith of the duties assigned to him, communicate, directly or indirectly, any official document or any part thereof or classified information to any Railway servant or any other person to whom he is not authorised to communicate such document or classified information."

(Authority: Railway Board's letter No. E (D&A) 2005/GS1 dated 21.02.2006) - ACS No.97

12. Subscription: No railway servant, shall, except with the previous sanction of the Government or of the competent authority, ask for or accept contributions to or otherwise associate himself with the raising of any funds or other collections in cash or in kind in pursuance of any object whatsoever.

Railway Ministry's decision – (1) The association of Railway servants with the selling of tickets for charity show or for any purpose whatsoever attract the provisions of this rule and prior permission of the Government would be necessary for this purpose. Sale of Tickets by Railway employees to the members of the general public is likely to invite public criticism and should not be permitted.

(E(D&A) 68 GS 1-7 dt 19/22.08.1968.)

Railway Ministry's decision – (2) The powers under this Rule may be exercised by the General Managers in respect of all staff working under them for collection of subscription for celebrating religious festivals only. Permission should be given on the specific conditions that only voluntary subscription are collected and no pressure of any kind is brought on them on the collection of these funds.

(E(D&A) 68 GS1-7 dt.30.01.1969.)

13. Gifts – (1) Save as provided in these Rules, no Railway servant shall accept, or permit any member of his family or (any other person acting on his behalf) to accept, any gift.

Explanation —The expression "gift" shall include free transport, boarding, lodging or other service or any other pecuniary advantage provided by any person other than a near relative or personal friend

having no official dealings with the govt. servant.

Note: (1) A casual meal, lift or other social hospitality shall not be deemed to be a gift.

Note: (2) A Railway servant shall avoid accepting lavish hospitality or frequent hospitality from any individual, industrial or commercial firms, organizations, etc. having official dealings with him.

(2) On occasions such as weddings, anniversaries, funerals or religious functions, when the making of gift is in conformity with the prevailing religious and social practice, a Railway Servant may accept gifts from his near relatives or from his personal friends having no official dealings with him, but shall make a report to the Government, if the value of such gift exceeds–

(i) rupees twenty five thousand in the case of a Railway servant holding any Group 'A' post;

(ii) rupees fifteen thousand in the case of a Railway servant holding any Group 'B' post;

(iii) rupees seven thousand five hundred in the case of a Railway servant holding any Group 'C' post.

(Authority - Railway Board's letter No. E (D&A) 2014 GS1-3 dated 12.01.2015)... ACS No.126

(3) In any other case, a Railway servant shall not accept any gift without the sanction of the Government if the value exceeds–

(i) rupees one thousand and five hundred in the case of Railway servants holding any Group 'A' or Group 'B' post and

(ii) rupees five hundred in the case of Railway Servants holding any Group 'C' or Group 'D' post.

(Authority: Railway Board's letter No. E (D&A) 2004/GS1-2 dated 15.03.2004)—ACS NO.91

(4) Notwithstanding anything contained in sub-rules (2) and (3), a Railway Servant, being a member of the Indian delegation or otherwise, may receive and retain gifts from foreign dignitaries if the market value of gifts received on one occasion does not exceed rupees one thousand. In all other cases, the acceptance and retention of such gifts shall be regulated by the instructions issued by the Government in this regard from time to time.

(5) A Railway Servant shall not accept any gifts from any foreign firm which is either contracting with the Government of India or is one with which the Railway servant had, has or is likely to have official dealings. Acceptance of gifts by a Railway servant from any other firm shall be subject to the provisions of sub- rule (3).

(Authority: Railway Board's letter No. E (D&A) 96 GS 1-8 dated

17.01.1997.)

Railway Ministry's decision–1: The acceptance of tips is misconduct and may be treated as a good and sufficient reason for taking disciplinary action.

(E (D&A) 61 GSI-15 dt. 19.09.1961.)

Railway Ministry's decision–2: Gifts received or given by a railway servant in the form of cash attract the provisions of the Rule even though it is a transaction between father and son.

(E(D&A) 64 GS1-5 dt. 25.02.1965.)

Railway Ministry's decision–3: Receipt of presents by Railway servants at the time of their marriage in form of cash, ornaments, cloths or other articles, otherwise than as consideration for marriage, from relative and personal friends and others will be regulated by the above Rule. Purchase of items of movable property for giving presents at the time of marriage or on other occasions will be regulated by Rule 18 (3), like any other transaction of movable property.

(E (D&A) 65 GS1-12 dt. 23.04.1966.)

(E (D&A) 65 GS1-20 dt. 07.07.1970.)

Railway Ministry's decision–4: Making or acceptance of gifts amongst "Near Relatives" which include father, mother, son, daughter etc. requires the approval of the competent authority in terms of sub rule (5) above.

(E (D&A) 69 GSI-20 dt. 05.01.1970.)

Railway Ministry's decision – 5: The following are the instructions in regard to receipt, retention and disposal of gifts of high valuation received by Railway servants from foreign dignitaries and foreign firms.

1. The presents of symbolic nature like a ceremonial sword, ceremonial robe etc. may be retained by the recipient.
2. The gifts of the value not exceeding Rs. 1000/- may also be retained.
3. Railway servant shall report the receipt of gifts, the value of which exceeds Rs. 1000 to the department indicating the value. The Department will refer the matter to Toshakhana for valuation of the gifts. If it is found that the value is Rs.1000/-or less the gift will be returned to the recipient. If however, the value exceeds Rs. 1000/- it will be retained by in Toshakhana and the receipient will, have the option to purchase it from Toshakhana by paying the difference between the value as estimated and Rs. 1000/-.
4. Acceptance of gifts from foreign firms with whom the Railway servant has had or has or is likely to have official dealing either, directly or indirectly by virtue of his official position as well as

acceptance of gifts from firms which are contracting firms with the government are prohibited.

(E (D & A) 76 GSI-31 dt. 22.12.1976.)

13-A. Dowry: No Railway servant shall —

(i) give or take or abet the giving or taking of dowry; or

(ii) demand directly or indirectly, from the parents or guardian of a bride or bridegroom, as the case may be, any dowry.

Explanations:- For the purpose of this rule 'dowry' has the same meaning as in the Dowry Prohibition Act, 1961.

In this Act, "dowry" means any property or valuable security given or agreed to be given either directly or indirectly—

(a) by one party to a marriage to the other party to marriage; or

(b) by the parents of either party to a marriage or by any other person, to either party to the marriage or to any other person; at or before or after the marriage as consideration for the marriage of the said parties but does not include dower or mahr in the case of persons to whom the Muslim Personal Law (Shariat) applies.

Explanation I – For the removal of doubts, it is hereby declared that any presents made at the time of a marriage to either party to the marriage in the form of cash, ornaments, clothes or other articles shall not be deemed to be dowry within the meaning of this section, unless they are made as consideration for the marriage of the said parties.

Explanation II – The expression "Valuable security" has the same meaning as in Section 30 of the Indian Penal Code.

14. Public demonstrations in honour of Railway servants : No railway servant shall except with the previous sanction of the Government receive any complimentary or valedictory address or accept any testimonial or attend any meetings of entertainment held in his honour or in the honour of any other Government servant :

Provided that nothing in this rule shall apply to–

(i) a farewell entertainment of a substantially private and informal character held in honour of a railway servant or any other Government servant on the occasion of his retirement or transfer or any person who has recently quit the service of any Government; or

(ii) the acceptance of simple and inexpensive entertainments arranged by public bodies or institutions.

Note: Exercise of pressure or influence of any sort on any railway servant to induce him to subscribe towards any farewell entertainment even if it is of a substantially private or informal character and the collection of subscriptions from Group 'C' and Group 'D' employees

under any circumstances for the entertainment of any railway or other Government servant not belonging to Group 'C' and Group 'D' is forbidden.

Railway Ministry's decision – 1: Officers in Group 'A' service upto the J.A. Grade should furnish promptly particulars of all invitations received by them from foreign missions in India and accept them only after obtaining the necessary clearance from the Railway Board. Officers in Group 'B' service and below are debarred from accepting such invitations except in very rare cases. All officers, so permitted, should submit a list of any important and interesting talks or other discussions held with the representative of the foreign mission on matters of interest to the Railway Board.
(E (D&A) 57 GSI-3 dt. 08.01.1957.)

Railway Ministry's decision – 2: Railway servants should refrain from associating themselves with functions inappropriate and inconsistent with the rule of detached impartiality such as to declare buildings etc. open or to lay the foundation stones of new buildings or to allow roads, bridges, parks or public institutions such as hospitals, schools or colleges to be named after them. When occasions which have a cultural and sociological significance arise, especially in remote areas, prior permission of their superior officer should be obtained.
(E (D&A) 60 GSI-8 dt. 27.03.1961.)

Railway Ministry's decision – 3: While no subscription should be collected from class III and class IV staff when any entertainment is held in honour of a Class II or Class I Officer it is not the intention of the rule that when an entertainment is held in honour of Class III/Class IV staff, a class I or class II Officer should not attend the function as a guest by invitation or on a contributory basis.
(E (D&A) 60 GSI-8 dt. 04.11.1967.)

15. Private trade or Employment –

1. Subject to the provisions of sub rule (2) no Railway Servant shall, except with the previous sanction of the Government–

(a) engage directly or indirectly in any trade or business or

(b) negotiate for or undertake, any other employment or

(c) hold an elective office or canvass office for a candidate or candidates for an elective office, in any body, whether incorporated or not or

(d) Canvass in support of any business of insurance agency, commission agency, etc. owned or managed by any member of his family or

(e) take part except in the discharge of his official duties, in the registration, promotion or management of any bank or other company registered or required to be registered, under the Companies Act, 1956 (1 of 1956) or any other law for the time being in force or of any co-operative society for commercial purposes.

(f) participate in or associate himself in any manner in the making of-

i. a sponsored media (radio or television) programme or

ii. a media programme commissioned by Government media but produced by a private agency or

iii. a privately produced media programme including video magazine;

Provided that no previous permission shall be necessary in case where the Railway Servant participates in a programme produced or commissioned by Government media in his official capacity.

(Authority: Railway Board's Letter No. E (D & A) 96GS1-8 dated 07.01.1997)

2. A railway servant may, without the previous sanction of the Government–

(a) undertake honorary work of a social or charitable nature or

(b) undertake occasional work of a literary, artistic or scientific character or

(c) participate in sports activities as an amateur and

(d) take part in the registration, promotion or management (not involving the holding of an elective office) of a literary, scientific or charitable society or of a club or similar organisation the aims or objects of which relate to promotion of sports, cultural or recreational activities, registered under the Societies Registration Act, 1860 (21 of 1860) or any other law for the time being in force or

(e) take part in the registration, promotion or management (not involving the holding of an elective office) of a co-operative society substantially for the benefit of railway servants, registered under the Co-operative Societies Act, 1912 (2 of 1912) or any other law for the time being in force.

Provided that:–

i. he shall discontinue taking part in such activities, if so directed by the Government and

ii. in a case falling under clause (d) or clause (e) of this sub-rule, his official duties shall not suffer thereby and he shall, within

a period of one month of his taking part in such activity, report to the Government giving details of the nature of his participation.

3. Every railway servant shall report to the Government if any member of his family is engaged in a trade or business or owns or manages an insurance agency or commission agency.
4. Unless otherwise provided by general or special orders of the Government, no Railway servant may accept any fee for any work done by him for any private or public body or any private person without the sanction of the prescribed authority.

Explanation –The term 'fee' used here shall have the meaning assigned to it in Rule 103(18)-R.I.

Railway Ministry's decision – (1) It is not permissible for a Railway servant to take an Insurance Agency in his own name and canvass for the same.

(E (D&A) 58 GSI-40 dt. 07.03.1958.)

Railway Ministry's decision – (2) Railway servants should not ordinarily be allowed to accept part time employment whether under Government or elsewhere, even though such employment is after office hours.

(9E (D&A) 58 GSI-29 dt. 16.01.1959.)

Railway's Ministry's decision – (3) Railway servants, holding recognized qualification for any system of medicine may be granted permission by the Heads of Departments to undertake medical practice during spare time, on a purely charitable basis without detriment to his official duties. This will not apply to those who possess the qualification and are employed as physicians, surgeons etc., on the Railways.

(E (D&A) 64 GSI-5 dt. 30.5.64 and 10.11.1965.)

Railway's Ministry's decision: (4) No railway servant should negotiate for commercial employment during service without obtaining the prior permission of the Head of the Department and such permission should not be given unless there are any special reasons for doing so.

(E (G) 6 EM 1-2 dt. 26.03.1966.)

15-A. Sub-letting and vacation of Government accommodation.

(1) Save as otherwise provided in any other law for the time being in force, no Railway servant shall sub-let, lease or otherwise allow occupation by any other person of government accommodation which has been allotted to him.

(2) A Railway servant shall, after the cancellation of his allotment of

Government accommodation vacate the same within the time-limit prescribed by the allotting authority.

(Authority: Railway Board's letter No. E (D&A) 96 GS1-8 dt. 17.01.1997.)

16. Investment, lending and borrowing :

(1) No Railway Servant shall speculate in any stock, share or other investment:

Provided that nothing in this sub rule shall apply to occasional investments made through stock brokers or other persons duly authorized and licensed or who have obtained a certificate of registration under the relevant law.

Explanation – Frequent purchase or sale or both, of shares, securities or other investments shall be deemed to be speculation within the meaning of this sub-rule.

(2) (i) No Railway servant shall make or permit any member of his family or any person acting on his behalf to make, any investment which is likely to embarrass or influence him in the discharge of his official duties. For this purpose, any purchase of shares out of the quotas reserved for Directors of Companies or their friends and associates shall be deemed to be an investment which is likely to embarrass the Railway servant.

(Authority: Railway Board's letter No. E (D&A) 96 GS 1-8 dt. 17.01.1997.)

(ii) No Railway servant who is involved in the decision making process of fixation of price of an Initial Public Offering or Follow-up Public Offering of shares of a Central Public Sector Enterprise shall apply, either himself or through any member of his family or through any other person acting on his behalf, for allotment of shares in the Initial Public Offerings or Follow-up Public Offerings of such Central Public Sector Enterprise. (Authority: Railway Board's letter No. E (D&A) 2009/GS1-4 dated 14.07. 2009) - **ACS No.108**

(3) If any question arises whether any transaction is of the nature referred to in sub-rule (1) or sub-rule (2), the decision of the government thereon shall be final.

(4) (i) No railway servant shall, save in the ordinary course of business with a bank or a public limited company either himself or through any member of his family or any other person acting on his behalf -

(a) Lend or borrow or deposit money, as a principal or an agent, to or from or with, any person or firm or private limited

company with whom he is likely to have official dealings or otherwise place himself under pecuniary obligation to such person or firm or private limited company; or

(b) lend money to any person at interest or in a manner whereby return in money or in kind is charged or paid.

Provided that a railway servant may give to, or accept from, a relative or a personal friend, a purely temporary loan of a small amount free of interest, or operate a credit account with a bonafide tradesman or make an advance or pay to his private employee.

Provided further that nothing in this sub-rule shall apply in respect of any transaction entered into by a railway servant with the previous sanction of the Government.

(ii) When a railway servant is appointed or transferred to a post of such nature as would involve him in the breach of any of the provisions of sub-rule (2) or sub-rule (4), he shall forthwith report the circumstances to the competent authority and shall thereafter act in accordance with such order as may be made by such authority.

Railway Ministry's decision: Loan taken from LIC by the Railway servant against their Insurance policies will be covered by the exception provided in the above rule and permission of the Government will not be necessary.

(E (D&A) 68 GSI/21 dt. 21.11.1968.)

17. Insolvency and Habitual indebtedness :

(1) A railway servant shall so manage his private affairs as to avoid habitual indebtedness or insolvency.

A railway servant against whom any legal proceeding is instituted for the recovery of any debt due from him or for adjudging him as an insolvent shall forthwith report the full facts of the legal proceeding to the Government.

Note: The burden of proving that the insolvency or indebtedness was the result of circumstances which, with the exercise of ordinary diligence, the railway servant could not have foreseen or over which he had no control and had not proceeded from extravagant or dissipated habits, shall be upon the railway servant.

(2) The following procedure shall be followed in the case of non-gazetted railway servants:-

(i) The report required under sub-rule (1) above shall be submitted by the railway servant to his immediate superior who should

forward it through the normal channel to the authority competent to remove or dismiss the employee from service. Except where such authority requires guidance or clarification from a higher authority, it shall consider and pass appropriate orders thereon.

A railway servant desiring to seek the benefit of the Insolvency Act shall apply to the Head of his Department, or to such authority as the government may specify in this behalf, for permission to file a Schedule in a Court of Law. Same time, he shall explain in such form as the Government may prescribe in this behalf all the circumstances which led to his financial embarrassment. The said authority will then consider his case in the light of those circumstances.

If the railway servant can prove that the indebtedness was the result of circumstances, which, with the exercise of ordinary diligence, he could not have foreseen or over which he had no control and did not proceed from extravagant or dissipated habits and if as the result of investigation, the said authority considers that sufficient justification exists for the retention of the employee in service, he may permit him to have recourse to the court.

Otherwise he should take steps either to dismiss or remove the employee from service as the circumstances of the case may warrant. If a railway servant asks for permission to seek the benefit of the Insolvency Act for second time such permission may not be granted by an authority lower than the General Manager or Head of Office who, if he decides to retain the employee in service, shall report the circumstances to the Railway Board for information. As the Railway Co-operative Credit is often the creditor in such a case and other railway servants are sureties for the debtor, the said authority will, in deciding whether or not the debtor should be retained in railway service, consider the effect of this dismissal or removal on the railway and on his fellow employees.

1. No. E (D&A) 58 GSI-6 dt. 15.03.1958 and 27.06.1966.
2. No. E (D&A) 60 GSI-5 dt. 07.06.1960.
3. No. E (D&A) 60 GSI-5 dt.30.01.1961.
4. No. E (D&A) 64 GSI-6 dt.25.02.1965.
5. No. E (D&A) 69 GSI-14 dt. 14.08.1969.
6. No. E (D&A) 75 GSI-3 dt. 09.03.1975.
7. No. E (D&A) 76 GSI-2 dt. 30.04.1976.

(ii) A railway servant who seeks the assistance of the Insolvency Court without the previous permission of the competent authority

shall render himself liable to removal from service.

(iii) A railway servant who is arrested for debt is liable for dismissal.

(iv) Steps will be taken from time to time by the head of an office to ascertain from pay sheets, etc. whether any railway servant under him are in habitual state of indebtedness. If a moiety of the pay of a railway servant is being frequently attached for debit has been continuously so attached for a period exceeding two years or is attached for a sum which under ordinary circumstances he could not repay within two years, such railway servant shall be considered liable for dismissal.

(v) Every case falling under (iii) or (iv) shall be considered in the light of the instructions contained in clause (i) above before it is finally decided whether or not the railway servant concerned should be dismissed or removed but in exceptional circumstances such railway servant should not be retained in service.

(vi) A railway servant shall also report to the Government or to such authorities as may be specified in this behalf the facts when a portion of his salary is constantly being attached, has been continuously attached for a period exceeding two years or is attached for a sum which, in ordinary circumstances, cannot be paid within a period of two years.

(vii) When a moiety of a railway servant's salary is attached, the report by his superior officer to the Government competent authority should show what is the proportion of the debts to the salary; how far they detract from the debtor's efficiency as a railway servant; whether the debtor's position is irretrievable and whether in the circumstances of the case, it is desirable to retain him in the post occupied by him when the matter was brought to notice or in any post under the Government.

18. Movable, immovable and valuable Property : (1) (i) Every railway servant shall on his first appointment to the railway service submit a return of his assets and liabilities, in such form as may be prescribed by the Government, giving full particulars regarding—

(a) the immovable property inherited by him, owned or acquired by him or held by him on lease or mortgage, either in his own name or in the name of any member of his family or in the name of any other person;

(b) the shares, debentures and cash including bank deposits inherited by him or similarly owned, acquired, or held by him;

(c) other movable property inherited by him or similarly owned, acquired or held by him;

(d) debts and other liabilities incurred by him directly or indirectly.

Note (1): Sub-rule (1) shall not ordinarily apply to Group 'D' railway servants, but the Government may, in appropriate cases, direct that it shall apply to any of such railway servants or any class of such railway servants.

Note (2): In every return, the values of items of movable property worth less than Rs. 10,000 may be added and shown as a lump sum. The values of articles of daily use such as clothing, utensils, crockery, books and the like, need not be included in such return.

Note (3)(1)(i)**:** Where a railway servant already belonging to a service or holding a Post is appointed to any other government or Railway service or post, he shall not be required to submit a fresh return under this clause.

(ii) Every railway servant belonging to any service or holding any post included in Group A or Group B shall submit an annual return in such form as may be prescribed by the Government in this regard giving full particulars regarding the immovable property the inherited by him or owned or acquired by him or held by him on lease or mortgage either in his own name or in the name of any member of his family or in the name of any other person.

(2) No railway servant shall, except with the previous knowledge of the Government acquire or dispose of any immovable property by lease, mortgage, purchase, sale, gift or otherwise either in his own name or in the name of any member of his family:

Provided that the previous sanction of the Government shall be obtained by the Railway servant if any such transaction is with a person having official dealings with him.

(3) Where a railway servant enters into a transaction in respect of movable property either in his own name or in the name of a member of his family, he shall, within one month from the date of such transaction, report the same to the Government, if the value of such property exceeds two months basic pay of the Railway servant:

Provided that the previous sanction of the Government shall be obtained by the Railway servant if any such transaction is with a person having official dealings with him. **(Authority- Railway Board's letter No. E (D&A)**

2011 GS1-3 dated 11.07.2011) ACS No.118

Note 1: Purchase of items of movable property for giving presents at the time of marriage will be regulated by rule 18(3) above like any other transactions in movable property (Railway Board's letter No. E (D&A) 65 GS1-12 dated 23.04.1966.)

Note 2: The powers of the Government so far as sub-rule (3) is concerned, may be exercised by–

(i) General Manager and the Chairman, Railway Rates Tribunal, in respect of both gazetted and non-gazetted officers under their respective administrative control and

(ii) Senior Deputy General Managers on Zonal Railways in respect of gazetted officers below the Senior Administrative Grade and non-gazetted officers subject to the condition that the powers hereby delegated are not further delegated by them to lower authorities so far as cases of gazetted officers are concerned.

(4) The Government or any authority empowered by it in this behalf may, at any time by general or special order, require a railway servant to furnish, within a period specified in the order, a full and complete statement of such movable or immovable property held or acquired by him or on his behalf or by any member of his family as may be specified in the order. Such statement shall, if so required by the Government or by the authority so empowered, include the details of the means by which, or the source from which, such property was acquired.

(5) The Government may exempt any category of railway servants belonging to Group 'C' or Group 'D' from any of the provisions of this rule except sub-rule (4). No such exemption shall, however, be made without the concurrence of the Railway Board, who will consult the Ministry of Home Affairs (Now Cabinet Secretariat, Department of personnel).

Explanation I. - For the purpose of this rule, the expression 'movable property' includes—

(a) jewellery, insurance policies the annual premium of which exceeds two months basic pay of the railway servant, shares, securities and debentures**; (Authority - Railway Board's letter No. E (D&A) 2011 GS1-3 dated 11.07.2011) ACS No.118**

(b) All loans, whether secured or not, advanced or taken by the

Government servant.

(c) motor cars, motor cycles, horses or any other means of conveyance and

(d) refrigerators, radios, radiograms and television sets.

Explanation II. —For the purposes of this rule, "lease" means, except where it is obtained from or granted to, a person having official dealings with the railway servant, a case of immovable property from year to year or for any term exceeding one year or reserving a yearly rent.

Railway Ministry's Decision No. 1: It is undesirable for Railway servants to bid at auctions arranged by their own department or under orders of which the auction is conducted and if he does so it would be regarded as indulging in conduct unbecoming of a railway servant under the rules.

(E (D&A) 58 GS-1-6 dt. 15.03.1958 & 27.06.1966.)

Railway Ministry's Decision No. 2: The intention of provision to sub-rule (2) & (3) regarding bonafide deal is to assure that–

(i) the transaction proposed to be entered into is for bonafide purposes;

(ii) the acquisition/sale of property in question is at fair prevailing market prices and does not involve any element or profiteering or speculation;

(iii) there is no reasonable ground to hold that the transaction in question is the result of the exercise of any undue official influence by the officer e.g. in return of any official favours conferred or likely to be conferred upon the prospective seller/buyer of the property and

(iv) there is nothing otherwise objectionable in return to the proposed transaction.

(E (D&A) 60 GS-1-5 dt. 07.06.1960.)

Railway Ministry's Decision No. 3 : The term "Regular and reputed dealer" means a person or firm who deals in a particular item and keeps regular accounts of lists, its transaction and who has regular business premises. A co-operative housing society registered under the Co-operative Society's Act, 1912 or any corresponding law in force also falls under this definition.

(E (D&A) 60 GS-1-5 dt. 30.01.1961.)

Railway Ministry's Decision No. 4: Whenever a Railway servant wishes to build a house, the following procedure should be followed:-

(a) Before starting construction of the house, he should report or seek permission as the case may be and after completion of the

house, he should report to the prescribed authority.

(b) The details in proforma prescribed should be furnished wherever it is possible to do so. Wherever it is not possible to furnish the details about purchase of movable property acquired for the construction of the house, the Railway servant concerned should mention the covered area on which the building is proposed to be erected and the estimated cost of the building.

(c) In case where the expenditure to be incurred on repairs or minor construction work in respect of any immovable property belonging to a Railway servant, is estimated to exceed Rs. 1,000/- sanction of the prescribed authority is required.

Railway Ministry's Decision No. 5: The factum of giving or receiving money between father and son can be termed as a transaction of movable property within the meaning of Rule18 (3).
(E (D&A) 64 GS-1-6 dt.25.02.1965.)

Railway Ministry's Decision No. 6: In exercise of the powers conferred by rule 24 read with Rule 2(a) (ii) of these rules, the Railway Board hereby directs as follows:

(i) Powers exercised by the Railway Board under rule 18(2) of the above rules shall be also exercisable by the General Managers, all Indian Railways, Production Units and the Director General, RDSO in respect of Gazetted officers under their respective administrative control subject to the condition that all cases of such sanction accorded by them shall be reported to the Railway Board and

(ii) Powers exercisable by the Railway Board under rule 18(3) of these rules shall be also exercisable by Director General, RDSO in respect of gazetted officers under his administrative control.
(E (D&A) 69 GS-1-11 dt. 14.08.1969.)

Railway Ministry's Decision No. 7: Railway servants should not buy or sell property to or from a firm with whom he has official dealings. In exceptional cases, however, permission may be granted only after careful enquiry into the officer's dealing with the firm and after it is satisfactorily established that he was not conferred and is not likely to confer any official favour upon the party concerned.
(E (D&A) 69 GS-1-3 dt. 09.05.1975.)

Railway Ministry's Decision No. 8: While no permission of the Government is necessary for taking Life insurance Policy or making fixed deposits in Banks under sub-rule (3) above, permission is required to be obtained to join a Chit Fund.
(E (D&A) 69 GS-1-36 dt. 13.12.1976.)

Railway Ministry's Decision No. 9: The provision of Delhi Rent Control Act and similar other provisions in other States, wherever applicable, should be observed by Railway servants while taking rent advance for property held by them.
(E (D&A) 69 GS-1-2 dt. 30.04.1976.)

Railway Ministry's Decision No. 10: It is clarified that transactions entered into by the spouse or any other member of family of a railway servant out of his or her own funds (including stridhan, gifts, inheritance etc.) as distinct from the funds of the railway servant himself in his or her own name and in his or her own right, would not attract the provision of sub-rule (2) and (3) of Rule 18.

Railway Ministry's Decision No.11: Supervisory staff of Group 'C (class-III) on railways working in scales of pay the maximum of which is Rs.900/- and above, should also submit an annual return regarding the immovable property inherited by him, or owned or acquired by him, or held by him on lease or mortgage, either in his own name or in the name of any member of his family or in the name of any other person. The return should be submitted within three months of his first appointment in the grade and thereafter in the month of January every year.
[No.E (D&A) 78 GS1-14 dated 24.10.1980]

Railway Ministry's Decision No.12: The following categories of Commercial Staff in all grades, viz. - Reservation Clerks, Parcel Clerks, Booking Clerks, TTEs and TCs should besides submitting a property return on their initial appointment as required in Rule 18 (1) (i) of the Conduct Rules, should also submit a return of their property at the time of every promotion, as also at the time of submitting documents for pension (approximately two years prior to superannuation).
[No.E (D&A) 85 GS1-13 dated 10.02.1986]

Railway Ministry's Decision No. 13: Sale and purchase of shares, securities, debentures etc. are to be treated as transactions in movable property. An intimation is to be given under Rule 18(4) to the prescribed authority in the proforma laid down in the following cases:

(i) Group 'A' and 'B' Officers - If the cumulative transactions i.e., sale, purchase or both in shares, securities, debentures or mutual funds scheme etc. exceeds Rs.50,000/- during the calendar year.

(ii) Group 'C' and 'D' Officers - If the cumulative transactions i.e., sale, purchase or both in shares, securities, debentures or mutual funds scheme etc., exceeds Rs.25,000/- during the

calendar year.

The above intimation will be in addition to the intimation(s) required to be given under Rule 18(3) in respect of individual transactions in shares, securities, debentures, etc. which exceeds the amounts prescribed therefor.

[E (D&A) 92 GS1-2 dated 17/21.05.1992]

(Authority: Railway Board's letter No. E (D&A) 2007/GS 1-1 dated 26/10/2007] – **ACS No.104)**

18-A. Restrictions in relation to acquisition and disposal of immovable property outside India and transaction with foreigners, etc.: Not withstanding anything contained in sub-rule (2) of rule 18. No railway servant shall except with the previous sanction of the Government–

(a) Acquire, by purchase, mortgage, lease, gift or otherwise, either in his own name or in the name of any member of his family, any immovable property situated outside India;

(b) dispose of, by sale, mortgage, gift or otherwise or grant any lease in respect of any immovable property situated outside India which was acquired or is held by him either in his own name or in the name of any member of his family and

(c) enter into any transaction with any foreigner, foreign Government, foreign organization or concern-

(i) for the acquisition, by purchase, mortgage, lease, gift or otherwise, either in his own name or in the name of any member of his family or any immovable property.

(ii) for the disposal of, by sale, mortgage, gift or otherwise, or the grant of any lease in respect of any immovable property which was acquired or is held by him either in his own name or in the name of any member of his family.

19. Vindication of Acts and Character of Railway servants : (1) No railway servant shall, except with the previous sanction of the Government, have recourse to any Court or to the Press for the vindication of any official act which has been subject matter of adverse criticism or an attack of a defamatory character.

Provided that if no such sanction is received by the railway servant within a period of three months from the date of receipt of his request by the Government, he shall be free to assume that the permission as sought for has been granted to him.

(Authority: Railway Board's letter No,. E (D&A) 96 GS1-5 dated 24.12.1996)

(2) Nothing in this rule shall be deemed to prohibit a railway servant from vindicating his private character and or any act done by him in

his private capacity and where any action for vindicating his private character or any act done by him in his private capacity it taken, the railway servant shall submit a report to the Government regarding such action.

Railway Ministry's Decision No. 1: Railway servants seeking redress of their grievances arising out of their employment of conditions of service should in their own interest and also consistently with official propriety and discipline first exhaust the normal official channels of redress before they take the issue to a court of law. Any attempt by Railway servants to seek redress from the court of law or such matters (even in cases where such a remedy is legally admissible) without first exhausting the normal official channels of redress can only be regarded as contrary to official propriety and subversive of good discipline and may well justify the initiation of disciplinary action against them.

[E (D&A) 62 RG6-21 dt.05.02.1964 & E (D&A) 69 RG 6-37 dt. 14.02.1967]

20. Canvassing of Non-official or other Influence: No railway servant shall bring or attempt to bring any political or other influence to bear upon any superior authority to further his interests in respect of matters pertaining to his service under the Government.

Railway Ministry's Decision. - Railway servants are advised to strictly refrain from bringing pressure from the M.Ps and other influential outsiders to secure benefits out of turn or regarding any matter arising out of their service. If such occasions arise, the name of the officer or the member of the staff concerned will be brought to the notice of the Head of the Department for such disciplinary action as may be considered necessary.

[E (D&A) 70 RG6-9 dt. 07.07.1971]

21. Restrictions Regarding Marriage: (1) No railway servant shall enter into or contract, a marriage with a person having spouse living:

(2) No railway servant, having a spouse living shall enter into or contract, a marriage with any person and

(3) A railway servant who has married or married a person other than of Indian Nationality shall forthwith intimate the fact to the Government.

Provided that the government may permit a railway servant to enter into or contract, any such marriage as is referred to in clause (1) or clause (2), if it is satisfied that–

(a) such marriage is permissible under the personal law applicable to such railway servant and other party to the marriage and

(b) there are other grounds for so doing.

22. Consumption of intoxicating Drinks and Drugs :

(1) A railway servant shall–

(a) strictly abide by the law relating to intoxicating drinks or drugs during the course of his duties and shall also take due care that the performance of his duties at any time is not affected in any way by the influence of such drink or drug,

(b) refrain from consuming any intoxicated drink or drug in a public place;

(2) A railway servant shall not–

(a) appear in a public place in a state of intoxication;

(b) use any intoxicating drink or drug to excess;

(c) if he belongs to the category of running staff (both local and traffic) or is connected directly with train passing, have taken or used any intoxicating drinks or drugs within eight hours of the commencement of duty or take such drinks or drugs during the course of duty.

Explanation – For the purpose of this rule, "Public place" means any place or premises (including conveyance to which the public have or are permitted to have, access whether on payment or otherwise.

23. A Prohibition regarding employment of Children below 14 years of age: No Railway servant shall employ to work any child below the age of 14 years.

[Authority: Railway Board's letter No. E (D&A) 99 GS1-3 dated 07-01-2000]

24. Interpretation: The power of interpretating these rules is reserved to the president.

25. Delegation of Powers: The Government may, by general or special order, direct that any power exercisable by it under these rules shall, subject to such conditions, if any, as may be specified in the order, be exercisable also by such officer or authority as may be specified in the order.

26. Repeal and Savings: The Railway Services (Conduct) Rules, 1966, contained in Appendix VI of the Indian Railways Establishment Code, Volume I, shall cease to be in force except as respects things done or omitted to be done.

Obligation to abide by all administrative Instructions:

Notwithstanding anything contained in these rules, a railway servant shall be governed by all the administrative instruction that may be issued from time to time in regard to the conduct of railway servants.

ANNEXURE-A

CONCEPTS OF ELECTRIC TRACTION

Power Supply:

25 KV, AC, 50 Hz single phase power supply for electric traction is derived from the grid system of State Electricity Boards through traction sub-stations located along the route of the electrified sections at distances of 35 to 50 km apart. The distance between adjacent sub-stations may, however, be even less depending on intensity of traffic and load of trains.

Sectioning of OHE:

To ensure rapid isolation of faults on the OHE and to facilitate maintenance work, the OHE is sectioned at intervals of 10 to 15 km along the route. At each such point a 'switching station interrupter', usually rated at 600A, is provided. The shortest section of the OHE which can be isolated by opening interrupters alone is called a 'sub-sector'. Each sub-sector is further sub-divided into smaller 'elementary sections' by provision of off-load type manually operated isolator switches.

At some stations with large yards, alternative feeding arrangements are provided so that the power for feeding and yards may be drawn from alternative routes. Normally the switch is locked in one position, being changed to the other when required after taking necessary precautions.

To meet requirements at electric loco running sheds, isolator with an earthing device in the 'off' position is provided. At watering stations, manually operated interrupters and isolators with earthing heels are provided to enable switching off of the power supply locally and earthing the OHE to enable working on roofs of rolling-stock. There are several types of switching stations, as detailed in the following paras:-

Feeding Post (FP): It is a supply control post, where the incoming feeder link from grid substation is terminated:

Each feeder supplies the OHE on one side of the feeding post through interrupters controlling supply to the individual lines. Thus, for a two track line, there will be four interrupters at each feeding post.

Sectioning and Paralleling Post (SP):

These posts are situated approximately midway between feeding posts marking the demarcating point of two zones fed from different phases. A 'paralleling interrupter' is provided at each 'SP' to parallel the OHE of the up and down tracks of a double track section; 'bridging interrupters' are also provided to permit one feeding post to feed beyond the sectioning post up to the next FP if its 25 kV supply is interrupted for some reasons. These bridging interrupters are normally kept open and should only be closed after taking special precautions as detailed in these rules.

Sub-Sectioning and Paralleling Post (SSP):

One or more SSPs are provided between each FP and adjacent SP depending upon the distance between them. In a double track section, normally three interrupters are provided at each SSP i.e. two connecting the adjacent sub-sectors of up and down tracks.

Sub-Sectioning Post (SS):

These are provided only occasionally. They are similar to SSPs with provision for sectioning of the OHE but not paralleling.

Neutral Section: It is a short section of insulated and dead overhead equipment which separates the area fed by adjacent substation or feeding post.

A neutral section is provided to make it impossible for the pantograph of an electric locomotive or EMU train to bridge the different phases of 25 KV supply, while passing from the zone fed from one sub- station to the next one. Since the neutral section remains 'dead', warning boards are provided in advance to warn and remind the Loco pilot of an approaching electric locomotive/EMU to open locomotive circuit breaker (DJ) before approaching the 'neutral section', to coast through it and then switch 'on' on the other side. Special care is taken in fixing the location of neutral sections, on level tangent tracks far away from signals, level crossing gates etc. to ensure that the train coasts through the neutral section at a sufficiently high speed, to obviate the possibility of its stopping and getting stuck within the neutral section.

Other Important Equipment at Switching Stations:

Certain equipments are installed at various points to protect the lines, to monitor the availability of power supply and provide other facilities. These are generally as under:

1. Lightning arresters are provided to protect every sub-sector against voltage surges.
2. Auxiliary transformers are provided at all the posts and also at certain intermediate points to supply AC at 240 V, 50 Hz required for signalling and operationally essential lighting installations. To ensure a fairly steady voltage, automatic voltage regulators are also provided where required.
3. Potential transformers are provided at the various switching stations for monitoring supply to each sub-sector.
4. A small masonry cubicle is provided to accommodate remote control equipment, control panel, telephone, batteries and battery chargers required for the control of interruptors and other similar equipments.

OVERHEAD EQUIPMENT

Catenary and Contact Wires:

1. The overhead equipment above the tracks comprises the following:-
   (a) A stranded cadmium copper wire of about 65 mm^2 section or stranded aluminium alloy wire of about 116 mm^2 section for catenary.
   (b) A grooved hard drawn copper contact wire of 107 mm^2 cross-section (when new)supported from the catenary by means of droppers of 5 mm diameter spaced not more than 9mm apart.
2. The catenary and contact wire together have an equivalent copper section of 157 mm^2. The current normally permissible on a single track is 600 A approximately, because of equivalent cross-sectional area of OHE. This current limit is based on the temperature limit of 85°C in contact wire. Certain sections in Waltair-Kirandul section have the catenary and contact wires together having an equivalent copper section of 200 mm^2.
3. For loop lines, sidings, yards and spur lines excluding the main running lines and first loop or lines taking off from main running line, tramway type OHE having only grooved hard drawn copper contact wire of 107 mm^2 section is provided.

Height of Contact Wire:

The normal height of contact wire for regulated OHE is 5.60 m (with 10 cm pre-sag for 72 m span) above rail level. For unregulated OHE in areas with a temperature range of 4°C to 65°C, this figure is 5.75 m and in areas with a temperature range of 15°C to 65°C, it is 5.65 m. In certain cases, such as under over-line structures, the height may be as low as 4.65 m on BG and 4.02 m on MG. For passing oversized consignments on such lines, special precautions have to be taken.

Span of Supporting Mast/Structures:

The span normally used for supporting the OHE from masts/structures using the cantilever type bracket assembly varies from maximum 72 m on straight track to 27 m on curved track, the spans depending upon the degree of curvature. The catenary system is normally supported on straight tracks at maximum intervals of 72 m (63 m on MG) by cantilever type arms fixed to galvanized broad flange or/ section steel masts or fabricated steel structures. On curves, the catenary is supported at closer intervals, the spans adopted depending upon the degree of curvature.

Stagger: The contact wire is staggered so that as the pantograph glides along, the contact wire sweeps across the current collecting strips of the pantograph upto a distance of 200 mm on either side of the centre line on straight runs and 300 mm on one side on curves. This ensures a uniform wear of the current collecting strips of the pantographs.

Overlaps: The OHE conductors are terminated at intervals of about 1.5 km with an overlap generally, the conductor height being so adjusted that the pantograph glides from one conductor to the other smoothly.

There are two types of overlap spans, as under:-

a) Uninsulated overlap spans where the distance of separation between two contact wires is 200 mm and the two conductors are permanently connected together electrically by suitable jumpers.

b) Insulated overlaps, where the two OHE systems are kept apart at a distance of 500 mm normally the electrical discontinuity at insulated overlaps is bridged by interrupters or isolators, except at neutral sections.

Regulated and Unregulated OHE:

OHE with automatic tensioning called 'regulated OHE' is generally provided for all main lines. However, for large isolated yard and unimportant lines, automatic tensioning is dispensed with in the interest of economy and only unregulated OHE is used.

Section Insulator Assembly:

Section insulators are provided to insulate the OHE of one elementary section from the OHE of the adjacent elementary section such as at cross-overs. When the pantograph of a locomotive passes from one track to another along a cross-over/turnout, current collection changes from one OHE to other and therefore the runners of the section insulators overlap with contact wire so that there is no arcing. On double line sections with runners trailing, the section insulator assembly using porcelain insulators is fit for speeds up to 120 km/h provided it is installed between the first one-tenth and one - third of the span. In case the runners of the section insulator assembly are in the facing direction or it is not installed within the first one third of the span, the speed should be restricted to 80km/h.

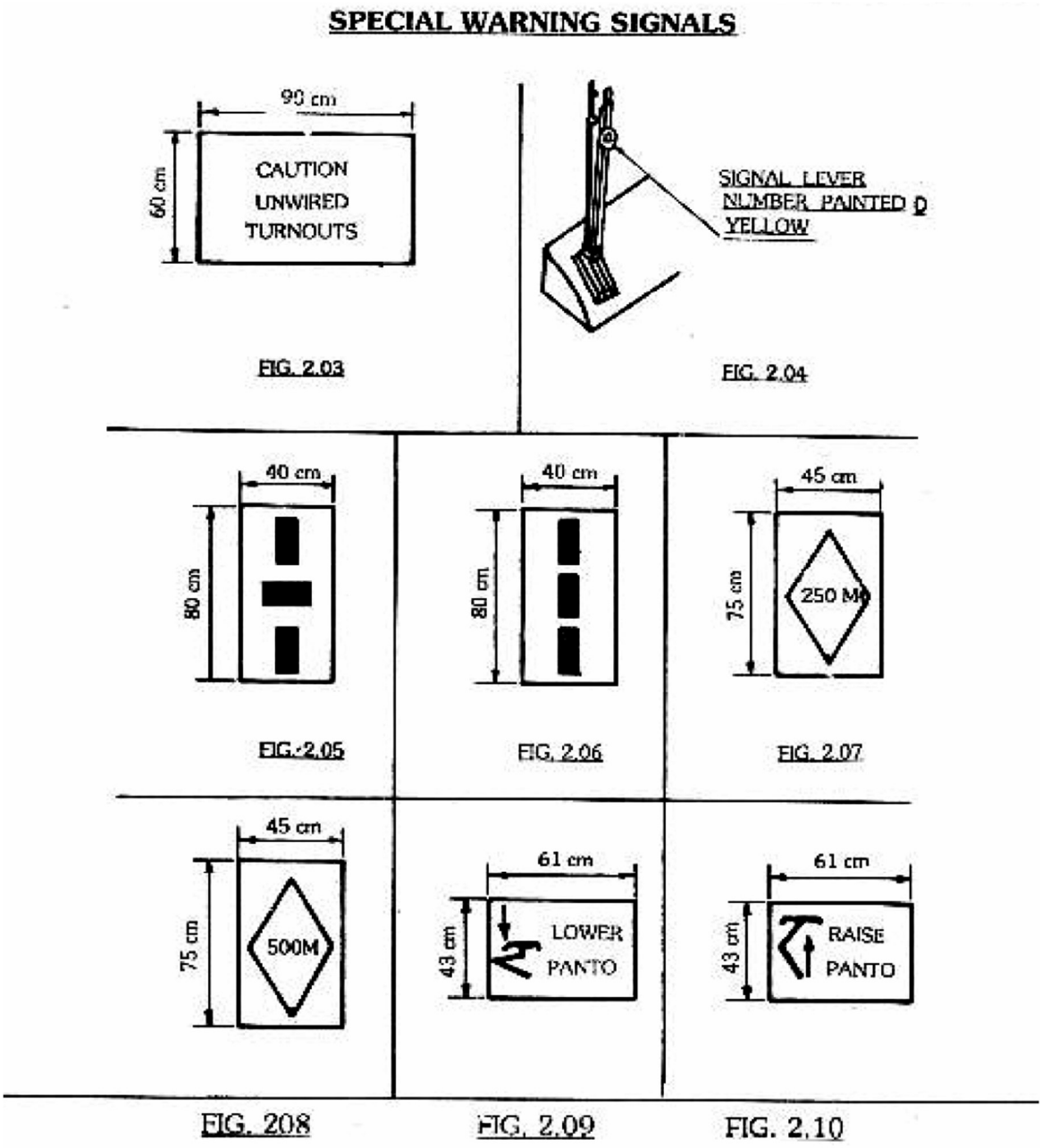


FIG. 2.03 FIG. 2.04

FIG. 2.05 FIG. 2.06 FIG. 2.07

FIG. 208 FIG. 2.09 FIG. 2.10

GENERAL DESCRIPTION OF ELECTRIC ROLLING STOCK

Classification of Electric Rolling Stock:

Locomotives and Multiple Unit stocks are classified by means of a three/four letter code followed by a number to indicate the individual class and a series of the same. The code letters used for AC locos and EMUs are given below: The first letter denotes the Gauge: 'W for BG and 'Y' for MG

The second (middle) letters 'A' denotes the system of power supply for which it is suitable - A for AC & C for DC, CA for DC & AC.

The third letter for locos indicates the class of service -

'M' for mixed traffic locos suitable for both passenger and freight services, 'G' for Freight (Goods) service locos, 'P' for Passenger services locos and 'S' for Shunting locos.

Multiple Unit Stock is denoted by the letter 'U'.

The various classes of AC locos and EMUs at present in service on Indian Railway are as under:-

(a) AC Locos— WAG1, WAG2, WAG3, WAG4, WAG5, WAG6, WAG7, WAG9,WAG9M

(b) WAP1, WAP2, WAP3, WAM1, WAM2, WAM3, WAM4, WAP4, WAP5, YAM1, WAP7

(c) AC/DC Locos—WCAM1,

(d) AC EMUs— WAU1, WAU2, WAU3, WAU4, YAU.

In addition, two types of BG DC EMUs converted for AC working are in use on the Eastern Railway.

Important Equipment of Electric Loco/EMU:

1. **Pantograph:**

For collecting power from 25 KV ac contact wire, pantographs are mounted on the roof of the traction vehicles. AM 12 pantograph of Faively design has been adopted by Indian Railways for 25 KV ac electric locomotives and EMUs. These pantographs are provided with steel strips for current collection. The raising and lowering of the pantograph is by means of a pneumatically operated servo motor. This pantograph is a single pan design having two o-springs mounted on it. For keeping the pantograph in the lowered condition, main springs have been used. The suspension of pan is on plungers.

This pantograph is suitable for operation up to 140 km/h. For increasing the speed potential, improved pantograph with lower dynamic mass and independent pan heads have been used. Further, in order to improve the life of the contact wire, use of carbon strips has also been tried. Use of carbon strips for current collection has already been adopted in European countries.

Use of carbon strips necessitates change in the design of the pantograph; the pan head which is more or less rigid in case of steel strip pantograph needs to be made more flexible in the vertical, horizontal and transverse movement for carbon strip pantographs. This is achieved by improved suspension of the pan head. The speed potential of such a pantograph is of the order of 250km/h.

2. **Circuit Breaker:**

-- Air Blast Circuit breaker

-- Vacuum Circuit breaker

These breakers are designed for isolation of power to the traction vehicle in the event of faults.

Vacuum Circuit Breakers were introduced on electric locomotives on Indian

Rlys. in the year 1985. The VCB is a simplified design with fewer number of parts (260 Nos.), have a simplified control block and self - contained interrupting medium that is vacuum. Due to these features, the life of the main contact achievable is as high as 1 lakh electrical operations as against 20,000 operations for air blast circuit breakers. As a result, the periodicity of replacement of main contact is second POH for VCB and IOH for Air Blast Circuit Breakers. Besides these factors, VCB also offers the advantages of reduced size, reduced weight and reduced maintenance cost as compared to this for air blast circuit breakers. The total trip-time for VCB is less than 60 milli-seconds while the same is of the order of 100 milli-seconds for air blast circuit breakers. The air blast circuit breaker is only capable of breaking the fault current with breaking capacity of 250 MVA. The VCB, besides having breaking capacity, is also designed for making capacity of the same rating, i.e. 250 MVA and can handle the same level of fault current during closing also.

3. **Transformer**:

Power to the traction vehicles is available at 25 KV ac single phase from the contact wire. In order to step down the voltage as well as to control the same for feeding to the traction motors, the traction power transformers are provided on the traction vehicles.

These transformers generally have a primary winding, a regulating winding, traction secondary windings and auxiliary windings. The regulating winding is designed for choosing appropriate voltage for the traction motors. The auxiliary winding is required for feeding the auxiliary motors on the locomotive.

In order to increase the h.p. of the locomotives, the traction transformers have been uprated from time to time keeping the overall dimensions unchanged on account of space constraint. The upratings have been achieved by using increased copper section of the conductor used, improved insulation scheme and in certain cases, adoption of aluminium foil wound construction for minimizing the losses.

With the introduction of thyristorised converters, the design of the traction transformer has undergone simplification with the deletion of regulating winding. The transformer for thyristorised converter becomes a two limb construction and traction secondary winding split into 4 windings for two step sequence control.

The traction transformer necessarily has to have forced oil circulation and forced air cooling. For this purpose, oil pump, oil cooler and blower form an integral part of the traction transformer.

4. Tap Changer:

Tap changer is provided on 25 KV (HT) regulating winding of locomotive transformer for controlling the voltage input to main transformer.

5. Traction Motor:

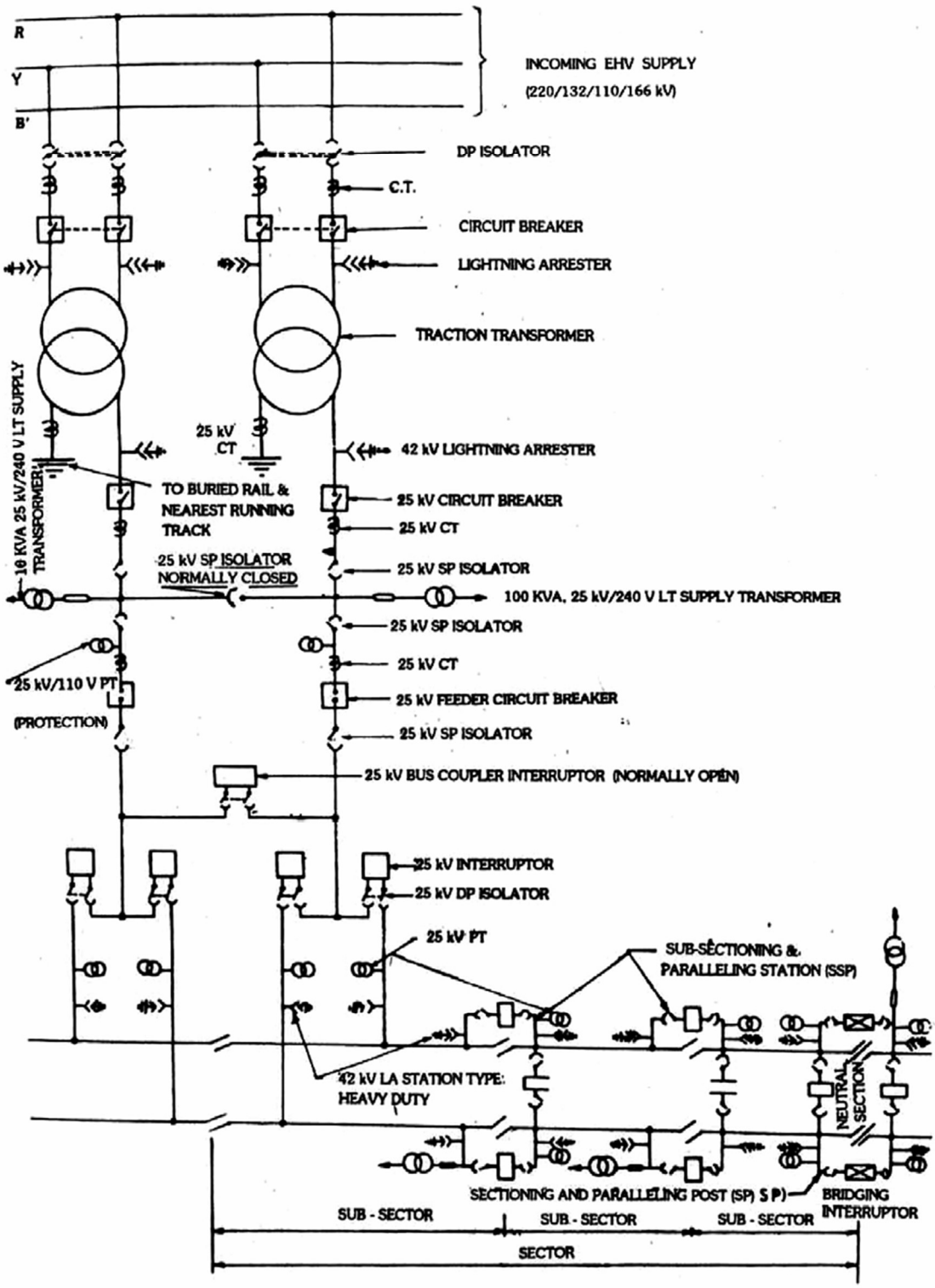
In case of traction motor, great emphasis is being given on improving power to weight ratio, keeping in view the limited space available on the locomotive for mounting the same. There is continuous effort to improve the performance of traction motors by making them lighter/compact and at the same time, more reliable. Indian Railways have been adopting the latest technology available for design and manufacture of traction motor. Over a period of years, the traction motors have become now 2.5 times lighter, especially for EMU application.

6. Arno Converter:

Arno Converter is a special duty machine for conversion of single phase in-coming supply into 3 phase out-put supply. 3 phase supply is essentially required on most of the electrical locomotives for driving certain auxiliary equipment like blowers and compressors. The function of Amo Converter is to supply 3 phase power required for these auxiliaries.

TYPICAL OF TRACTION POWER SUPPLY FEEDING ARRANGEMENT

FIG. 1.01
(PARA 20100)



ANNEXURE-B

Different Types of Rolling Stock along with their Code and Carrying Capacity

Coaching Stock Commonly in use on Indian Railways:

Type of coach	Axle load (approx.) tonnes	Overall Dimensions			Bogie Wheel base (mm)	Bogie centres (mm)	Type of coach speed (km/h)
		Length (mm)	Breadth (mm)	Height (mm)			
ICF Non Air conditioned & air conditioned coaches(BG)	13/16.25	22297	3250	4025/4250	2896	14783	105/110$ 130/140$$
BEML Non Air conditioned coaches(BG)	13	22297	3250	4025	2896	14783	105/110
LHB Coach (BG)	16.25	24000	3240	4039/4250	2560	14900	160
Double Deck ICF coaches(BG)	16.25	22297	3050	4265	2896	14783	105/110
Garib Rath Coach (BG)	16.25	22297	3250	4381	2896	14783	130C&M VOL-I105 others C&MVOL-I
EMU/ICF AC/DC (MC)##	20.32	20726	3658	3810	2896	14630	100
EMU ICF AC (TC)#	20.32	20726	3658	3810	2896	14630	70
HHPDEMU (DPC)	20.32	21417	3245	3886	2896	14783	100
HHPDEMU(TC)	16.25	21337	3245	3886	2896	14783	100
METRE GAUGE	10	20183.5	2740	3355	1980	13715	75/100
OHE CAR 8 WHEELER (BEML)	16.25	20726	3658	3818	2896	14630	105
OHE CAR 4 WHEELER (OVIS)	16	8540	3250	3735	5000	NA	–

REF: ICF DRGNO.EMU/2C/ASR-9-0-201 $ For Mainline

REF: ICF DRGNO.EMU/2C/ASR-9-0-001

$$ For Rajdhani / Satabdi Express

Broad Gauge Coaching Stock along with their codes:

Description	**Code**
ICF Design Coaches :	
Inspection Carriage (Administrative)	RA
AC Inspection Carriage (Administrative)	RAAC
Tourist Car	CT
Air Conditioned Tourist Car	ACCT
Pantry Car	WCB
AC Pantry Car(EOG)	WCBAC
AC Class with Coupe, vestibule	WACC
AC First Class(EOG)	WFAC
AC- 2 Tier Sleeper Coach	WACCW
AC-2 Tier Sleeper Coach (Self Generating)	WGACCW
AC- 3Tier Sleeper Coach (SG)	WGACCN
AC- 3Tier sleeper coach(EOG)	WACCN
AC First Class (Vestibule) (Self Generating)	WGFAC
First Class coach with Coupe	FC
First Class coach with Coupe (vestibule)	WFC
First Class coach(SG)	WGFC
First Class Chair Car coach(SG)	WGFCZ
AC Chair Car Second Class(SG)	WGSCZAC
AC Chair Car Second Class	WSCZAC
Second Class Double Decker Coach	WGSD
Second Class Coach (SG)	GS
Second Class Coach with (Vestibule)	WGS
3-Tier Sleeper coach (SG)	WGSCN
Second Class, Luggage and Guard Compartment	SLR
Second Class cum luggage & Brake VAN(SG)	GSLR
Second Class cum luggage & Brake van with disabled friendly compartment(SG)	GSLRD
Second class coach with Brake Van & Disabled friendly compartment (SG)	GSRD
Second class cum Brake Van (SG)	GSR

3-Tier Sleeper + Luggage + Brake Van (SG)	GSCNLR
Brake & Luggage cum Generator Car	WLRRM
Store Delivery Van on IRS under frame	RS
Accident Relief and Tool Van	RT
Staff Car for ART	RT
Medical Van	RH
Store cum Power Van for Relief Train	RSH
Auxiliary Medical Van	RHV
2 coach SPART DPC with supervisor van cum Tool Van	SPRT
2 coach SPARMV DPC with Auxiliary van cum Tool Van	SPRM
3 coach high speed self-propelled ART with one DPC cum supervisor van & one TC cum medical van	SPRT(HS)1
Rail cum Road Vehicle	RRV
Training /Inspection Van	RE
Self-Propelled Tower Car	RU
Postal Van	PP
Milk Van	VVN
Parcel Van	VP
High Capacity Parcel Van	VPH
Motor cum Parcel Van	VPU
Refrigerated Parcel Van	VPR
High Capacity Van	VPH
High Capacity Van without racks & collapsible shutter doors	VPHX
High Capacity Motor cum Parcel Van W/O racks & collapsible shutter doors	VPUHX
Motor Car Carrier Coach	NMG
Coaches for Palace On Wheels:	
AC Saloon	WPCTAC
AC Generator Car	WPSRRMAC
Non-AC Staff Car	WPSRS
AC Staff Car	WPSAC
Coaches for Deccan Odyssey:	
Cabin Car	WDTAC
GYM/Yoga Car	WDCGNAC

Conference Car	WDCCAC
Restaurant Car	WDCRAC
Bar Car	WDCBAC
Staff Car	WDSAC
Power Car	WDSRRMAC
LHB Type Coaches:	
AC First Class Coach (EOG)	LWFAC
AC First Class Coach (SG)	LWGFAC
AC 2-T sleeper Coach(EOG)	LWACCW
AC 2-T sleeper Coach(SG)	LWGACCW
AC 3-T Sleeper Coach(EOG)	LWACCN
AC 3-T sleeper Coach(SG)	LWGACCN
AC Hot Buffet Car(EOG)	LWCBAC
Non AC Hot Buffet Car(EOG)	LWCB
Brake, Luggage cum Generator Car	LWLRRM
Second Class Coach (EOG)	LS
Second Class Coach (SG)	LGS
3- TIER Sleeper LHB Coach (EOG)	LWSCN
3Tier Sleeper Coach(SG)	LWGSCN
AC executive Chair Car (EOG)	LWFCZAC
AC Chair Car (EOG)	LWSCZAC
Double Decker Chair Car AC Coach	LWSCZDAC
Double Decker (EOG) Chair Car AC Coach	LWSCZDAC1
Anubhuti Coach	LWAFCZAC
Non AC Chair Car LHB Coach (EOG)	LWSCZ
Self-generating LHB coach fitted with 30 kw Alternator	LWLRRM(SG)
Second Class cum Luggage & Brake Van(SG)	LGSLR
High Capacity Motor Car Cum Parcel Van	LVPHU
Hot Buffet Car(EOG)	LWCB

Narrow Gauge Coaching Stock along with their codes:

Tourist Car	CT
Inspection Carriage	ACRA/RA
First Class with attendants compartment	FCQ
First Class Chair Car with ladies Compartment	FCZY
First Class	FC
First Class with Second class composite	FCS
Chair Car	CZ
Second class(Self-generating)	GS
Chair Car Luggage Guard compartment	CZLR
Second class Guard Compartment	GSR
Second class, Luggage and Guard compartment	SLR
First Class Chair Car cum luggage van	FCZLR
Second class half postal van composite cum Luggage compartment	SPPHR
Luggage Van	LV
Luggage Van cum Guard Compartment	LR

Freight Stock commonly in use on Indian Railways

	Tpye of Wagons/Discription	Length overHd. stock	Length over buffer/ couplers	Width inside/ overall	Height inside/ from rail	Bogie Centres	Nominal Max.axle load	Tare	Pay Load	Gross Load	No. of wagons per rake	Through-put per rake	Cubic Capacity	Speed	Type of Coupler	Type of Bearing
		mm	mm	mm	mm	mm	t	t	t	t	no	t	cum	kmph	kmph	
1	O OPEN	5944	7214	2845/3055	1600/2836	3504	16.3	10.31	22.19	32.5	86	1908	27	75	SC	PB
2	BOXC/OPEN COAL	12800	13729	2852/3136	1880/3161	8800	20.32	25	56.28	81.28	45	2532	68.58	75	CBC(T)	CRB
3	BOXN/BOXNHS	9784	10713	2950/3200	1950/3233	6524	20.32	23.2	58.08	81.28	58	3368	56.3	75/100	CBC	CTRB
4	BOXNHA	9784	10713	2950/3200	2175/3450	6524	22.1	23.17	65.23	88.4	58	3783	62.8	100	CBC	CTRB
5	BOXN(LW)	9784	10713	3022/3250	1990/3263	6524	20.32	20.41	60.87	81.28	58	3530	58.84	65	CBC	CTRB
6	BOXNAL	9784	10713	3022/3250	2066/3341	6524	20.32	18.26	63.02	81.28	58	3655	61.09	-	CBC	CTRB
7	BOXNHL	10034	10963	3022/3250	2028/3301	6690	22.9	20.8	70.8	91.6	58	4106	61.05	80	CBC	CTRB
8	BOXN25	9784	10713	2957/3135	2333/3606	6524	25	23	77	100	58	4466	67.5	75/100	CBC	CTRB
9	BOI/OPENGONDOLA	10700	11629	2850/3100	1050/2331	6700	20.32	22.8	58.48	81.28	53	3099	32	75	CBC	CRB
10	BOY/IR BOY/IRON ORE SPL	11000	11929	2924/3134	1175/2450	7330	22.9	20.71	70.89	91.6	52	3686	37.8	65	CBC	CTRB
11	BOY25	9784	10713	2907/3135	1334/2607	6524	25	21	79	100	58	4582	37.94	75/100	CBC	CTRB
12	CR/COVERED	7162	8432	2946/3081	2445/3746	4572	16.3	10.77	21.73	32.5	74	1608	51.4	75	SC	PB
13	CRT/COVERED	7890	8822	2946/3081	2675/3977	4900	20.32	13.1	27.54	40.64	70	1927	61.9	75	CBC(ALL)	CRB
14	CMR/CATTLE/MILITARY	7162	8432	2946/3081	2445/3746	4572	16.3	11.23	21.27	32.5	74	1573	51.4	75	SC	PB
15	CE/COVERED EXPLOSIVE	5943	7213	2672/2978	2295/3746	3505	16.3	11.38	21.12	32.5	86	1816	32.7	75	SC	PB
16	BCX MK-11/Cov.Bogie Spl.	14500	15782	2944/3199	2446/3792	10000	20.32	28.5	52.78	81.28	39	2058	104	75	CBC(T)	CRB
17	BCN/COVERED BOGBIE	14500	15429	2944/3100	2446/3787	10000	20.32	27.2	54.08	81.28	40	2163	104	80/75	CBC	CTRB
18	BCNA/BCNAHS	13521	14450	2944/3200	2677/4014	9500	20.32	24.55	56.73	81.28	43	2439	103.4	75/100	CBC	CTRB
19	BCNHL	10034	10963	3340/3450	3060/4385	7153	22.9	20.8	70.8	91.6	58	4106	98.3	80	CBC	CTRB
20	BOBY/BOBYN	10718	12000	2863/3189	1781/3050	7450	20.32	27.04	54.24	81.28	52	2820	40.3	75	CBC(T)	CTRB
21	BOBX/HOPPER	10668	11938	2910/3050	-/2819	7112	22.9	25.15	66.45	91.6	52	3455	29.9	56	SC	PB
22	BOBS MK-II	10668	11597	2743/3020	-/3304	7112	22.9	30.4	61.2	91.6	53	3243	34	70	CBC	CTRB
23	BOBSN25	9784	10713	2925/3199	1941/3213	6524	25	28	72	100	58	4176	34.63	75/100	CBC	CTRB
24	BOBR	10671	11600	3340/3500	2461/3735	7571	20.32	26	55.28	81.28	53	2929	57.2	80	CBC	CTRB
25	BOBRN	9671	10600	3340/3500	2466/3735	6790	20.32	25.6	55.68	81.28	59	3285	56.78	65	CBC	CTRB

Freight Stock commonly in use on Indian Railways

-		Length overHd. stock	Length over buffer/ couplers	Width inside/ overall	Height inside/ from rail	Bogie Centers	Nominal Max.axle load	Tare	Pay Load	Gross Load	No. of wagons per rake	Through-put per rake	Cubic Capacity	Speed	Type of Coupler	Type of Bearing
		mm	mm	mm	mm	mm	t	t	t	t	no	t	cum	kmph	kmph	
26	BOBRNAL	9671	10600	3316/3500	2466/3735	6790	20.32	22.4	58.88	81.28	58	3414	56.6		CBC	CTRB
27	BOBRN25	9784	10713	3460/3500	2756/4205	6903	25	24.4	75.6	100	58	4437	66.68	75/100	CBC	CTRB
28	TO/OIL/TANK	7010	8280	2362	-/4108	4572	16.3	13.9	18.61	32.51	75	1395	25.65	75	SC	PB
29	TORX/OIL TANK	7010	8280	2362	-/3975	4572	16.3	12.1	20.4	32.5	75	1530	26.04	75	SC	CRB
30	TP/PETROL TANK	7010	8280	2362	-/4024	4572	16.3	12.85	17.53	30.48	75	1314	25.65	75	SC	PB
31	TPR/PETROL TANK	7010	8280	2362	-/3990	4572	16.3	11.84	20.66	32.5	75	1549	28.64	75	SC	CRB
32	TPGL/LQD.PET. GAS	8382	9652	2000	-/3978	4877	16.3	20.66	11.84	32.5	64	757	24.1	75	SC	CRB
33	TPGLR/LQD.PET .GAS	8382	9652	2300	-/4125	4878	16.3	18.2	14.3	32.5	64	915	33.1	75	SC	CRB
34	BTALN/AMMONIA	16600	17529	2200	-/4265	11570	20.32	49.13	32.13	81.26	35	1124	60.66	65	CBC	CRB
35	BTPN	11491	12420	2850	-/4265	8391	20.32	27	54.28	81.28	50	2714	70.4	75	CBC	CTRB
36	BTPGLN	18000	18929	2400	2400/4285	12970	20.32	41.6	37.6	79.2	33	1240	79.48	75	CBC	CTRB
37	BVG/BRAKE VAN GOODS	5943	7213	-/3200	2396/3755	3505	16.3	10.77	-	10.77	-	0	-	75	SC	PB
38	BVGT/BRAKE VAN GOODS	5944	7226	-/3197	2447/3735.6	3505	16.3	-	-	-	-	0	-	75	CBC(T)	PB
39	BVZC/BRAKE VAN GOODS	8540	9469	-/3200	2448/3894	5400	20.32	13.803	-	13.803	-	0	-	75	CBC	CRB
40	BVZI	13540	14469	-/3200	-/3894	9026	5.875	23.5	-	23.5	43	0	-	100	CBC	SRB
41	BOST	12800	13729	2850/3100	1805/3080	8800	20.32	25.5	55.78	81.28	45	2510	65.84	80/75	CBC	CTRB
42	BFNS	13716	14645	2845/3045	-/2785	9144	20.32	23.629	57.651	81.28	42	2421	-	100	CBC	CTRB
43	BRH/RAIL HEAVY	13716	14986	2845	-	9144	20.32	24.38	56.9	81.28	41	2332	-	75	CBC(T)	CRB
44	BRNA/BRNAHS	13716	14645	2845	-	9144	20.32	23.543	57.74	81.28	42	2425	-	75/100	CBC	CTRB
45	BRN25	13716	14645	2930/3130	1274	9144	25	23.5	76.5	100	42	3210	-	75/100	CBC	CTRB
46	BLCA	13625	14566	2200 max	1009	9675	20.32	19.1	61	80.1	42	2562	-	100	CBC/SDB	CTRB
47	BLCB	12212	13165	2200 max	1009	8812	20.32	18	61	79	47	2867	-	100	SDB	CTRB
48	Cement/Flyash	9784	10713	3129/3245	-/4165	6684	22.13/17.25	22	66.5/47.11	88.5/69.11	58	3857/2732	70	75/100	CBC	CTRB

DIESEL LOCOMOTIVES COMMONLY IN USE ON INDIAN RAILWAYS

Traction	Class	Wheel arrange-ment	Wheel dia. (mm)	Overall dimensions(mm)			Horse power	Max. Starting Tractive effort (t)	Max. speed (Km/h)	Axle load (t)
				Length	Breadth	Height				
Broad Gauge										
Diesel	**WDM2**	CO-CO	1092	17162	2914	4185	2600	30.45	120	18.8
Diesel	**WDM3A**	CO-CO	1092	17162	2914	4185	3100	30.45	120	18.8
Diesel	**WDM7**	CO-CO	1092	16238	2914	4185	1977	25.92	105	16.0
Diesel	**WDP3A**	CO-CO	1092	19122	2996	4184	3100	29.25	160	19.5
Diesel	**WDS4**	O-C-O	1092	11030	3100	4160	600	9.5	65	20.0
Diesel	**WDS5**	CO-CO	1092	16522	2864	4115	1065	31.5	109	21.0
Diesel	**WDS6**	CO-CO	1092	17212	2864	3980	1400	34	71	21.0
Diesel	**WDG3A**	CO-CO	1092	19150	3000	4180	3100	40.6	100	20.5
Diesel	**WDG4**	CO-CO	1092	21264	3158.2	4264	4000	53.00	100	21.0
Diesel	**WDP1**	BO-BO	1092	16110	3016	4191	2300	20.00	120	20.0
Diesel	**WDP4**	A-A-1-1-A- A	1092	21264	3158.2	4264	4000	27.55	160	19.5
Diesel	**WDM3D**	CO-CO	1092	18650	3090	4138	3300	38.61	120	19.5
Diesel	**WDM3B**	CO-CO	1092	18650	3090	4138	3100	38.61	120	19.5
Diesel	**WDG3D**	CO-CO	1092	19150	3000	4180	3300	40.6	100	20.5
Diesel	**WDP4B**	CO-CO	1092	21264	3200	4264	4500	40.775	120	20.2
Diesel	**WDP4D**	CO-CO	1092	23000	3050	4264	4500	39.2	130	20.5
Diesel	**WDG5**	CO-CO	1092	22262	3246	4381.7	5500	56.0	105	22.3
Narrow Gauge										
Diesel	**ZDM-3A**	BO-BO	700	10300	2240	3180	700/ 800	10.5	25	9.25
Diesel	**ZWM-4A**	BO-BO	700	10300	2240	3180	700	7.8	40	9.25
Diesel	**R Motor CAR**	BO-BO	610	9000	2300	3061	125	-	35	5.00

ELECTRIC LOCOMOTIVES COMMONLY IN USE ON INDIAN RAILWAYS

Traction	Class	Wheel arrange-ment	Wheel dia. (mm)	Overall dimensions(mm)			Horse power	Max. Starting Tractive effort(t)	Max. speed (Km/h)	Axle load (t)
				Length	Breadth	Height				
Elec.AC	**WAG5/A/ B/C**	CO-CO	1092	19974	3055	4165	3850	33.5	105	19.8
Elec.AC	**WAG5H**	CO-CO	1092	19974	3055	4165	3850	37.8	80	21.0
Elec.AC	**WAG6A**	BO-BO- BO	1092	20600	3184	4170	6280	46.0	100	20.5
Elec.AC	**WAG6B**	BO-BO- BO	1140	20600	3184	4235	6050	45.0	100	20.5

Elec.AC	**WAG6C**	CO-CO	1140	20600	3184	4235	6050	45.0	100	20.5
Elec.AC	**WAG7**	CO-CO	1092	20394	3179	4185	5000	44.0	100	20.5
Elec.AC	**WAG9**	CO-CO	1092	20562	3152	4255	6120	46.89	100	20.5
Elec.AC	**WAG9H**	CO-CO	1092	20562	3152	4255	6120	50.97	90	22.0
Elec.AC	**WAM4**	CO-CO	1092	19974	3055	4165	3640	33.84	110	18.8
Elec.AC	**WAP1**	CO-CO	1092	18794	3179	4235	3800	22.4	130	18.8
Elec.AC	**WAP3**	CO-CO	1092	18794	3179	4235	3800	22.4	130	18.8
Elec.AC	**WAP4**	CO-CO	1092	18794	3179	4235	5050	30.8	140	19.0
Elec.AC	**WAP5**	BO-BO	1092	18162	3144	4255	5442	26.3	160	19.5
Elec.AC	**WAP6**	CO-CO	1092	18794	3179	4235	5060	30.8	105	19.0
Elec.AC	**WAP7**	CO-CO	1092	20562	3152	4255	6120	32.9	130	20.5
Elec. AC-DC	**WCAG1**	CO-CO	1092	20980	3050	4237.5	AC-5000	AC-43.65	80	21.3
							DC-4600	DC-30.0		
Elec. AC-DC	**WCAM1**	CO-CO	1092	20950	3055	4162	AC-3640	AC-33.84	105	18.8
							DC-2930	DC-28.2		
Elec. AC-DC	**WCAP1**	CO-CO	1092	20950	3055	4162	AC-3640	AC-33.84	105	18.8
							DC-2930	DC-28.2		
Elec. AC-DC	**WCAM2**	CO-CO	1092	20980	3050	4230	AC-4715	AC-35.4	120	18.8
							DC-2916	DC-26.0		
Elec. AC-DC	**WCAM3**	CO-CO	1092	20980	3050	4237.5	AC-5000	AC-40.2	105	20.2
							DC-4600	DC-26.8		
Elec.DC	**WCG2**	CO-CO	1092	19974	3055	4238	4200	35.6	90	22.0
Elec.DC	**WCM6**	CO-CO	1092	20394	3179	4255	4600	36.0	100	20.0

Various Machines used for Track Maintenance

ANNEXURE - C

S. No.	Type of Track Machine	Name of Machine: Purpose of Deployment	Deliverables	Output/ Effective Hour
1	09-3X	Tamping Express: Plain Track Tamping	It corrects track geometry i.e. alignment, twist, cross level longitudinal level and packs ballast under sleepers. This machine can pack three sleepers at a time.	1.6 KM
2	CSM	Continuous Tamping Machine; Pain Track Tamping	Do. But it can pack only two sleepers at a time.	1.2 KM
3	UNO	Unomatic; Plain Track Tamping	Do. But can pack only one sleeper at a time. it is generally deployed at work site.	0.5 KM
4	DUO (0)	Duomatic; Plain Track Tamping	Do. But it can pack only one sleeper at a time. it is gernerally deployed at work site.	0.8 KM
5	WST	Work-site Tamper; Plain Track Tamping	Do. But it can pack only one sleeper at a time. it is generally deployed at work site	0.8 KM
6	BCM	Ballast Cleaning Machine; Ballast screening of Plain & Turnout Track	It screers track ballast by removing muck, thus, improving drainage & elasticity of track for safe & comfortable running.	0.2 KM
7	SBCM	Shoulder Ballast Cleaning Machine; Cleaning of Shoulder ballast	It is used to carry out cleaning of shoulder ballast by removing muck, thus improving drainage & elasticity of track	0.4 KM
8	UNI	Unimat; Turnout Packing	It corrects turnout track geometry i.e. alignment, twist, cross level and longitudinal level; aslo packs ballast under sleepers.	1 T/Out
9	DTS	Dynamic Track Stabilizer; consolidation of newly tamped track	It builds up lateral resistance & facilitates consolidation of track and helps to relax speed restriction early.	1 KM
10	TRT	Track Relaying Train; Laying of Track	It is a fully mechanized system of complete track renewal	0.36 KM
11	PQRS	Plasser Quick Relaying System; Laying of Track	It is a semi mechanized system of track renewal wherein pre-fabricated rail panels are laid and existing panels are removed with minimum labour.	0.20 KM
12	T-28	Turnout Replacement Machine; Replacement of turnout	It is a fully mechanized system of changing complete turnout with minimum labour.	1 T/Out per 4 hour
13	UTV	Utility Vehicle; Transportation of Heavy Material	It is a mechanized system of transporting heavy matarial (like rail sleepers) from one station to another in traffic block	50 rails per hour in one BFR
14	BRM	Ballast Regulating Machine; Equalization, regulation of ballast	It is a machanized system of track ballast equalization regulation and profiling.	2 KM
15	RH	Rail Threader; Positioning of rail during renewal, maintenance & construction of railway track	It is a self propelled unit designed to meet rail positioning duties while renewing/maintaining/constructing railway track.	0.5 KM