NORTHEAST FRONTIER RAILWAY

OPERATING MANUAL

2020 EDITION

For official use only

PREFACE

The objective behind the Operating Manual of N.F. Railway is to provide a ready handbook to Officers and staff involved in train Operations. Railway Board has published Operating Manual in 2008 containing broad framework of guidelines for various aspects of train operations. N.F. Railway is having a very difficult terrain and the contour of the land invites a challenge to Railway Network. Therefore, a need was left to issue a comprehensive Operating Manual incorporating various aspects of train operating and an effort was made to standardize the divers operating practice of Northeast Frontier Railway.

The existing Operating Manual of 2005 edition has been laden with may correction slips and JPOs in regards to phasing out of steam era and eradication of conventional vacuum brake system for which new edition of Operating Manual is indeed essential.

The Manual is intended for the guidance of Operating Staff along-with other staffs who are engaged in train operations. The new revised manual also incorporates instructions in connection with various. IT projects such as FOIS, COIS, CMS etc. The revised manual consisting of twenty eight chapters has covered a wide range of issue containing train operations and large number of updated instructions and information have been incorporated in this manual for necessary guidance of the Officers and staff.

The new edition has incorporated recent JPOs along-with Board's circulars for necessary reference. A Chapter on Electrification has also been added considering the recent trend of conversion to electric traction and explain working in electric traction territory.

This Manual supercedes the Operating Manual, 2005 edition of N.F. Railway.

I hope, this manual will serve the objective in providing necessary guidance for all Staff, Supervisors and Officers connected with train operations.

U.Hazarika

(U.Hazarika)
Pr. Chief Operations Manager

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CHAPTER-I

WORKING OF STATIONS

1.01: Introduction: Railway Stations, world wide, are located in prime city centres, as railways were started at a time when expansion of cities was yet to start. Railway station continues to be the focal point of central business district in all cities in the world. However Indian railway is the service provider to the big cities as well as at remote locations of different part of countries.

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

In their historic evolution, the stations now have catering establishments, resting facilities in 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.

Station Master is in overall charge of the station and includes Station Superintendent/ Station Manager.

1.02: 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, Chapter II of Operating Manual dealing with “Working of Trains” and Block working Manual as amended from time to time.

I. Responsibility of Station Master (supervisory)/Station Manager

i. Station Master is responsible for the efficient discharge of duties by different members of staff at his Station. (General Rules 5.01)

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. Availability, helpfulness and good conduct of station porters and licensed porters towards the public.

v. He shall be responsible for general up-keep of the station.

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 got noted by them.

vii. He shall be responsible for maintaining 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 the extracts of the complaint with explanation of the staff and his own remarks to Divisional Office in time. In case of complaints concerning the other department, 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 to and assist in relief measures ensuring prompt evacuation of injured & stranded passengers. He shall take note of all the information available and protect the clues/evidence, which may be helpful in the enquiry. He shall intimate the control office at regular interval for 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 fire fighting equipments at the station such as fire extinguisher, fire buckets etc. are in fine fettle and ready for use.

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

- The Signals are back to 'ON' position when the relevant slide/button/ lever are put back or intended train movement has been completed.
- It is not possible to take 'OFF' conflicting signals at the same time.
- Signals are not taken 'OFF' until all points are correctly set and facing & trailing points are locked in case of motor operated point.
- Any other manner of testing prescribed by the Authorised Officer.
- Panel testing: Normal/Abnormal by Station Master.
- At stations provided with continuous track circuits or at stations having solid state interlocking 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 Masters.

xiii. He should check the dairy of SM cadre of all the shift of previous day and shall note down the discrepancies for action and compliance by the respective authorities.

xiv. He must ensure that the essential Safety equipments at his station are in working order, complete and, if there is any deficiency should be made good without delay and ensure that all tricolor flasher hand signal are in working order.

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

xvi. The Station Master in charge at a station shall inspect his station daily with a view to ensure efficient working of-

- All public amenities including toilet, Fans, lights, lifts, Escalators and check the general cleanness of the station.

- All equipments being in efficient working order. Deficiencies must be promptly rectified or recorded in Petty Repairs Book.
- Safe and efficient working of trains.
- Crank handle testing with S&T staff once in a month & record it properly.
- Cabins, Station Master's office, yards, goods sheds and level crossing gates under his charge.
- Reservation Enquiry, Public Address system, Public Information Display System, Booking offices, Ticket Checking, Catering and Vending stalls etc.
    - Acknowledges the Station Master Diary daily
    - Check the staff grievance Register.
- Drinking Water availability.

xvii. He shall see that train signal register, station Diary, Inspection Note Book, reference books and other station record is properly maintained and preserved for a minimum period as prescribed later in this chapter.

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

xix. He shall ensure that sufficient stock is available for the requirement of the day. He shall keep in touch with the running of trains so that, in case of late running of 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 and certified 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 Sr.DOM 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/Refresher Course/ Competency/ Safety camp and special competency programmes. No one, overdue Periodical Medical Examination/Refresher Course Competency shall be allowed to perform his normal duties.

II. Station Master (Outdoor)

i) The Station Manager shall be responsible for general up-keep and proper working of the station.

ii) He shall maintain safety literature, rule books, safety record. He shall counsel staff regarding rules and safety systems

iii) He shall deal with public complaints and counsel commercial staff for courteous behaviour.

iv) He shall ensure right time placement and removal of terminating/originating trains and keep records in this regard and Supervise the shunting movement performed within station yard if so instructed by SWR.

v) He shall inspect gate, panel, station, regularly during his shift.

vi) 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.

vii) 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.

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

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

x) 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.

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

xii) He shall keep close watch on passenger amenities provided at station and their up keep.

xiii) He shall look after any other work assigned to him by Station Manager, from time to time.

xiv) In case of emergency he shall also perform duty on Panel.

xv) All instructions received from superiors shall be recorded in an 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.

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

III. <u>Block SM</u>

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

ii) He shall keep the Station Manager's control keys block instruments 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 record/documents in good shape and ensure that all entries are completed and are up-to date.

iv) He shall attend the control 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 message, any failure of block working etc. and invariably enter these failures in signal failure register.

vi) In case of any accident, he shall inform promptly the section control Station Manager/ Station Master immediately. He shall give all the information available with him in regard to the nature, places, cause and 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-to-date, posted with latest correction 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 arrival 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 descriptions of the train to which he had granted line clear or obtained line clear to panel SM.

IV. <u>Panel SM</u>

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 & GR.

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 respect before taking over the 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 SWRs 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 burning 'brightly and are giving correct indications.

vii) 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.

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

ix) He shall ensure that all Shunting operations are carried out as per extant orders and GR 5.19 and SRs thereof.

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

xi) He shall allow shunting in between the arrival/departure of trains or during slack period as frequently as possible to the maximum extent.

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

xiii) He shall keep his reference books up to date, posted with latest correction 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.

xiv) 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.

xv) 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.

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

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

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

xix) He shall issue shunting order for shunting operations as per extant rules. He shall keep a watch on the working of shunting staff.

xx) He shall keep a Close watch on the working of shunting staff.

xxi) He shall ensure clearance of running lines in case of failure of their track circuits.

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

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

xxiv) In case of abnormal working he shall be responsible for cranking pad locking of points and piloting of trains in absence of Deputy Station Manager/out door Station Master.

xxv) SMs deputed to work on panel should test all the relevant signals, counter readings(like ERRB, RRBU, EBPU, Calling-on)along with the practical demonstration of crank handle. This Operation must be conducted once in 2 months, if not done already under regular working. Sectional TI to ensure the same in presence of the concerned signal Inspector. Record of the same to be maintained in the station.

V. <u>Pointsman/ Shuntman</u>

i) He shall obey all lawful orders of the SM on duty or official in-charge supervising the shunting 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 with Competency certificate.

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 station area in the evening and putting out in the morning time as fixed by DRM office.

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. This will be dispense when Colour light Signal ,Flashing Tri-colour Torch is provided.

xv) At the time of through passing of trains he shall observe the train from opposite side of station all safety aspect and if the train is safe for onward run he will show all right signal.

VI. Gateman

i) He shall be responsible for proper operation of the gate as per GWI/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 come on duty in proper time and also with Competency certificate in neat and clean uniform.

v) He shall clean the gate lamps and hand signal lamps daily.

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

vii) He shall remain alert on duty till properly relieved.

viii) He shall ensure that the equipment at L-Xing are complete and in working orders.

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

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

xi) 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.

xii) He shall be polite and courteous in his behaviour towards the public.

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

xiv) He shall close the gate on sighting a train or when ordered by the SM on panel duty.

xv) 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.

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

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

VII Duty list and hours of duty:

1. Sr. DPO/DPO shall fix the duty hours for the staff at stations in accordance with the (Hours of employment regulations in consultation with Sr.DOM/DOM/ Sr.DCM/DCM). Copies of these duty hours (roster) must be displayed at each station .

2. 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 prior permission of the Station Master.

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

1.03: SM's responsibility for assurance:

Station Master's responsibility 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.

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. However, 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 Big yard and lobby - 10 days

   (b) Terminal stations with marshalling Big yard and lobby - 8 days

   (c) Large stations or junction stations - 5 days

   (d) Medium stations & Medium Road side station - 3 days

   (e) Road side stations - 2 days.

If employee fails to give declaration in fixed period, he must be directed for Refresher Training at his expense. It must cover pickups in all the shifts. (Minimum one day for each shift.)

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, there is no need of providing pick up time.(if there is no change in SWR or layout during this period).

Note: Assurance of staff : All the staff who are in any way associated with trains passing duties

must sign a declaration in the Assurance Register in token of having studied the Station Working Rules. Rule diagram and other instructions pertaining to their duties and understand the same and that they are in a position to take up the duties independently at the station. The Station Superintendent/Yard Master/Station Master shall also certify that the staff concerned have understood the instructions pertaining to their duties.

Fresh assurance shall be obtained in the Assurance Register from the staff concerned when –

1. He joins at the station as a new member;

2. There is any change in the Station Working Rules; and

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

1.04: Bio-Data/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, contractors' coolies or any other persons working at 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. Where there is no commercial staff deployed. SS concern should maintain the records for inspection.

1.05: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. If services are now available on-line then not mandatory to display.
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 stations.
8. Extract of Railways Act (24 of 1989) and payment of wages act.
9. A list of nearest Doctors and Hospitals, with telephone nos and distance.
10. Rules for the occupation of Rest Houses and 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. Bio-Data of Staff should be maintained which include Name, Designation, Address, Blood group, Mobile number etc.

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.

1.06: 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.

1.07: Rule Books, Manuals etc. at Stations:

1. The Station Master is personally responsible to see that rules books. are kept up-to-date and are available to staff for reference. (G&SR 2.01, 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. Destructions of obsolete records shall be recorded in a register.

1.08: 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 unauthorised 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.

1.09: 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 separate appendix to SWR.

1.10: Hand Book for gateman

1. Extract of the Station Working Rules. (i.e Gate working Instructions).
2. Public Complaint Book.
3. Vision test/PME and Competency Certificate of the Gateman.
4. Results of last Traffic Census.
5. Inspection Books.

1.11: Filing of Operating Circulars:

1. Every Station must maintain files of circulars, Alert advice, safety bulletins, Rule of the month etc. subject wise.
2. Each circular must be got noted by members of the staff concerned. In case of Group 'D' moderately literate staff, Station Master must record that circulars etc. have been correctly explained. Instructions for Guards 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.

1.12: 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 DRM,
7. SR.DOM shall provide model draft of letters, which are frequently received at stations, using a model draft 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.

1.13: 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.

1.14: 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 authorised by railway administration.

1.15: Religious Edifices within the railway limits:

Employees are forbidden to occupy any place in 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.

1.16: Normal period for which Station Operating Registers and Records are required to be preserved:

S.No. Book/	Description of the Book/Form	Period of preservation from the date of completion
	Train passing registers/Books/Forms	1 year
	Muster Roll	Permanent record
	Caution order register and Caution Order books	1 year
	Wagon Exchange Book/Wagon Exchange Register	3 years
	Sick Wagon and Transshipment Register	3 years
	Guard's Signature Book(Where CMS system available not required)	3 years
	Wagon Demand/Priority Register	3 years
	Indent and Loading Register	3 years
	Wagon Transfer Register	3 years
	Damaged Stock Register/ Sick Wagon Register	3 years
	Siding Voucher Book/Record of Time Wagon Handing over	3 years
	Control Order Book/Conference Book	3 years
	HQ Leaving Permission Register	1 year
	Uniform Register	Permanent Record
	Record of Station Equipment sent for repairs	Permanent Record
	Register of Inward and Outward Letters	3 years

	Register of Important Circulars	Permanent Record
	Station Order Book	Permanent Record
	Station Inspection Register	Permanent Record
	Transportation Bio-data Register Register of Home Addresses of staff etc	Permanent Record
	Spectacles Register(Also Maintained in PME Register)	1 year
	Station Diary and Charge Book	1 year
	Unconnected Wagon Register	3 years
	Load Report Register	3 years
	Register showing Analysis of Late starts To Goods Trains at important Yards	3 years
	Summary of Daily receipt and despatch of wagons and Work Done	Orders issued by DRM
	Special Stock Register	Orders issued by DRM
	Detention to Wagon at Train Marshalling stations	Local Orders to be issued by DRM
	Marshalling Register for Inward and Outward trains	Local Orders to be issued by DRM
	Register showing detailed Arrival, Placement, Despatch and Detention particulars of PU, Repack wagons, etc.	Local Orders to be issued by DRM
	Register of Long Distance Goods Train run	Local Orders to be issued by DRM
	Register showing Detention to wagons at Break of Gauge Transhipment point (Also in FOIS)	3 years
	Number Taker Book	3 years
	Yard Wagon Balance Register	1 year
	Guard's Duty Register	3 years
	Guard's Rough Journal	3 years
	Register of Train Advices	6 months
	Form of Train Examination advice	1 year
	Register showing load of Goods Trains and Goods trains run under load	3 years
	Statement of running of Passenger Trains	3 years
	Diary of Yard Supervisor.	Permanent Record
	Unusual Register, other registers and Records maintained in control offices and at specified stations	Local Orders to be issued by DRM

Note: -

(i) In calculating the one year or the three years period, the year to which the books and documents relate, and the year in which they are to be destroyed should be excluded.

(ii) Record pertaining to Court Cases, departmental enquiries should not be destroyed till three years from the date the case is decided.

(iii) 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 computerised, clubbed & some can be eliminated.

(iv) Records preserved more than stipulated period as prescribed above and devoid of any case as mentioned in item No. (ii) should be destroyed in presence of Sectional or Divisional TI, duly recording the list of registers destroyed.

1.17: Refresher course of serving Railway employees:

It will be necessary to conduct Refresher course to enable the staff keep themselves with the latest rules. Station Master, Controller, Traffic Inspectors, Guard, Pointsman, Gateman should be sent for Refresher course once in every three years. (For details see GR 14.04 & SR thereto).

1.18: Periodical Medical Re-examination of serving Railway employees:-

In order to ensure the continuous ability of Railway employees in class A-1, A-2, A-3 to discharge their duties with safety, they will be required to appear for reexamination at the following stated intervals throughout their service.

Category A-1, A-2, A-3

i) At the time of every period of four years, calculated from the date of appointment, until they attain the age of 45 years and then every two years until the age of 55 years and then there after annually, until the conclusion of their service.

ii) If an employee in medical category A has been periodically medically examined at any time within two years prior to his attaining the age of 45 years, his next medical examination will be held two years from the date of last medical examination and subsequent medical examination every two years until 55 years and then annually thereafter until retirement. If however such an employee has been medically examined at any time earlier than two years to his attaining the age of 45 years his next medical examination should be held on the date he attains the age of 45 years and subsequent medical examinations every two years thereafter.

Age (as on the date PME)	Next PME due
Less than 41Yrs	After 4 Yrs
41 Yrs	After 4 Yrs
More than 41 but less than 43 Yrs	45th D O B
43 Yrs	45th D O B
More than 43 but less than 54 Yrs	After 2 Yrs
54 Yrs	After 2 Yrs
More than 54 Yrs	After 1 Yrs

(For details see Para 514 IRMM)

1.19: Special instructions for temporary closure of stations due to terrorists threats.

In the event of non-availability of station staff at road side stations due to terrorist threat, the Station Master of the concerned station should seek a special permission from the competent authority i.e. Sr.DOM/DOM of the division by issuing a written message illustrating the details of the facts. On getting the permission from the Sr.DOM (in the form of written message or numbered control message) the Station Master who proposes the temporary closure of the station, shall issue an all concerned message addressed to Sr.DOM, Sr. DSTE, Sr. DME,Sr.DEE Sr.DSO, CHC and SMs on either end stations with a copy to Sectional TI, PWI, SI, LI and SSE/ Loco of the affected jurisdiction. The message shall contain the following points in brief :

(i) The reasons for temporary closure of station.

(ii) The date and time from which the station will remain closed

(iii) Expected duration of time for temporary closure of station.

(iv) Whether points are set clamp and padlocks in favour of Main line.

A. Precautions to be taken by SS/SM of the station which is being closed

a) The block sections at either end of the station shall be treated as one block section during temporary closure of station.

b) SM should ensure that all the facing and trailing points including catch siding/slip siding/ outlying siding and other siding points (if any) will remain permanently locked in favour of main line(i.e. straight road). The keys of the padlocks shall remain under the personal custody of the Station Master (in charge).

c) In addition, if any points man is provided (on the engine or train) who is to open the affected section in such situation, he shall be provided with extra assets clamps and padlocks as an additional precautionary measures to avoid detention if the miscreant unlock any point during the time gap. On arrival of the next block station where normal working is continued, the running pointsman shall intimate the condition of the closed station to station master of the station in advance. The running pointsman shall keep keys of the extra clamps and padlocks in his own custody which shall be returned to the issuing Station Master on his return trip.

d) In such situation, the Station Master in charge who introduces the temporary closure of the station, should keep the keys of the block instruments. SM's lock up box, key box, slides, cabins etc. in the normal position and all the keys will remain in his personal custody.

e) The Station Master in charge shall also intimate the station masters at the either end and the (Section Controller) on duty regarding issue of caution order in the form T/409 from the nominated stations or a station in rear to all the Loco Pilots/Guards of Up/Dn trains regarding abnormal working of the sections and advise them to follow the speed restrictions mentioned in the caution orders. The speed of the train shall be restricted to 25 KMPH during day time when the view ahead is clear and 15 KMPH during night or when the view is not clear over the portion of the track between both the points to be clearly mentioned. The speed over the section is to be decided by the engineering department with approval from security on the basis of the merit of the case. All the Loco Pilots of Up/Dn trains are authorized to pass the approaching/departing signal at ON position as mentioned in T/409 which is to be served by the Station Master of the rear of the station.

B. Action to be taken by the Station Master in rear :

a) The Station Master of the rear station shall also issue another caution order to the Loco Pilot to stop his train short of level crossing gates and pass the same cautiously after closing and locking the gates in the mid section against road traffic by the crew or running Pointsman (as the case may be) the Loco Pilot shall pass the train safety. The caution order will carry with it additional instructions which will be as follows :

" Loco Pilots of all Up and Dn trains will stop at the short of the level crossing gates and apprise the Gateman of his stoppage by sounding engine whistle. He shall then be hand signaled past the gate by the Gateman. If there is no Gateman, he shall be guided by one of the engine crew or running Pointsman who is travelling in the engine or Guard(as the case may be) of the train after then ascertain that the gates are closed and locked against the road traffic. After safe passage of train, the travelling Pointsman/Guard will open the level crossing gate and entrain the train for onward journey".

b) The line clear for the train shall be obtained from station in advance by the Station Master in rear station through approved means of communication and Paper Line Clear Ticket in the form T/B 1425 & T/C 1425 shall be issued to all UP/DN trains entering the affected block section. The Section Controller shall note the private number issued by the Station Masters in advance/rear stations in the control chart for records.

Action to be taken after restoration of normal working :

After restoration of normal working on getting security certificate from concern department as well as ensuring safety, the Station Master who initiated the temporary closure of station shall issue a message of resumption for normal working of trains addressed to all concerned officials as mentioned in para above, intimating the time and date of resumption of normal working and the last train dealt under abnormal working. The sectional TI of the section shall visit the said station where such working was introduced and give a detailed report to Sr.DOM and DRM of the division within a span of 7 days from the date of closure of the station.

1.20: Cognizable Offences.

The following offences under the Indian Railway Act 1989 have been made cognizable.

	Offence
	Railway servant drunk on duty. Endangering Safety of persons. Omission to give notice of accident. Obstructing level crossings. Unlawfully bringing dangerous or offensive goods upon a railway. Needlessly interfering with means of communication in a train. Entering compartment reserved or already full or resisting entry into a compartment not full. Defacing public note. Fraudulently traveling or attempting to travel without proper pass or ticket. Altering or defacing pass or ticket. Entering carriage in motion: on otherwise improperly travelling on a railway. Entering carriage or other place reserved for females. Drunkenness or nuisance on a railway. Obstructing railway servant in his duty. Maliciously wrecking or attempting to hurt person travelling by rail. Maliciously hurting or attempting to hurt person travelling by rail. Endangering safety or persons travelling by railway. Endangering safety or persons travelling by railway by rash or negligence act or omission. Special provision with respect to the commission by children of acts endangering safety of passengers travelling by railway.

1.21: Arrest for offences against certain section.

(i) If a person commits any offence mentioned in above may be arrested without warrant or other written authority by any railway servant or police officer or by any other person when such servant or officer may call to his aid.

(ii) A person so arrested shall, with the least possible delay be taken before a Magistrate having authority to try him or commit his for trail

N.B. In all cases where it is possible call in police. The arrest should be made by them and not by Rly Servant.

(iii) When a non cognizable offence is committed the Railway should take the initiative if an investigation by the police is desired.

1.22: Procedure for arrest of Railway staff.

When the arrest of a Railway staff 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 the duty of the person so arrested. If the immediate removal from duty of the Railway staff is likely to endanger the safety of the travelling public or be serious inconvenience to the railway the arrest shall ordinarily be deferred until the relief is effected. Should it be necessary, however, to place a Railway staff under immediate restraint, he may be arrested and permitted to continue on duty under guard.

CHAPTER-II
WORKING OF TRAINS

2.01: General: 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 shall give 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 and on ghat section/LMG-BPB hill section 6 trips of road learning shall be provided before being put to work the train/vehicle independently.

2.02: Examination of Trains

Each train shall be examined by competent person from the rolling stock/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/ Brake power certificate indicating duration of its validity.

2.03: Classification of Trains: Trains are either scheduled as shown in the Working Time Table or non scheduled trains and are run on the following account: -

(A)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 of carriage of coaching traffic only.

(e) Goods trains for movement of conventional freight cargo

(f) Container Trains

(g) Mixed trains carrying both passengers and freight Other trains to include Exhibition Trains, Mobile Hospital on wheels etc.

(B)Engineering Account

1. Ultrasonic and other track testing trains:

(a) Material trains.

(b) Track maintenance trains like Tie Tamping Machines, Rail grinding trains PQRS, BCM, DGS etc.,

(c) Wiring Special / Tower wagons.

(C)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.

2.04: 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 CTNL in conjunction with the Power Control and or Lobby Supervisor.

2.05: Train Preparation:

The time at which 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 compliment 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

To facilitate passengers boarding, 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 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.

2.06: Classification of light engines – Definition

A light engine is an engine running outside station limits without vehicles attached.

Engine are run light on-

(a) Traffic Account
(b) Engineering Account
(c) Locomotive Account

(d) Miscellaneous Account

The following explains the heads under which a light engine should be classed:

(a) Traffic Account-

(i) All engines run light to balance power

(ii) All engines run light a pilot in advance of a train

When the light engine is run for the purpose of working a coaching train it is to be reckoned as coaching: when for a goods train, as goods and when for a mixed train, as mixed. In the last case, the division between coaching and goods should be made in proportion to the respective vehicle kilometers run.

(b) Engineering Account:

(i) All engines run light to work locomotive trains

(ii) All maintenance train engines run tight to a running shade to be stabled there for the night.

(iii) All engines run light to a shade after completion of maintenance work.

(c) Locomotive Account:-

(i) All engines run light to work locomotive trains

(ii) All engines run light to and from workshop for or after repairs.

(iii) Engines run light from one station to another for shed or watering purpose.

(iv) Engines sent light from one station to another on transfer.

(d) Miscellaneous Account-

(i) All engines run light in connection with the miscellaneous train service

(ii) Engines of maintenance trains run light to running sheds for repairs or shed purpose.

2.07: Jurisdiction of Divisions:

Division	Jurisdiction
KIR	Malda Town(exclusive)-New Jalpaiguri- Raninagar Jalpaiguri-Haldibari, Katihar Jn.- Kumedpur, Katihar Jn.-Mukuria, Katihar jn.-Jogbani, Eklakhi-Balurghat, Katihat Jn-Teznarayanpur, New Jalpiaguri-Siliguri Jn. Aluabari Road, Barsoi-Radhikapur, Siliguri Jn- Darjeeling(NG section).
APDJ	Raninagar Jalpaiguri(exclusive)-New Bogaigaon(exclusive), Siliguri(exclusive)-AlipurduarJn-Samuktala Road, Raninagar Jalpaiguri(exclusive)-Y-leg- New Chengrabandha ,New Mal Jn- New Chengrabandha-New Coachbihar, AlipurduarJn- New Coachbihar-Bamanhat, Fakiragram- Dhubri-New Coachbihar.
RNY	New Bongaigaon-Rangiya-Agthori(exclusive), New Bongaigaon-Goalpara Town-Kamakhya(exclusive), Rangiya Jn- Rangapara North Jn.- Dekargaon, Rangapara North Jn.-North Lakhimpur- Murkongselek, HarmutiJn-Naharlagun,Ragapara North Jn-Bhalukpong.
LMG	Agthori- Lumding Jn- Furkating Jn.(exclusive), Chaparmukh Jn- Mairabari, Chaparmukh Jn- Shilghat Town,Lumding Jn-Badarpur-Silchar, Katakhal-Bhairabi, Katakhal-Vangaichungpao,Badarpur Jn- Karimganj-Agartala-Sabroom, Baraigram-jn- Dullabcherra, Karimganj- Maishashan, Tetelia - Kamlajari

TSK	Furkating-New Tinsukia- Dibrugarh Town,New Tinsukia- Tirap, Makum Jn-Dangri, Sumulguri- Moranhat-Dibrugarh, Amguri-Tuli, Dibrugrah- Bogibeel North Block hut(exclusive).

2.08 LHB (Linke Hoffmann Busch) Coaches

ICF design coaches have been the main passenger carriers of Indian Railways since their inception. It was not possible to attain higher speeds due to inherent design limitations of these coaches. To overcome this problem, Indian Railways introduce for LHB type of Coaches.

LHB type of coaches are far superior w.r.t. passenger comfort, safety, speed, corrosion, maintenance and aesthetics. These coaches are also longer as compared to ICF design resulting into more carrying capacity.

The expected benefits from LHB type of coaches are as under:-

i Higher carrying capacity - These coaches are about 2 meters longer than ICF coaches. With this extra length two additional rows of chairs in chair cars or one additional bay in sleeper coaches can be accommodated.

ii The weight of LHB coach is lesser as compared to ICF design coaches. LHB coach can accommodate 72 passengers as compared to 64 in conventional AC III Tier Coach. Thus giving better pay to tare ratio.

iii Low corrosion – There will be low corrosion of LHB coaches due to extensive usage of Stainless Steel and better design and manufacturing techniques.

iv Low Maintenance – Replacement and removal of sub-systems will be required only after one million kilometers.

v LHB Coaches have aesthetically superior interiors with FRP panels for side wall and roof. They can be removed easily for maintenance, resist water seepage and are wear resistant;

vi There are no visible screws inside the passenger compartment.

vii Better passenger comfort: Better Riding Index has been specified as compared to conventional ICF coaches.

viii LHB coach offers better passenger safety due to:

- Use of fire retardant materials for furnishing.
- Provision of emergency open able windows.
- Vertically interlocked Centre Buffer Couplers.

LHB coach offers better passenger amenities due to :

- More space for pantry;
- Individual reading light in chair car;
- Ergonomically designed chairs with reclining back rest;

2.09: Passenger Trains Operation

Introductory: Railway operating work is divided into two main branches viz. Passenger Train operation and Goods train operation. The public judge the efficiency of a Railway by the punctual and safe running of passenger services. Late running of trains is not only a cause of irritation and inconvenience to passengers but also involves wasteful expenditure. As a public utility service the Railways are to ensure that the passenger services are comfortable, safe and punctual.

Classification of passenger services:-

On this Railway the following types of coaching trains are run-

(a) Mail and Express Trains-
These are high speed services which carry passengers and postal mail over long distances stopping only at important nominated stations.

(b) Passenger Trains:-
These trains cover relatively short distances and stop at every station.

(c) Mixed Trains:-
On Branch line sections where enough passengers and goods traffic does not offer for the running of separate passenger or Goods Trains, Mixed trains are provided to reduce the cost of operation. Such trains stop at all stations and are essentially slower in speed.

2.10: Time Tables –

(i) Time table in force on Railway must be pasted in a conspicuous and accessible place at every station. The copy must be in English and Hindi. The posting of such time table constitutes a public notice and the effect of publication is that the Railway Administration promises that a train shall run as advertised. In pursuance of this section, GR 4.02 provides that no passenger or mixed train shall be dispatched from a station before the advertised time. Any breach of this rule will amount to breach of promise on the part of the Administration.

(ii) It is a standard practice to prepare the Time Table once in year.

Following types of Time Tables are published on this Railway and issued to come into force:-

(A)Public Time Tables –

These are handy volumes for use by the public and are printed in English and in regional languages. In addition to the time schedules they contain a variety of useful information for travelling public. At road side non-important stations, the arrival time of stopping passenger carrying trains is shown as departure time so as to enable the train to make up time and get an earlier start, if that would facilitate crossing ahead.

(a)Sheet Time Table-

These are printed in English and Hindi and contain the schedules of various coaching services. These are exhibited on the notice boards of station platforms and in passengers waiting hall and in waiting room.

(b)Staff copy of Time Table –

This is a copy of Time Table meant for use by Railway staff.

(c)Working Time Table –

These are issued separately for North Bank(KIR, APDJ & RNY Divisions) and South Bank(LMG & TSK Divisions) for information and guidance of Railway staff specially the running staff, station and control staff. These contain variety of information and instructions for the staff.

2.11 Factors taken into consideration in preparing Time Table of passenger trains-

Apart from station to station running times which form the basic information for preparing the Time Table, the factors to be taken into consideration in determining the timings of a passenger train may be divided into-

(i) Facilities for passengers, and

(ii) Operating requirements.

The primary considerations are the needs of travelling public. However, in meeting their needs, consideration has to be paid to the following operating requirements –

(a) The facilities available at terminal stations – Terminal stations should be able to berth trains at the proposed timings, bunching of trains at terminal stations should be avoided.

(b) Maintenance of connection with other trains.

(c) Nominated rake link however may be interchanged by any rakes to nullify the effect of late running of one of such rakes or for better operational feasibility.

(c) Rake Links – Every Rake has a fixed Link designed to make the best use of the stock and to cater for the time required for the maintenance of the rake at its home stations. Any change in passenger train timings should not normally affect the rake links adversely. Rake links are prepared either to run UP and Down trains or for combining a series of services. The case is for long distanced trains where four or more rakes may be required to run the train depending on the turn round of the rake. The second would be the case of shuttle run with one rake or a local service with a number of short distance trains run every day.

The following points should be borne in mind in connection with preparation of rake links –

(i) The depot at which the rake will be maintained has to be decided, and an adequate halt will be provided for this rake at the station for proper maintenance of the rake.

(ii) Where the halting time at a terminal is too tight for the rake to start back as the corresponding train in the opposite direction it should be better to have an overlapping rake at the terminal so that late arrival is not transmitted into late departure of the train. Non-availability of sufficient time for maintenance of rake at terminal not only causes in convenience to passenger due to un-swept carriages, failure of lights, fans etc, but also affects the punctuality of service.

(iii) The use of passenger service rakes for shuttle service at the terminal should be considered only when justifies due to shortage of stock or when passenger requirements correspond to each other in two services.

(iv) All coaches of each rake should, as far as practicable, be of same design and of same colour so as not to create a bad impression of the public.

(d)Engine Links:- Train engine also have their links based on the same principles as rake links and should be given due consideration when modifying passenger train timings.

(e)Time for crossing and precedence –Whatever time is required for precedence to a more important train or crossing of an opposing train on single line, this has to be provided for in the timings of each train.

(f)Time for shunting- The time required for attaching and/or detaching of sectional and through service coaches has to be taken into account for determining the halt at the station. Time required for shunting for any other reasons shall also have to be taken into consideration.

2.12 Speed and Running Time- The various speeds and running time which are used in connection with time tabling are described below:-

(a) Maximum permissible Speed:- The maximum permissible speed is the highest speed permitted for different sections of the railway by the Commissioner of Railway Safety taking into consideration the condition of track, bridge curvature and gradient. This speed can not be exceeded by the Loco Pilot under any circumstances. The maximum permissible speed for each type of locomotives is also fixed for different sections and notified in the Working Time Table.

b)Minimum running time : The minimum running time between stations is fixed on the basis of maximum permissible speed. Then minimum running time is based on train wise and takes into account permanent speed restrictions and stoppages but does not include allowances for temporary speed restrictions. The train wise minimum running times are very useful to the Loco Pilot as he knows exactly to what action he can make up time on each train when he is running late without infringing the maximum permissible speed.

c)Normal running time : It is the running time required for each train between stations on the basis of Sectional speed taking into consideration the additional time required for permanent speed restrictions. Any allowance permitted for temporary speed restriction, and time for acceleration and /or deceleration in case of stopping trains when the train is running late. The Loco Pilot may exceed the normal running time up to the limit of the maximum permissible speed subject to other restrictions in force.

d)Recovery time : Apart from the provision of the permanent restriction and temporary speed restrictions, some additional time is provided to compensate for the time lost either on account of passengers or on account of operating reasons that might take place in the course of running of the train. Based on this, some adhoc allowances (i.e. recovery time) should be provided for different trains and included in the running time in the last lap of the passenger carrying trains. It has, however, to be safe guarded that such allowances do not make the timings too slack as this may have some undesirable repercussion.

e)Time allowance to cover temporary Engineering restrictions :- The time allowance to cover temporary engineering speed restriction is provided on each section based on the work proposed to be carried out by Engineering Department.

f)Time allowance to stop and start:- The time allowances are to be added to the running time to compensate for the time lost when a train has to stop and start. This is called time for deceleration and acceleration respectively.

g)Time allowance at junction stations : Time allowance at junction stations for maintaining connections with other trains and for other public requirements should be judiciously fixed and tedious halts avoided.

i) In cases where through coaches or reserved carriages have to be transferred from a train running late and mixed connection would mean considerable delay and inconvenience to through booked passenger connecting trains may be detained longer than the limits laid down above obtaining approval of the Sr.Divisional Operations Manager/Area Manager concerned. Every such detention must be reported to the control as well as recorded in the statement of daily detention register. Control should report it in their daily punctuality statement to Central Control for information of the head office.

2.13 Revision of Time Table :- The purpose of revising the time tables are described below :

a) To improve the running of trains, services from the experiences gained the object should be to speed up the trains and alter the time tables to obtain better punctuality.

b) To introduce new train services if the traffic demands within the availability of rolling stock and line capacity.

c) To provide different Engineering allowances according to progress of various works on lines and plan for undertaking new works.

d) To take into consideration the various public demands about halts, etc. coming from MPs, MLAs and other individuals and also from the Railways users Consultative Committee, Chamber of Commerce, postal Departments and Member of the Time Table Committee etc.

e) With the change in seasons, adjustment in train timings is required to be made for the benefit of travelling public.

2.14 Process of revision of Time Tables:-

Suggestions received from individuals and different representatives bodies are considered at various meetings held at divisional level and also at Headquarters level. While preparing time table for preparing trains running over more than one Railway collaboration is maintained with the concerned Railway. With a view of securing better coordination from the users of the Railway in drawing out seasonal time tables, a committee known as the Time Table Committee with Principal Chief Operations Manager at its Chairman discuss and advise regarding salient feature of the proposed time table along with various suggestions that are received from the public, MPs, MLAs and Member of different Railway Users' Consultative Committees etc.

2.15 Ordering of special passenger trains:-

Special passenger trains ordinarily ordered by the Pr. Chief Operations Manager who will issue Special Train Notices giving detailed timings to all concerned. When time does not permit him to have the Special Train Notices printed and issued on account of the special train having to be arranged on very short notice, all concerned will be advised of timings, etc. Only in case of exceptional emergency and when time does not permit of a reference to the Pr. Chief Operations Manager being made, local officials are authorized to arrange for the running of Special Train advising all concerned.

2.16 Duplication of Passenger carrying Trains-

A passenger carrying train may be duplicated if the original train is either stranded due to accidents or floods or breaches, or running so late as would cause serious inconvenience to passengers and disorganize the links.

2.17 Diversion of Passenger carrying Trains-

A passenger carrying train may be diverted by another route due to serious accidents or floods or breaches causing dislocation of traffic and blockage of line.

2.18 0verload and Double heading-

(a) When it is necessary to attach additional vehicles to a train over and above the maximum load permitted for such a train, the Station Master or the Yard Master as the case may be, must obtain permission from Divisional Railway Manager through Control in a Controlled section and through telegraph in a non- Controlled section. In the case of Mail or Express or Passenger trains running over more than one division, the Divisional Railway Manager after consultation with the Divisional Railway Manager of the other division over which the train will run, must obtain the sanction of the Pr. Chief Operations Manager.

(b) When double heading is to be done as an operating necessity in the circumstances which are not ordinarily foreseeable, the power to authorise double-heading may be delegated to officers not below the rank of senior scale.

(c) Whenever a train is to be strengthened to clear rush of traffic to such an extent as to require double-heading, it should be well considered because splitting invariably affects track capacity.

2.19: Cancellation: A passengers carrying train may be cancelled either due to serious accident or when due to abnormal working, two passengers carrying trains bunched together at same station, for the same section or where due to a duplicate train being run, the original train is not considered necessary. But in normal circumstances no regular passengers carrying train should be cancelled without prior approval of the Railway Board.

2.20: Punctuality

The efficiency of passenger train operation is mainly judged by punctuality. Punctuality is defined on the basis of :-

(i) Right Time Arrival (RTA) of trains at the destination ; and

(ii) Train 'Not Losing Time'(NLT) on the Railway / Division for which punctuality is being reckoned.

2.21 Causes affecting Punctuality-

Some of the causes which affect punctuality are described below

(a) Operating

(i) Improper time tabling.

(ii) Bad controlling,

(iii) Late placement of rake at starting station,

(iv) Delay on the part of station staff in asking and giving Line clear and handing over authority to proceed to the Loco Pilot.

(v) Delay on the part of Guard incoming for duty taking extra time to take over charge and dilatory working in supervision over loading, unloading of packages, shunting operations at wayside stations and giving signals to start his train.

(b) Mechanical

(i) Engine Late on train on account of being turned out of shed late.

(ii) Engine failure

(iii) Loco losing time during run

(iv) Extra time taken for carriage watering and fuelling.

(v) Loco Pilot missing token/ Tablet delaying starting or taking extra time in taking over charge of the Locomotive

(vi) Hot axle / flat tyre / any other coach defect on a train and carriage (s) having to be detached therefore,

(vii) Failure of head lights of Locomotives.

(viii) Vacuum / Air pressure troubles,

(ix) Failure of train lighting, fans and other electrical appliances.

(x) Failure of water supply for failure of electrical pump.

(c) Signal and Tele-Communication

(i) Defective signals requiring notice to be issued and trains to be received on written authority as per Rules in force.

(ii) Defective points.

(iii) Bad sighting of signals.

(iv) Failure of Block Instrument / Panel requiring adoption of abnormal working.

(v) Failure of Control.

(d) Engineering

(i) Block given to Engineering Department being exceeded.

(ii) Frequent imposition of Engineering restrictions.

(iii) Inadequate rate of water supply at carriage watering stations.

(iv) Rail fracture.

(e) Electrical

(i) Failure of train lighting , fans and electrical appliances.

(ii) Failure of water supply for failure of electric pump.

(f) Commercial

(i) Dilatory attitude on commercial staff in loading and or unloading parcels.

(ii) Detention due to discrepancies or mistakes in reservations.

(g) Unusual Occurrences

(i) Alarm Chain pulling

(ii) Passenger runover, getting sick or falling out of train

(iii) Theft

(iv) Accidents

(h)Miscellaneous

(i) Law and order problem

(ii) Insurgency related problem

(iii) Sabotage/ Train wrecking

2.22 Measures to improve Punctuality

Though punctuality of trains is an operating subject, its achievement depend upon the combined efforts of a number of departments. Given below are some of the measures to be taken to improve the punctuality figures.

(a)Control:-

Some of the additional duties of Control in achieving punctuality towards passengers carrying train operations.

(i) The fundamental defects in time tabling whatever suitably may be are discernible by experienced Controllers, crossing of trains at wrong stations, bunching of trains at junction stations with inadequate platform accommodation, inadequate provision of shunting time, and any drastic, revision of train timing will have to be carefully examined to see their repercussions on the train service as a whole.

(ii) The Section Controller has to arrange crossings precedence to the best advantage, In fixing the crossing and precedence, he should not be guided by the schedule running times alone but he has to consider the performance of the individual trains, the dependability of the Loco Pilot, and nature of the block sections involved.

(iii) It often happens that by a little detention to a passenger carrying train it may be possible to save an hour's detention to a goods train. In deciding whether such a detention can be Permitted, the importance of 'the passenger carrying train and its spare time to make up before the end of journey, and the performance of the train in general, should have to be considered.

(iv) To avoid delays in shunting and loading and unloading Parcels en-route, the section controller should give advance information to the Station staff about the work to be done.

(v) As a goods train approaches the terminal yard, the Section Controller should make advance enquiries whether the train would be accepted directly in to the yard or whether it may have to be regulated.

(vi) In case of over crowding, action has to be taken to restrict further booking of passengers.

(vii) Stabling of goods trains, where the needs arise, has to be done with foresight.

(viii) The controllers intelligence, knowledge, initiative as well as personality come into play when a passenger train is running late. They can infuse in the train crew and the station staff and urge to save time. In such cases, advance intimation indicating probable timings at stations the work to be done, crossing to be arranged, when given to the station staff and train crew, would definitely assist in making up times.

(ix) The controllers are the guides in deeds and friends and philosophers in needs, An attitude of sympathy and understanding displayed by the controllers towards the running staff can achieve wonders, whereas lack of tact can make such staff obstinate and refractory.

(b) Station Master-

The Station Master shall ensure that-

(i) Trains are not held up on account of such avoidable delays as signals extinguished, drooping or taken off late, shunting in the yard, crossing, precedence, absence of a competent railway servant in proper uniform at the foot of defective signals as prescribed in GRs & SRs concerned to pilot passed the signals, non-availability of a clear reception line or delay in obtaining 'line Clear, or giving 'permission to start 'or showing 'Proceed signal', 'All right signal' from proper place.

(ii) There is no delay in making over the correct' Authority to Proceed' to the Loco Pilot.

(iii) All concerned staff of the station are alert to do their respective job in connection with the train within the prescribed halt.

(iv) All passengers are accommodated within the booked stoppage of the train.

(v) Packages and mails are stacked at suitable site on the platform for loading promptly, ascertaining the position of available room and van on trains from the Guard of the approaching train, through Control or Station Master in rear, as the case may be, and also be prepared for unloading packages if any, promptly.

vi) Shunting is completed expeditiously as possible, keeping shunting staff ready, arranging sectionalized loading by grouping of wagons for Up and Dn direction in separate hook loads for one station in one hook. Empty trucks are secured ascertaining availability of room on trains, loads supposed to be attached by train approaching are coupled in group prior to arrival of trains.

(vii) The station clocks are synchronized with Control and, the watches of running staff with the Station Master's clock, so that there is no difference in time.

(viii) Connecting trains are not put on distant platform.

(ix) When a train is running late, as much time is made up as is possible by curtailing the authorized halt at the stations provided the train does not leave before the departure time shown in the public time table.

(x) The Distant signal, which brings in the element of speed signaling shall be used to convey precise information to the Loco Pilot.

(c) Guard :

The Guards who are for the time being, in charge of trains, have also the important parts to play in punctual running of the train services. They shall-

(i) Attend their trains in time in accordance with SR 4. 04/1 and start them at right time.

(ii) Be keen and prompt to check the train in all respects in terms of instructions laid down in GRs & SRs and other standing instructions, within the allotted time for the purpose

(iii) Be satisfied prior to start that the train is in a proper state of efficiency to travel with safety.

(iv) Exhibit signal to the Loco Pilot to start in accordance with GR 4.35 and SRs thereto when time is up.

(v) Exchange “All right” signal with the Loco Pilot in accordance with GR 4.42 and SRs thereto, failing which the loco Pilot is likely to come to a stop, adversely affecting the punctuality.

(vi) Make over and take over the packages promptly at stations.

(vii) Co-operate with station Masters by giving advance intimation as regards availability of room for packages in trains through control or from station to stations.

(viii) Ensure Prompt carriage watering and attend shunting Promptly when necessary.

(ix) Cooperate with Loco Pilot to reduce idle time to the minimum in every way.

(x) Endeavour to reduce station halts as short as possible in accordance with the provisions of the Working Time Table in force and other instructions.

(xi) Whenever necessary, seek the co-operation of control to ensure that there is no avoidable detention to the train.

(xii) Seek assistance whenever necessary from the Station Master of the station in advance through walkie-talkie set well in advance.

(xiii) Keep in touch with driver frequently through walkie-talkie set.

(d) Loco Pilot

(i) The speed of trains is one of the vital factors. Loco Pilot, though they belongs to Electrical Department have important part to play towards the success of punctual running of their trains. They shall- (i) attend to their duties in time as ordered by the Authorised officer.

(ii) Be keen and prompt to take over the engine at shed, being satisfied that the engine is in a state of efficiency and good working order and to come out on traffic point in due time.

(iii) Create vacuum / air pressure as soon as engine is attached to train and not at the last moment.

(iv) See that correct “Authority to Proceed” is obtained prior to start and is not missed

(v) Ensure that there is no loss of time or engine failure due to the faulty operation of the engine crew.

(vi) See that minimum time is taken at stations for Loco requirements.

(vii) Try to make up the lost time on the run without disregarding any of the speed · restrictions or exceeding the maximum permissible speed on the section.

(viii) Try to maintain acceleration when starting as high as permissible.

(ix) Complete shunting as quickly as possible subject to limits of speed and restrictions, paying due obligation to signals.

(x) See that the provisions of GR 4. 35 and SRs thereto have been fulfilled and be alert to start the train thereafter immediately on receipt of Guard's signal to start.

(xi) Keep in touch with Guard frequently through walkie-talkie set.

(e) Power Controllers-

Power Controllers though belonging to the mechanical Department, are under the Administrative control of the Chief Controller. They are to maintain liaison between traffic Controllers and Loco sheds so that power available is utilised to the best advantage, and is supplied without delay as and when required and to arrange for the most effective disposal of engines and crews in consultation with the CHC so as to effect better turn-round of engine.

(f) SSE/Loco/Shed In-Charge

The SSE/Loco/Shed In-Charge should see that:-

(i) Locomotives are properly maintained and are turned out in time.

(ii) The Pilot/Shunting engines are in perfect working order and their shunters do not waste time in unnecessary Loco requirements or while shunting and

(iii) They should always remember that limping horses no place in the running race.

(g) Carriage and Wagon Staff-

carriage and wagon staff have to see that-

(i) Stock is efficiently maintained so that frequent attention on the run is not necessary

(ii) Brake-power of the train is sufficient and according to rules

(iii) Coach maintenance is good to avoid detaching of vehicles en-route.

(iv) Operational Safety, so far related to mechanical aspects of the stock on train is ensured.

(h) Engineering & S & T Department-

(i) The Engineering Department must not generally impose too many restrictions, and S&T department should see that interlocking gears are properly working.

(ii) Failures of points, signals, panel, interlocking, instruments. etc are promptly attended to and rectified to avoid abnormal working

(iii) Proper sighting of signals is fully ensured, and where necessary, signals are re-sighted to enable the Loco Pilot to have clear view,

(i) Electrical-

The Electrical staff should always guard against-

(i) Failure of train light, fans and engine head lights.

(ii) Failure of water supply due to electrical pumps.

(iii) Failure of lights at stations and in yards, etc

(j) RPF / GRP staff: They will ensure that-

(i) Law and order problems do not cause any detention to the train running.

(ii) Criminal cases like theft / ACP / murder are promptly tackled without causing undue detention to train running.

(iii) Wherever prescribed security patrolling should be undertaken to avoid cases related to sabotage or train working.

(k) Other Measures-

The following other measures to improve punctuality may be utilized to advantage-

(a) Punctuality sense should be developed amongst staff and punctuality drives should be observed periodically. During these drives, Officers and Inspectors should accompany trains in the brakevans and on the foot plates of engines to improve their running, to ascertain major causes responsible for late running and to suggest remedial measures.

(b) All Officers and Inspectors whenever they are in a train or at a station should see that all trains arriving or leaving the station keep to their schedules, and if a train is already running late, it makes up as much as is possible. The factors responsible for the detentions should be carefully noted for remedial measures.

(c) If the late 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 Pr. Chief Operations Manager through the Sr.DOM/DOM concerned, so that necessary easing be effected when the next time table is drawn up or earlier.

(d) If it is observed that certain important stations become bottle necks at certain periods affecting punctuality of trains, necessary steps should be taken to space trains adequately.

(e) On certain sections it may be observed that although the engines are normally able to haul the loads, they are unable to make up time in case of late running. The head quarters office should be approached for necessary instructions.

(f) If certain rake link found to be very light, they should as far as possible be adjusted, to ease the position.

(g) 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 with prior permission from Pr. Chief Operations Manager. The matter should be given due publicity in the press. This steps should, however, be taken very judiciously and for as short a period as is absolutely necessary.

(h) Request by high Official to detain trains beyond their schedule stoppages should not, ordinarily with compiled with,

(i) Running of the train beyond the capacity of the section should be avoided.

(j) Special watch should be kept on surprise or special ticket checks or out of course stoppages by Railway Police, exercise or other authority and it should be ensured that the trains are not detained unnecessary on these accounts. The permission of Sr.DOM should normally be obtained before resorting to such checks or out of course stoppages.

2.23: Sectional and through service coaches:

(a) Section coaches are coaches which are run on selected trains between two important stations on the direct route of the train. These coaches provide additional accommodation as well as reservation facilities for passengers travelling between the two stations on the outward as well as on the return trips of coaches.

(b) Through service coaches: These are the coaches which are transfer from one train to another train at a junction station to reach there destination stations not served by the original train.

2.24: Destination Boards:

(a) Destination Boards shall be provided on the SLR, Upper Class coaches and sectional/ through service coaches. The Board shall be fixed in the centre of the coaches at the edge of the roof along to top moulding with name of destination station writing English and other regional language. In the case of sectional/through service coaches, the name of the stations between they run, must be shown on the destination boards.

(b) The responsibility of fixing the destination boards rests with the Train Examiner of the originating station. At a station where train Examiner is not posted this responsibilities develops on the station Master.

(c) The Train Examiner or the station Master, as the case may be must remove the destination boards from the coaches going to the shop and fixed them on the coaches temporary used instead till the original coaches received from the shop.

(d) Destination boards must be kept in the safe custody of the Train Examiner or the Station Master, sa the case may be , till they are fixed on the train.

2.25 Ringing of station bell/Announcement by PA system for passenger carrying trains scheduled to stop.

Unless otherwise specially mentioned in this behalf, station bell as referred to in S. R. 2. 10/1 and 4.35/2 shall be rung for mail, express, passenger and mixed trains only at those stations at which such train or trains is/are scheduled to stop in accordance with the following manner –

(a) As soon as line clear is given :
  (i) For Up trains – Sharp continuous beats preceded and followed by three distinct strokes.
  (ii) For Down trains - Sharp continuous beats preceded and followed by two distinct strokes.

(b) When train let station in rear :
  (i) For Up trains – Sharp continuous beats followed by three distinct strokes.
  (ii) For Down trains - Sharp continuous beats followed by two distinct strokes.

(c) Before departure of train :
  (i) For Up trains – Three pause three distinct strokes.
  (ii) For Down trains - Two pause two distinct strokes.

(d) At station where public address system (i.e. Loud Speaker) are provided clear information regarding the description of trains, line, platform, etc. should be audibly announced through such public address system when a train is on line clear, train left station in rear and before departure of the train from a station.

(e) At stations where booked halt of trains is more than five minutes, a warning bell (i.e. sharp continuous beats at least for ten seconds) should be rung at least five minutes before due departure of the train. In addition, passenger should be audibly warned through public address system if provided.

(f) Where there is PA system is available and working the ringing of bells is not mandatory.

2.26: Time Allowed for the Engines Between Shed and Yard:

(a) DRM of the division having loco shed will prescribe the time allowed for outgoing engine to travel from "Bahar" line to the train and incoming engine to travel from the train to the "Bahar" line. Likewise the transit time from 'Bahar' line to shed & shed to 'Bahar' line should be fixed depending upon the shed layout. The LP must ensure that the time is not exceeded.

(b) It will be the responsibility of the Station Master/Yard Master on duty to ensure that an outgoing locomotive is taken out of the "Bahar" line immediately it comes and an incoming train engine due to go to shed is released for shed and reach the "Bahar" line without undue delay.

(c) Arrangements for recording the time of arrival at the "Bahar" line or the time of returning to loco limits have been made at the junction of traffic and loco limits. The LP must record their on the time of arrival and also detention, if any, for being taken out of "Bahar" line or release for shed.

(d) **T**he time ahead of the scheduled departures of trains by which the outgoing engine is to be placed on "Bahar" line is prescribed for each shed. The LP must ensure that the outgoing engines are placed in the "Bahar" line within the time prescribed. Any failure to turn up at the "Bahar" line with the engine in time must be recorded in "Bahar" line register with the reasons there of.

(e) The movement of engines in big yards, to & from the loco shed will be controlled by shunt signals and other signals. The LP must make themselves conversant with the same and move their engines accordingly.

2.27: Classification of Passenger Services:

As a public utility service the Railways have to serve the various needs of the public. The following types of coaching trains are run:

a) Superfast trains: These are high speed long distance train services having limited stoppages at important stations. Average speed of these trains is normally more than 55 kmph.

b) Mail and Express trains: These are high speed services which carry passengers and postal mail overlong distances stopping only at important stations. Average speed of these trains is normally 45 to 55 kmph.

c) Local Passenger trains: These trains cover relatively short distances and generally stop at every station. Average speed of these trains is normally less than 45 kmph.

d) Mixed trains: On unimportant Branch Line sections where enough passenger or goods traffic does not offer for the running of separate Passenger and Goods trains, mixed trains are provided to reduce the cost of operation. Such trains stop at all stations and are essentially slow.

e) Suburban trains: These are light trains of greater frequency serving the suburban area of metropolitan cities. Eg., MEMU/EMU/DMU/DEMU services.

2.28 : Classification of Routes (Broad Gauge):

Group A route - Max. Permissible speed - 160kmph

Group B route - Max. Permissible speed - 130kmph

Group C route - Suburban section i.e. Mumbai, Kolkata, Delhi, Chennai

Group D route - Max. Permissible speed - upto 100 kmph

Group D special - Max. Permissible speed - 110 kmph

(Where the traffic density is very high or likely to grow substantially in future)

Group E route - Max. permissible speed - Below 100 kmph

Group E special - Max. Permissible speed - Less than 100kmph

(Where the traffic density is very high or likely to grow substantially in future)

2.29: VEHICLE CODES:

For easy reference and identification, each and every type of coaching stock is provided with a code. Following codes are given for various types of coaching stock.

DIFFERENT TYPE OF B.G. COACHING VEHICLES OWNED BY INDIAN RAILWAYS

SN	Group Description	Alpha type coaches	Type and Description
1	Fully Air Conditioned Coaches	WAC	Fully Air Conditioned (Vestibuled)
		WGFAC	Fully Air Conditioned (Vestibuled) self generating
2	Partially Air Conditioned coaches	FAC	Air -conditioned coach with First Class.
		FACC	Air -conditioned coach with First Class with Coupe
		WFACCW	First AC cum Second AC.
3	Second AC Sleeper.	WGACCW	Air-conditioned Two tier sleeper (Vestibuled).
4	Second AC 3-tier sleeper	WGACCN	Air-conditioned Three tier sleeper (Vestibuled).
	Second AC Chair Car	WSCZAC	Air-conditioned II-Class chair car.
5	II AC Chair Car. (EOG)	WGSCZACEN	Air-conditioned II-Class chair car with end on generation
6	First Class Coaches	FC	First Class coaches (With Coupe)
7	First class composite coaches	WFCS	First and Second class coach with coupe (Vestibuled)
		EWFRCP	First Class with brake & observation
		WGFSCN	First & Second class coach with Coupe

8	Second class coaches and second class composite coaches	GS	Second class (self generating)
9	AC Executive chair car	WGFCZACEN	Air-conditioned 1- Class Executive Chair Car with end on generation
		WGSCZ	II-Class Chair Car (Self generating vestibuled)
		WGSD	II-Class Double Decker(Self generating vestibule)
		SRN	II-Class with power Car.
		SPPT	II-Class Coach with 3/4 postal.
		SP	II -Class Coach with 1/6 postal
		SPPC	II-Class Coach with full postal.
		SPPH	II-Class Coach with 1/2 postal.
		SPPQ	II-Class coach with 1/4 postal.
		SYPPC	II-Class Coach with ladies and postal.
10	Parcel luggage van	VP	Bogie Parcel Van.
		EVP	Four Wheeler Parcel Van.
		VVN	Bogie Milk Van.
		VPH	High Capacity Parcel Luggage Van.
11	Motor & parcel van	VPR	Refrigerated parcel van
12	II class sleeper coaches	WGSCN	II class 3 tier sleeper (self generating) vestibule
13	SLR Group/II Class Composite coaches	SLR	II Class with brake & Luggage
		GSR	II-class with brake Van
		DSLR	Disabled Second Class With brake & Luggage.
14	LR group	LR	Luggage Brake Cum Van
		WLRRMEN	Luggage & Brake with generator (vestibule) EOG
15	Upper Class Tourist Car	CTAC	Air Conditioned Tourist Car.
		CT	First Class Tourist Car.
16	Lower Class	CTS	Second Class Tourist Car
17	Dining/Kitchen/Buffet car	WCD	Dining Car vestibule
		WCB	Buffet car vestibule (Pantry cars)
		WSCBZAC	Dining Cars (Vestibuled) – AC with chair car
18	Inspection carriages, saloons,staff and Misc. Departmental vans	ER	Inspection carriages
		RA	Officers Saloon
		RH	Bogie Medical Van.
		RHV	Auxiliary Medical Van with Brake relief.
		BLRZ	Ostilograph Car.
		DKRD	Dynamo meter stores Cum Staff Car.
		DKDS	Dynamo meter stores Cum Staff Car
		ERS	Stores Delivery Van. (four Wheeler)
		ERU	4- Wheeler Tower Wagons.

	Inspection carriages, saloons,staff and Misc. Departmental vans	RD	Bogie Staff Car for Research Directorate
		RM	Charging Van.
		RS	Stores Delivery Van
		RE	Mobile Training Car.
19	Postal Van	PPS	Full postal vans
20	Military coaches	M	II – class Military Coach of own(Military) base
		MA	II – Class Military Coach provided by Rly
		MF	I-Class Military Coach
		MK	Military Kitchen Car
		MRA	Ambulance Ward Car.
		MS	Bogie Military Special Car.
		WACMRA	AC Ward Car (Military)
		WACMRD	Ward Cum Dinning Car (Military)
		WM	II-Class Military Coach (Vestibule)
		WMF	I-Class Military Coach (vestibule)
		MGSCNR	II-Class 3-tier with Brake (Military)
21	Treasury Van	VPT	Treasury Van with security staff
22	Brake Van	SRJ	Second Class Brake Van
23	Second Class	GSCZJ	Second Class Jan Chair Car
24	Second Class AC Chair Car.	CZACJ	Second Class Air- condition Jan Chair Car
LHB Coaches			
25	LGS		Second class self-generating
26	LSCN		Second class 3-tier sleeper
27	LWACCW		AC2Air-conditioned 2-tier sleeping-car
28	LWACCN		AC3 Air-conditioned 3-tier sleeping-car
29	LWCBAC		Air-conditioned pantry/kitchen/buffet car
30	LWFAC		AC 1 Air-conditioned first class sleeping-car
31	LWFCZAC		Air-conditioned executive chair car
32	LWLRRM		Luggage/generator/brake van
33	LWSCZAC		Air-conditioned chair car
34	LWSCZ		Chair car

CHAPTER-III

MARSHALLING

3.01: Marshalling: Marshalling is attaching of vehicles on a train in a predetermined manner to ensure train safety, provide operational expediency and to maximize customers convenience.

3.02: 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 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.

II. 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 parcels packages and mails on platforms.

3.03: 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 can not occupy it.

(v) Two anti-telescopic or steel-bodied coaches should be marshalled inside the anti telescopic or steel-bodied SLRs at both ends.

(vi) 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 two end coaches at either side are antitelescopic. 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 a passenger coach and marshalled accordingly. If they are anti-telescopic or steel-bodied they can be marshalled anywhere as operationally convenient.

(e) Sectional/Through Service Coaches:

(i) 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.

3.04: Block Rake Composition:

For block rake composition and marshalling order, 'Normal composition and marshalling order and rake link of passenger trains' are issued by PCOMs of respective railways from time to time.

3.05: 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 4.08 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 provided that such stock is fitted with center buffer couplers.

3.06: Attaching of Vehicles outside the Rear Brakevan :

Vehicles outside the rear Brakevan can be attached in accordance with the provision of the GR 4.24 and SRs thereto:

i) Attaching of vehicles in rear of Brakevan in fully Air brake/vacuum train in working air pressure.

ii) Attaching of power plant bogies

iii) Attaching of damaged vehicles

3.07: 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 outermost 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/Assisting Engine	(a) On ascending gradients in rear of train. (b) On descending grades in front. (c) Both gradients in quick succession, if any, then in front.

3.08: ATTACHMENT OF DEAD LOCOMOTIVES

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) Check whether running of double/triple headed 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) Loco Pilot 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 MPS of the train in 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. 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 7 permission 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 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.

3.09: Medical Relief Van: Can be run without brake van.

3.10: Inspection Carriages attached to Light Engine: Maximum three inspection carriages occupied by the officers can be attached.

Not more than one inspection carriage shall be attached with Mail/Express train at a time. No inspection carriage shall be attached to a 'Prohibited' or 'Restricted' train, except that in the latter case and inspection carriage may be attached to a 'Restricted' train with the permission of PCOM.

In case more than 03 Inspection carriages are attached, rules regarding running of goods train without brake van will apply.

3.11: Attaching of Travelling Cranes: Provisions of G&SR 4.27 should be followed

3.12: In Case of failure of Loco in the section, either single Loco or Coupled WDM2/ WDM3A Loco May be attached for further working of the train.

Chapter-IV

FREIGHT OPERATION

4.01: Importance of Freight Operation:

The freight business is the major source of revenue for the Indian Railway. Main activity centers of Freight operation include terminals, yards, control office and stations.

4.02: 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 en route, except for crew change and other Operational requirement. Such trains will normally include container trains, air braked block rakes for single destination. These trains are planned to run like non stop Rajdhani trains and may have a fixed timetable 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. are known as departmental trains.

4.03: 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 centres.
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 • C.C. rake This in turn results in -Sick Wagon detachments & attachment of fit wagons for completing the rake composition.

4. Following are the series of operations for empty rakes being offered for loading:-
   - • Examination
   - • Supply/placement
   - • Loading
   - • Despatch

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 complete 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.

4.04: 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 station 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. 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 between 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 and 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 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.

4.05: 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 round 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 to 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 representation on Bar Chart can represent the time spent by each Loco to serve as a good 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 on line (f) time for Light Engine running (g) time taken for Shunting (h) time spent at terminal/ destination (i) enroute 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 effect of interruption to traffic.

c) Control of Operating Department on Loco running:

Electric and Diesel Locos are maintained by the respective Loco Sheds and Locos once turned out of shed are available for utilisation for a number of days till prescribed maintenance/ inspection schedule is due in the shed or the locos require out of course repairs. Thus, while the operating staff has the 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 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 the 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, reliability, safety and predictability have to be aimed. 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 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 Crews/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 despatching 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 the trains are 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) To highlight the set of suitable paths for guidance of Control, which can be used for, goods train ordering also.

iii) To 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 or 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 a train running from the Chief 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. They also keep watch on “expect” of train formation, examination, readiness etc. and by constant chasing, planning and updating of information, trains are ordered on realistic expect, 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/Siding/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.

4.06: Role of Various Agencies in Freight Operations:

Large number of agencies play important role 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 centres, 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:

1. Analysing shortfalls of previous day to take remedial measures and pin-point weak spots.

2. 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
- Disposition of empties
- Loading at important terminals – and in case of shortfall, reason for the same.
- Review of unusual occurrences
- Examination 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.

4.07: Head Quarter's Role in Freight Operations:

The Division's Freight Operations generally require close co-ordination 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:

4.08: 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 to the Head Quarters (Central Control) from Divisional Control.

This includes, loading and stock position, particulars of old outstanding and fresh registration of indents, category wise position of unloading, transshipment, Yard balances, important yards and 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(R&L) 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 Quarters plays an important part in planning and co-coordinating freight operations. After detailed conference with the Operating Officers, and in terms of Railway Boards current-operating directives Head Quarters 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 centres 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. Coordination 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.

4.09: 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, fertilizers, 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 between various Railways and other Central Government Departments and vital sectors of Economy connected with Railways. Policy formulation and Planning, which have important bearing on Freight Operations is also the major function of the Railway board.

4.10: 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. The 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 endeavour for the achievements in technology upgradation along with the operating strategies and determine the level of excellence in Railway Operations to a great extent. In nutshell, all the functionaries have to work as a dedicated team.

4.11: 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:

4.12: 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 the fluidity of 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 tonnes 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 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, suitable loco is provided for its haulage. In order to get the optimum use of motive power and to increase the capacity utilisation and throughput, each Locomotive is given a load approximately to the 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 wagon becomes available for next loading. Reducing the time taken for loading /unloading by technology upgradation and other strategies in co-ordination with the customers has to be endeavored.

iv) Empty Running:

Ideally it is 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) Despatch in Block Rakes:

Despatching 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 single consignee to single consignor, is ideal. Consignees can also be motivated to club their Indents to get trainload and block rakes. Also two points loading on same engine run can improve wagon usage. Close 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 Train. A crack train/Link Train is a train when the same crew (and engine if possible) instead of "Signing off" at the intermediate crew changing point works a train to farther junction. Thus, a train running from NGC to NCB or vice versa without Crew/Guard change at NBQ can be run as X 'Crack'. The Crew can also be utilised on 'Crack' basis when the same Crew perform 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' stand for the effective daily wagon holding or midnight wagon balance of a day (excluding sick, POH wagons in or waiting for shops, like departmental wagons, wagons lent for departmental use, and the wagons used for coaching traffic). 'L' stands for the total number of wagons loaded on the Division/Railways plus the wagons loaded at Transhipment 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 ,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.

$$\frac{2250}{350+150} = \frac{2250}{500} = 4.5 \text{ days WTR (Wagon Turn Round)}$$

viii) Detention to Trains and Wagons:

(a) Detention to Trains:

A check on the detention to trains

(1) Outside signals or at stations adjacent to Goods Terminals,

(2) In shunting operations at road side stations and

(3) En-route detentions for various reasons should be exercised regularly.

(b) Detention to Wagons:

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:

Engines being costly resources their utilization have to be carefully monitored. Some of the measures for improving Engine Utilizations 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 preferences.

(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 Couple) 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 trouble shooting.

(o) Hauling capacity of the Locomotives should be properly utilised.

(p) Engineering speed restrictions should be regularly reviewed and reduced by maximizing 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 utilisation Special watch on Loco pilots loosing 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:-

$$\frac{\text{No. of Goods Trains X Distance travelled by each train in 24 hrs.}}{\text{Total time taken by all the Goods Trains run}} = \text{Average speed}$$

The distance and the time taken are calculated from the Control Charts. Thus all detention to Goods Trains en-route enters into calculation and has the effect of bringing down the average speed.

Almost all the factors affecting engine utilisation play 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.

4.13: Staff Supervisions:

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.

4.14: Targets and Statistics:

One of the important means to utilise fully and efficiently the existing carrying capacity of a railway is to set measurable and specific targets for the various performances 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 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.

4.15: Long Haul Train Operation: Composition of more than one standard train formation is known as Long Haul Train operation. With the increase in demand of freight traffic and emphasis to reduce cost of operation, Indian Railways have been concentrating for increasing through put. This can be achieved by improving and designing wagons having better pay to tare weight ratio, increasing number of wagons per train, increase in axle load, etc. Though, through put is achieved to some extent, congestion on various important routes is still a constraint to meet traffic demands. In order to ease the congestion, railways have introduced running of long haul trains to improve the through put and reduce congestion at the same time.

For running of long haul trains, railways have already initiated steps for provision of longer loops at different stations to accommodate these trains for various operational reasons. Due to absence of longer loops, it is not possible to arrange precedence and crossing of trains at stations.

Formation and instructions to run these trains is given as under:

a) Zonal Railway shall identify sections for running of long haul trains and notify the section and formation points of long haul trains.

b) These long haul trains shall only be formed at notified stations in the presence of SE(C&W). If it is not a C&W point, SE(C&W) should be arranged at this point for issue of 'Cover BPC' after ensuring validity of BPC of constituent rakes. Cover BPC is a BPC issued by C&W staff after checking brake power continuity of amalgamated train. This Cover BPC contains the BPC particulars and originating brake power of the individual rakes and also the brake pressure of the leading loco and last vehicle. This cover BPC shall be handed over to the Loco Pilot of the leading train. However, BPCs of two constituent rake trains shall remain with respective Loco Pilots and in case of absence of rear rake loco pilot, with the guards of the respective constituent train. Air pressure in the leading locomotive shall be 5 Kg/Cm2 and minimum pressure in the trailing brake van is 4.7 kg/cm2.

c) Following combination of constituent trains are permitted in forming a long haul train:

Front Rake	**Rear Rake**
Empty train	Empty train
Loaded train	Empty train
Loaded train	Loaded train

The constituent empty/loaded trains can be of any type as decided and notified by Pr. Chief Operations Manager from time to time.

d) The combining rakes shall be with single pipe air brake system

e) Each train should have valid BPC.

f) Maximum speed of long haul train will be restricted to lower of the maximum speed of the constituent trains in the section.

g) Special T/G boards are to be provided in notified sections to enable the LP to pick up the speed after restrictions.

h) Pre tested walkie-talkie sets of adequate power will be supplied to LP and Guard for reliable communication during run and to the C&W staff during the course of formation.

i) During the running, if the walkie-talkie communication fails, the long haul movement will be terminated at the next station. Long haul train shall not be operated during communication failure.

j) In case of loaded - loaded or loaded – empty combinations hauled by electric locomotives, at least 5 compressors of the leading MV unit will be in ON condition. Locomotives in the middle of the long haul rake are not permitted to change the brake pipe. Leading locomotive will work the train and trailing locomotive will be just a piped vehicle that can provide additional power when required.

k) Before restarting train after brake application, it shall be ensured that the brake pipe pressure in the leading loco is 5 kg/cm2 and the last brake van is 4.7 kg/cm2. The guard in the trailing brake van shall confirm to the LP in the leading locomotive on the walkie talkie set about the pressure in the last van before starting the train.

l) Crew, guard and station staff should be imparted familiarisation training by supervisors/ officers from operation and traction in regard to long haul train operation.

m) Guard of leading train will travel in its brake van or the middle locomotive cab and guard of trailing train will travel in the trailing brake van.

4.16: Clearing of Rakes with Invalid/Missing BPC:

When back loading is done at a station where freight train examination facilities exist, the rake must be examined there and fresh BPC issued. In case of rake is back loaded, detected with invalid /missing BPC and in the absence of C&W examination facilities the rake can be cleared by any of the following means.:-

(a) Checked by a flying squad and fresh BPC issued , if operationally feasible.

(b) If it is not possible then the rake is permitted to run upto the next C&W examination point in the direction of movement by GDR check as per Para 4.17 of this chapter.

4.17 : GDR Check:

Guard Driver (GDR) Check, at locations where TXR is not available, have been conducted by crew along with the prescribed performa to be filled by train crew post such check :

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
5. If it is a premium rake, which is being loaded or unloaded

Various staff ensure the activity and responsibility are as follows:-

A. Guard & Driver

- 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 froma 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 samerecorded 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 afterproper 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 door 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 deptt 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, BOBRN, BCACBM etc. The examination gangs should clearly endorse by hand or by Rubber Stamp the following –'All doors checked & found working'.

CHECKS TO BE DONE BY GUARD AND DRIVER
Items to be checked by Guard and Driver

1	All CBCs and Air Hoses are properly coupled and locked.
2	All the Angle Cocks are in open condition.
3	The last Angle Cock is in closed condition.
4	Empty / Load device handle is in proper position.
5	There is no loose fittings / hanging parts like springs push-pull rod, Brake Beam, Safety brackets, Brake Blocks etc. which may endanger safe running of the train.
6	Hand brakes are released.
7	All Doors/Hoopers/Covers of wagons are closed and locked/secured.
8	Check continuity of air pressure/vacuum before starting.

Proforma for joint checking of Driver and Guard

1	Date and Place	
2	Train No & Loco No.	
3	From……	To……..
4	BPC No, Date & Place of issue	
5	Loaded at…….	Unloaded at……
6	Time Loco attached……..	
7	Total Load	

Signature of Driver Signature of Guard

Driver's Name:…… Guard's Name :……

(This memo should be prepared in 3 copies, one copy to be kept with Driver, one copy with Guard and one will be given by Guard to Station Master/Yard Master)

(RB's letter No.2018/M(N)/951/34 Pt. dated 23.06.2020)

4.18: Electronic In-motion Weigh Bridge:

Electronic In-motion Weigh Bridge is a machine for weighment of loaded rakes while in motion. Weighment of loaded wagons is a necessary pre condition to arrive at the correct pay load being carried by the railways for which freight is to be recovered at the tariff fixed by the Central

Government. Overloading beyond certain limit causes excess stress on the rail and wagons leading to its eventual breakage which is a safety hazard. So, railway has decided to provide electronic in-motion weighbridge at all originating full rake mineral loading points. In addition to the above, in-motion electronic weigh bridges shall also to be provided at intermediate weighing points wherever necessary. Chief Goods Supervisor or any other official of the commercial department nominated by the division will be the custodian and the in-charge of the weigh bridge including weigh bridge house and weighing operations. The weigh bridges shall be switched off when not required for weighment for more than 30minutes. The weighbridge equipment shall be switched on at least 15 minutes before the weighment starts.

The weighment in-charge shall ensure that the weighment readings are recorded at a speed less than 15kmph, which can be checked from TC, monitor and visual display provided. Readings taken at more than15 kmph are not valid. “Weighbridge Ahead” boards shall be provided on both sides of the weigh bridges about 300 mtrs in advance of the weighbridge with special marking to indicate the loco pilot that they shall pass over the weighbridge. The LP shall be suitably instructed regarding weighment of the train. The SE(P.Way) shall maintain level gradient not exceeding 1 in 300 for 100 mtrs. on either side of way rails. The approach rails shall be 52 kg/mtrs on ST sleeper. Creep anchors will be provided to avoid creep.

As soon as the rake is placed for weighment, the commercial staff posted at weighbridges shall complete all formalities of enlisting wagon numbers, its tare weights, CC and type of wagon with permissible carrying capacity of the loaded commodity, etc. If the wagons are found overloaded beyond permissible quantity of a particular commodity, he will initiate action for levy of panel freight demurrage and handling charges as prescribed in commercial rules. Intimation about overloading will also be sent to all concerned including originating, destinations & station ahead either to impose speed restriction, adjustment of load, detachment of wagon or for recovery of charges levied.

The staff concerned at weighbridges will exhibit the certificate about satisfactory function of weighbridges issued by weight & measure department. The electronic weighbridge shall be tested with duly calibrated test wagon every month as per procedure prescribed by the manufacturer and a certificate given to the commercial department jointly signed by the weighbridge in-charge and official of the mechanical department. In addition to the testing with the test wagon, repeatability test of the electronic in-motion weighbridge shall be carried out every three months along with the service engineer of the manufacturer. In case of non-functioning of weighbridge, necessary advice shall be sent to mechanical and operating department for necessary action.

Function of all weighbridges in the Division should be reported in the daily position. If a weighbridge gets out of order then loading shall be permitted up to 7 days by DRMs, up to 30 days by PCOM and up to 6months by GMs with their personal approval. If the weighbridge remains out of order for more than six months, it should be brought to the notice of the Board (ME, MM and MT).

4.19: Transportation Options:

These are various transportation options differentiated primarily by the volume of traffic & include following services:-

a) **Block Rakes**: It is a train carrying wagons for a single destination. Composition of block rake composed of different types of wagons are notified by Railway Board will be booked at Train Load Rate (TLR).

b) Mini Rakes: This is a short rake with a composition shorter than the specified number of wagons required for a block rake. Mini rake can be loaded at TLR under the following conditions

i) It will have a minimum composition of 20 wagons.

ii) It can be booked to or from any notified full rake or half rake terminal.

iii) Free time for loading /unloading will be 5 hours.

iv) It can be loaded only up to 400kms.

v) Permitted only in covered wagons.

c) Two Point Rake: it is a train carrying wagons for two terminals. Two point rake can be loaded at train load rate under the following conditions.

i) Originating terminal should be notified full or half rake terminal.

ii) Destination terminal should not be more than 200km apart in busy season ,400kms apart in lean season.

iii) Minimum 10 wagons should be loaded for each destination.

d) Multi Point Rake: This is a train carrying wagons for more than two destinations multi point rake can be booked at TLR under the following conditions.

i) Originating terminal and each destination terminal should be notified full rake or half rake terminal.

ii) No two destination terminals can be more than 200kms apart.

iii) Minimum 10 wagons should be loaded for each destination.

(e) Two and Multi Point Rake: (Other than covered wagons):-

Such type of rake can be loaded at TLR under the following conditions.

i) Both the station should be notified full rake /half rake terminals.

ii) Minimum 10 wagons should be loaded for each station.

(f) Rakes from two origination terminals (Covered wagons):- Rakes from two originating terminals covered wagons can be loaded at TLR under the following conditions.

i) Two point combinations from which loading is permitted, will be notified by the zonal Railway.

ii) Each notified terminal should be notified full/half rake terminals.

iii) Destination terminal should be notified full/half rake terminals.

iv) Two loading terminals must be less than 200kms Apart.

v) Minimum 10 wagons should be loaded from each terminal.

(g) Rakes from two originating terminals (other than covered wagons): Booking at TLR will be allowed under the following conditions:

i) Each terminal should be notified full/half rake terminal.

ii) Destination terminal should also be open for full/half rake.

iii) Minimum 10 wagons should be loaded from each terminal.

iv) Indent should be for complete Block rake.

(h) Multi Commodity Block Rake: Block rake of multi commodity will be booked according to following conditions:

i) Both the originating & destination should be notified full rake/half rake points.

ii) The total number of wagons indented and loaded should be according to the number of Block rake.

iii) Each wagon will contain one commodity. But different wagons can contain different commodities.

iv) The customer will have to pay seasonal surcharge or congestion surcharge also.

4.20: Running of Goods Train without Brakevan-

In an emergency or under special instructions as reffered in GR 4.23, when it becomes inescapable to run a Goods train without Brake van the following precautions must be taken :-

(i) The Train must be provided with continuous air pressure from the engine to the rearmost vehicle and with prescribed brake -power. The Train Examiner must mention the number and description of the last vehicle while issuing the brake power certificate of such trains.

(ii) The Tail lamp(lit or unlit as the case may be) shall invariably be fixed and tied at the tail end of the rearmost vehicle by the Guard.

(iii) The Guard of the train should travel in the engine.

(iv) When on Ghat section, such as LMG-BPB an engine is attached in the rear to act as Banker. The Guard of the train shall travel in the engine in rear.

(v) Working of Goods train without Brakevan is prohibited during total interruption of communication.

(vi) At the originating station the Guard of the train shall relay the number and description of the last vehicle on telephone to the Section Controller and in writing to the Station Master / Yard Master of the train originating station.

(vii) Before starting the train the Station Master / Yard Master of the originating station must intimate the Section Controller on controlled section the number and description of the Last Vehicle under exchange of Private Number. The Section Controller must alert the Station Masters enroute intimating the train number as also the number and description of the Last Vehicle as intimated by the originating station.

The Section Controller must keep a record the number and description of last Vehicle and the Private Number exchanged.

(viii) While asking and giving line clear, the Line clear Enquiry and its Reply must clearly include the number and description of the Last vehicle under exchange of private Number and the number and description of the Last vehicle and the private Number exchanged are recorded in the Train Signal Register.

(ix) The number and description of the Last vehicle must be repeated to the section controller and the station Master of the station in advance while giving “Train Entering section signal” from each station where BPAC is not installed or BPAC is not functioning.

(x) The train running without brakevan must not allowed to run through any station enroute. The train must stop at each block station.

On controlled section, the Section Controller shall be responsible to ensure stoppage of such train at each block station and to take the number and description of the Last Vehicle from each such station and got it verified.

However where in a section, a block proving axle counter between block stations of the receiving station is installed and is functioning (On duty Station Master should personally ensure that BPAC is functioning), train need not be stopped at each block station.

(xi) The Guard, Loco Pilot and Asstt. Loco Pilot shall look back frequently during journey to see whether the rear portion of the train is following in a safe and proper manner.

(xii) At stations where end cabins are provided, the station Master on duty before taking 'OFF' the reception signal must intimate the cabinman at either end, the number and description of the Last vehicle and exchange private Number separately with them. The Number exchanged shall be recorded in their respective Train Signal Registers.

(xiv) On arrival of the train the cabinman of the end cabin nearest to which the last vehicle of the train comes to rest shall physically check and verify the number and description of the last vehicle with that obtained from the Station Master. If the number and description of the Last vehicle is found correct the Cabinman Master shall report complete arrival of the train on telephone to the Station Master exchanging private Number. Until the Private Number exchanged the station master must not send "Train Out of Block section signal' to the station in rear.

In case the end Cabinman is unable to verify the number and description of the last vehicle he must intimate the Station Master. The Station Master in such a case shall then require the Guard to certify the complete arrival of the train.

However where in a section, a block proving axle counter or continuous track circuiting between block stations and complete track circuiting of station section of the receiving station is installed and is functioning and there is a clear indication of clearance of block section as well as complete arrival of the train as per indication given, it would be taken as assurance for complete arrival of the train to the Station Master.

(xv) At Station other than those with end cabins or where certification of the complete arrival of train is to be obtained from the Guard. the Station Master shall send the complete arrival register to the guard. And obtain complete arrival certificate as per rules in force and then only send "Train out of Brock Section" report to the Section in rear and to control if any.

However where in a section, a block proving axle counter or continuous track circuiting between block stations and complete track circuiting of station section of the receiving station is installed and is functioning and there is a clear indication of clearance of block section as well as complete arrival of the train as per indication given, it would be taken as assurance for complete arrival of the train to the Station Master.

4.21: Working of a Goods train without Guard procedures to be followed-

In an emergency or under special instructions referred to in GR 4. 25 (2) (a) & (b) the decision to run a train without Guard shall be taken in each case only with the written permission of the Authorised Officer of the Railway. When running of a train without Guard is so authorised in an

emergency or under special instructions by the Authorised Officer, the procedures laid down below must be strictly adhered to :-

(i) The train shall be provided with continuous and effective air pressure from engine to the rearmost vehicle which must be a “Brake Van” and also provided with the prescribed brake power as per rules inforce.

(ii) On the Ghat section, such as LMG-BPB. an engine shall be attached in the rear to act as banker.

(iii) If a Guard is not provided at the train originating station, the Train Examiner must examine the train carefully and mention the number and type of Brake van / engine attached in rear in the brake power certificate issued for such train. But in case no Guard is provided at any intermediate point as at crew changing station, the Driver on being advised by. The Station Master / Yard Master, shall examine the train, brake power of the train and also ensure that the rearmost four pistons are in proper working order.

(iv) Tail Lamp(lit or unlit as the case may be) as the case may be, must be fixed at the tail end of the rearmost Brake van, or engine attached on Ghat section.

(v) The train shall be intimated to the section controller on the Controlled section by the Station Master under exchange of private Numbers, The Section Controller shall keep a record in his Train Control Chart of the number and type of the Last Vehicle as also the Private Number exchanged. The Section Controller shall alert the Station Masters enroute intimating the train number as also the number and type of the Last Vehicle as intimated by the originating station.

(vi) At the originating station. a Caution Order shall be issued to the Driver with necessary endorsements for running of train without Guard and also intimating the last vehicle number.

(vii) While asking and giving line clear for the train, the number and type of the Last Vehicle attached in rear must be clearly indicated in the line clear Enquiry and Reply message, The number and type of the last vehicle must be recorded in the Train Signal Register.

(viii) While giving “Train Entering Block Section” Signal, the number and type of last vehicle shall be repeated to the Section Controller and the Station Master in advance where BPAC is not installed or BPAC is not functioning.

(ix) The Loco Pilot and the Assistant Loco Pilot, shall look back frequently during journey to see whether the train is following in a safe and proper manner in terms of GR 4. 41.

The duties devolving on the Guard for protection of the train as laid down in GR 4.44 and 6. 03 shall devolve on the Loco Pilot,

(x) The Station Master and the Cabinman, where provided shall ensure the correctness of the Last vehicle number as well as correct position of the last vehicle indicator before closing the block section and before signaling “Train Entering Block section” signal, to the block station in advance.

(xi) Working of Goods train without Guard is prohibited during total interruption of communication.

(xii) During day, if the Station Master is not able to read correctly the number and type of the last vehicle of the train passing through his station, he must immediately inform the Station Master of the block station in advance to stop and examine the train. Until the “Train out of

Block Section" report is received from such block station in advance, the Station Master of the station at which the train has passed through must not give "Train out of Block Section" report to the block station in rear as also to the Section Controller, if any.

The Section Controller shall inform the Station Master immediately in rear of the such station not to give or take line clear for any train to move over the same block section and shall initiate action to stop movement of train over the adjacent line on the parallel line section where the adjacent lines run closely parallel to each other between the concerned stations till such time the last vehicle number is examined and correctness / ensured.

However where in a section, a block proving axle counter between block stations of the receiving station is installed and is functioning (On duty Station Master should personally ensure that BPAC is functioning), train need not be stopped at each block station.

(xiii) While running through any station the Loco Pilot or the Assistant Loco Pilot deputed by the Loco Pilot in this behalf shall look out for "All Right" signals exhibited by the station staff If the Station staff exhibits a danger hand signal, the Loco Pilot shall lake immediate step to stop the train.

4.22: working of Goods train without Brake van and without Guard-procedures to be followed-

In an emergency or under special instructions referred to in GR 4.23 (I) and 4.25 (I), the decision to run a Goods train without Brake van and without Guard shall not be taken unless specially permitted by the written permission of the Authorised Officer of the Railway. When the running of a train without Brake van and without Guard is so authorised by the Authorised Officer in terms of the above rules, the procedures laid down below must be strictly followed :-

(i) The train must be provided with continuous and effective air pressure from the engine to the rearmost vehicle and also provided with prescribed brake powers as per rules inforce. On the Ghat section such as LMG-BPB an engine must be attached in the rear to act as Banker.

(iii) The Train Examiner must examine the train carefully and mention the number and type of the Last vehicle while issuing the brake power certificate at the train originating station. But in case no Guard ae provided at any intermediate point as at Crew changing station, the Driver on being advised by the Station Master / Yard Master shall examine the train, · brake power of the trains and also ensure that the rearmost four pistons are in proper working order.

(iv) Tail Lamp(lit or unlit as the case may be), as the case may be, must be fixed at the tail end of the rearmost vehicle.

(v) The number and type of the Last Vehicle attached shall be intimated to the Section Controller on duty by the Station Master / Yard Master under exchange of Private Numbers. The Section Controller shall keep a record in his Train Control Chart of the number and type of Last Vehicle as also the Private Number exchanged.

The Section Controller must alert the Station Masters enroute intimating the train number as also the number and type of the last vehicle as intimated by the train originating point.

(vi) At the originating point, a Caution Order shall be issued to the Driver with necessary endorsement for running of train without Brake van and without Guard and also intimating the number and type of the Last vehicle.

(vii) While asking and giving line clear for the train the number and type of the last vehicle attached in the rear must be clearly indicated in the Line Clear Enquiry and Reply Message. The number and type of the Last vehicle shall be recorded in the Train Signal Register.

(viii) While giving “Train Entering Block section” report the number and type of the last vehicle shall be repeated to the section controller and the Station Master of the block station in advance where BPAC is not installed or BPAC is not functioning.

(ix) The Loco Pilot and the Assistant loco Pilot shall look back frequently during journey to see whether train is following in a safe and proper manner.

The duties devolving upon the Guard for protection of the train as laid down in GR 4. 44, 6. 03 and Subsidiary Rules there under shall devolve on the Loco Pilot.

(x) Train running without Brake van and Guard must not be allowed to run through any station enroute. The train must stop at each station. On controlled section, the Section Controller shall be responsible to ensure stoppage of such train at each station and to take the number and type of last vehicle from each such stations and get it verified.

However where in a section, a block proving axle counter between block stations of the receiving station is installed and is functioning (On duty Station Master should personally ensure that BPAC is functioning), train need not be stopped at each block station.

(xi) At stations provided with end Cabin the Station Master, before taking ‘OFF ‘the reception signals, must intimate the Cabinman at either end, of the number and type of the last vehicle and exchange Private Number separately with them. The Number, type of last vehicle and the Private Number exchanged shall be recorded in the Train Signal Registers.

(xii) On arrival of the train the Cabinman of the end Cabin nearest to which the last vehicle comes to a stand, shall physically check and verify the number and type of the last vehicle with that obtained from the Station Master. If the number and type of the last vehicle is found correct, the Cabinman shall report complete arrival of the train on telephone to the Station Master exchanging private Number. Until Private number is exchanged the Station Master must not send “Train Out of Block Section” report to the block station in rear.

In case the end Cabinman is unable to verify the number and type of the last vehicle, he must intimate the Station Master and obtain a private Number from the Station Master. The Station Master, in such a case, shall then physically check and verify the last vehicle and certify the complete arrival of the train.

However where in a section, a block proving axle counter or continuous track circuiting between block stations and complete track circuiting of station section of the receiving station is installed and is functioning and there is a clear indication of clearance of block section as well as complete arrival of the train as per indication given, it would be taken as assurance for complete arrival of the train to the Station Master.

(xiii) At stations other than those with end Cabins, the Station Master shall physically check and verify the last vehicle number before sending “Train Out of Block Section” report to the block station in rear as also to the Section Controller if any.

However where in a section, a block proving axle counter or continuous track circuiting

between block stations and complete track circuiting of station section of the receiving station is installed and is functioning and there is a clear indication of clearance of block section as well as complete arrival of the train as per indication given, it would be taken as assurance for complete arrival of the train to the Station Master.

(xiv) Working of Goods train without Brakevan and without Guard is prohibited during total interruption of communication.

CHAPTER-V

PREFERENTIAL SCHEDULE

5.01:Introduction: 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 although the former may have been registered much earlier.

(a) This Priority Schedule is decided by 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)

5.02: 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 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 through which it has been directed unless there is specific instruction in writing from the center or his authorized agent to the contrary, goods will be despatched by the route optionally 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 rationalities order issued from time to time.

CHAPTER-VI

MOVEMENT OF OVER DIMENSIONAL AND OTHER BULKY CONSIGNMENTS

6.01: 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.

6.02: Maximum Moving Dimensions from rail level (at any point):

Description	Gauge		
	BG (MM)	MG (MM)	NG (609 MM)
Height at Centre	4115	3430	2895
Height at sides	3505	3200	2745
Maximum width	3050 for Bogie Wagon 3200 for 4 wheeled Wagon	2590	2135

Note:

(i) Above mentioned dimensions includes 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.

6.03: 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 has a gross clearance of 22.86 cm (9 inches) and above.

Class 'B': Those ODC loads, which has 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 has a gross clearance of less than 15.24 cm (6 inches) but not less than 10.16 cm (4 inches).

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/Foreign. Railway: PCOM	BG-40 KMPH, MG-25 KMPH, NG-15 KMPH	Day & Night	TXR
C	CRS	BG-25 KMPH, MG-25 KMPH, NG-15 KMPH	Day	SSE(C&W) SSE(P.Way) & TI

Note – Night running suspended in case of 'C' class ODC and escort must be provided by supervisor of Mechanical, Engineering & Traffic department.

6.04: ODC Clearance:

1. 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 7.62 cm (3 inches) bounce (vertical) on the straight together with following additional factors applicable only when the structure in question is situated on a curve.

2. Horizontal Clearance

Horizontal clearance is required as 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 the smallest clearance from fixed structure the formula being :- $\frac{HC}{G}$

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:- $\frac{B^2}{8R}$

where B = Distance between Bogie centre

R = Radius of curve.

In cases where the overhang at the end of a vehicle may have to be calculated by the formula will be: - $\frac{L^2-B^2}{8R}$

Where L is the length of the vehicle, B= distance between bogie centre, R= Radius of curve.

Note: Additional lurch on curves may be taken 38 mm.

3. Vertical clearance:

In case 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.

6.05: Procedure for sanctioning movement of ODC

When 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. He should apply to the Sr.DOM, who 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.

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 (eg. 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.

6.06: Loading:

On receipt of the sanction, the consignment should be loaded carefully, lashed and packed properly, so as to avoid any change of shifting en-route.

While examining the wagon loaded, the SSE(C&W) must pay attention on the following: Load is well secured; Load is within the C.C. of the wagon; Weight on any pair of wheels does not exceed; Axle load restriction, if any; Under gear of the wagon.

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. SSE(C&W) must issue “fit to run” certificate to the effect that the loaded wagon concerned is safe to run via the particular route specified.

SS/SM will inform, then to Sr.DOM/DOM and office of the PCOM, followed by a confirmation copy, to be sent to PCOM.

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.

Under any circumstance, provisional sanction must not be treated as final sanction and final sanction must invariably be awaited before consignment is despatched.

SS/SM/YS/YM concerned must furnish full particulars of the wagon to the Control, such as Wagon No., Owning Railway., 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 despatch the wagon by a particular train on date advise and obtain their acknowledgement.

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.

6.07: On Electrified Sections:

a) In addition to the precautions laid down above, the following special precautions must be observed for transport of over- dimensional loads on the electrified section:

b) In all cases, where oversize consignment is moving, it should be remembered by all staff accompanying the ODC, that the overhead electrical equipment is always ‘LIVE’, except when a particular power block has been obtained from the Traction Power Controller. Even

when a power block has been obtained, it should be remembered that all the lines, other than those for which the power block has been granted, are 'LIVE' at 25000 Volts.

c) No person should climb on the roof of carriages of wagons, when those vehicles are located beneath the overhead equipment, except when the equipment is made 'DEAD' and earthed.

d) The following are the prescribed clearance from contact wires for the passage of over-dimensional loads through electrified traction areas and the special restrictions required:

e) Special speed restriction is not required when the gross clearance is at least 390 mm.

f) Speed must be restricted to 15 kmph, when the gross clearance is in between 390 mm to 340 mm.

g) Speed must be restricted to 15 kmph and over head power must be switched off when the gross clearance is less than 340 mm

h) No consignment with less than 100 mm gross clearance from the over head contact wire will be permitted over electrified section.

i) A representative of the Traction Department should also accompany all ODC having clearance as specified in item (b) and (c) of sub para (3) above, over electrified section.

j) A representative of the Traction Department should accompany all ODC loads having width of more than 1981 mm for BG and 1910 mm for MG from the centre line of the track.

k) Section Controllers and Traction Power Controller must co-ordinate, while an ODC moves on electrified area.

l) A list of structures, where the clearances are restricted on the electric traction area and also the clearance available under over bridges should be with the Section Controllers and Traction Power Controllers.

6.08: Despatch of ODCs:

1. At the originating station the ODC wagon will be moved 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, describe the train number with letter 'X' suffixed on it.
4. It will be the duty of the Dy. Chief Controller to keep adjoining Control Office informed about the movement of such ODC, till such time, it is handed over to the adjoining division by specified train. 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 152 mm and there must not be less than 304 mm up side clearance in the end trucks between each of load 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.

9. A separate private number should be exchange additionally between stations for running ODC consignment.

CHAPTER-VII

CONTROL ORGANISATION

7.01: Introduction :The Control Organisation 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, each section having a given number of stations.

The two-way telephone system, also called an omnibus circuit which 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, can be analyzed later.

To guide and assist the section controller, there are shift Deputy Controllers.

All technical disciplines involved in train movement have a representative in the Control office to provide the required support from his department. These would include-

- Motive Power Controller
- Traction Power Controller
- Signaling and Tele-Communication Controller Commercial Controller
- Security Controller
- C& W Control
- Engineering Control

The entire organisation 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 organisation 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 Organisation.

7.02: 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 8 hrs duty staff.

(i) Incident management on rail network & at station

(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 yard

(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 for wagons outstanding at stations and arrangements for supply of wagons.

(ii) Number of wagons loaded and empty wagons/rakes awaiting despatch.

(b) Arranging running, regulation, putting back and cancellation of trains.(both freight & coaching)

(c) Securing maximum loads for trains.

(d) Collecting stock position from the different stations, marshalling and terminal yards.

(e) Arrangement of Crew & Guard 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 of stock control.

(i) Arranging supply of wagons against pending registration.

j) Securing 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

(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 kilometers is kept to the minimum.

(f) Providing guidance to running staff for troubleshooting.

4. Carriage and Wagon Control is responsible to assist the train and traffic control and to-

(a) Ensure timely examination and fitness of all trains

(b) To keep a watch over the detachment of sick wagons/coaches and to arrange 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 C&W depot to avoid detention to trains.

(d) To keep a watch over placement of wagons/coaches in sick line and their release.

(e) To keep account of detention to trains on C&W account and take remedial action.

(f) To provide guidance to running staff for trouble shooting.

(g) For Electrical Multiple Units, this function is performed by EMU controller.

(h) Monitor 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 transhipment of sick wagons by arranging matching stock and labour.

(d) To keep a watch over submission of station returns.

(e) Monitoring of public complaints lodged at the stations.

(f) To ensure proper maintenance of public amenities available at stations.

(g) 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 accounts.

(e) Guiding running/ station staff in trouble shooting.

7. Engineering Control

Monitors imposition & cancellation of Engineering Restrictions, Working of track machines & monitoring integrated maintainable blocks. To co-ordinate works during maintenance blocks 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/stations.

10. 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 transhipment 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 despatch.

j) Arranging of engineering and other departments blocks with minimum detention to traffic.

k) Running of material trains and other track machines, tower wagons etc.

l) Arranging relief for engine crews and Guards.

m) Ensuring maximum utilisation of locomotives.

n) Issuing instructions for train working in case of equipment failures and whenever abnormal methods or 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 coordination 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.

7.03: Telecommunication Facilities in Control:

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

(c) Intercom facility to various Officers and other functionaries concerned with the control is connected with important work centres with STD or Trunk Exchanges.

3. Deputy Control Lines:

This circuit is provided between 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 T.P.C. in OHE remote control centre, all stations, control-offices and selected work places. The section controller or T.P.C. can also be contacted from the emergency socket provided over the sections of line by means of portable telephone of the control point with indication on the electric mast, direction wise, to the nearest circuit.

6. Section Control Board: The Section Controller of each section is provided with 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 the coloured pencils shall be used as per extant convention. 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 computerised 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 trains 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 and planning the running of any extra train and guidance of section controllers and should be displayed on the boards to which they refer.

7.04: Duties of Control Staff:

1. Duties of controllers:

The main duties of control staff are as under: These are only guidelines to their day to day working and are not exhaustive.

(a) Chief Controller (In-charge). The Chief controller is in- overall 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

(iii) These will generally relate to interchange, loading and locomotive utilisation

(iv) Checking control charts and bringing to the notice of the Senior Divisional Operations Manager/Divisional Operations Manger all avoidable detention to trains.

(v) Punctuality performance with particular reference to trains which lost punctuality

(vi) Maintaining statistics regarding the punctuality of passenger trains.

(vii) Scrutiny of stock papers, Monitoring interchange obligations.

(viii) Watching detention to stock at stations and terminals

(ix) Watching the work of marshalling yards/freight terminals.

(x) Maintaining liaison with neighboring Divisions

(xi) Watching utilisation of loco and their terminal detention.

(xii) Checking duty hours of running staff and balancing of crews.

(xiii) Granting engineering blocks, power blocks etc.,

(xiv) Attending control office in cases of accident

(xv) Establishment work of control office

(b) Chief controller (Movement)/Dy. Chief Controller / 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 unusual.

(iv) Keeping 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) Supervising the running of oversized consignments.

(vii) Maintaining liaison with the Power Controller.

(viii) Co-ordinate the work of various Section Controllers.

(ix) Maintain discipline among control staff in the absence of Chief Controller.

(x) Maintain 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 details 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 transhipment 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, transhipment etc.

(d) Duties of Chief Controller(Punctuality)/Deputy Chief Controller:

i) Ensuring punctuality of passenger trains in system

ii) Ensuring punctuality at the start of all outgoing passenger train

iii) Maintaining Detention Reports of Coaching trains

iv) Ensure that late running trains make up time

(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. 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-blocks and working of material trains so as to give the maximum possible time with least detention to other traffic.

(viii) Incident management to include adjusting movements of trains in view of the likely impact of the incident, informing all concerned

(ix) Keeping a watch over damaged vehicles detached at road side stations and arranging repairs or transhipment of their contents and proper attention on the part of the train examining staff.

(x) Arrangement of ART & M/Van in case of accident.

(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 en-route.

(xiv) Recording stock report (where stock clerks are not posted)

(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 en-route

(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 relief in case of accidents as per 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 and watching movement of diesel fuel tank wagons (for power controllers only)

(g) Traction Power Controller

Traction Power Controller shall be responsible for

i) While taking over shift duty acquaint himself 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.

7.05: 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 initialed with time.

At the end of each turn of duty the relieved as well as the relieving Station Master 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) No Terminal Station should 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, trollies 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 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 tonnes and vehicles) particulars of shunting to be done on the journey, time of departure, brief reasons of late start, time of S/O of crew fuel balance 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 or 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 leave from or returns to the shed 'Bahar line'. This in no way, relieves the Station Master of the responsibility for issuing necessary all concerned messages regarding engine failures and engine trouble en-route. The Controller, shall record the duration of such defects in his chart, diary and registers.

xvi) Time to be checked with control: Station Master, Crew Controller and Lobbies must check their time with control at appointed hours 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 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 to speak 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.

7.06: Co-ordination between Control and Stations:

1. Asking line clear: In order to avoid the detention to passenger trains for crossing 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.

2. 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.

3. 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.

4. 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 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.

7.07: 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/Sr.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 goods train.
13. Through goods train.
14. Accident relief train returning from the site of accident (unless otherwise ordered).
15. Shunting and van goods train.
16. Departmental trains.

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.

7.08: Accidents: Controllers and other staff should thoroughly understand and act on the guidelines contained in G & SR and Accident Manual. Saving of lives and rescue of injured and mitigating hardship to passengers must be given the topmost priority.

7.09: 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. Books/Documents and basic records to be kept in Control Office:

1. Station Working Rules of all stations.
2. Working facilities available on the transhipment 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 section 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 sections and plans of the various sections of the jurisdiction and details of train watering, Engine fuelling etc.
10. Master charts depicting all trains indicated in the working time table in force.
11. Charts showing jurisdiction of the various officials details of:
    (a) of the maintenance branch of the post and Telegraph department responsible for maintaining control circuit wires in good condition.
    (b) of the various departments of the railways,
    (c) Zone 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.
18. Rules Books(G&SR, Accident Manual, Operating Manual, Block working Manual etc. and Working Time Table

7.10: 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.

(q) Private number sheet

(r) Rules Books(G&SR, Accident Manual, Operating Manual, Block working Manual etc. and Working Time Table)

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 TNL'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.

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/cube oil Fuel Tank Wagons.

(h) Register showing Undue and Abnormal Detention.

(i) Shed Conference Register.

(j) Fuel Balance Register.

(k) Schedule Dates of Locos

7.11: 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.

7.12: Learning duty and declaration of Controller:

a) Before staff are allowed to work independently as Controller, they shall be required to pick up duties on the Boards they would have to worked. This learning duty must be under the guidance of the Section Controller on duty. The period of learning duty would depend on the aptitude for control work which the staff possesses but in any case, it will not exceed five days in each shift for each board.

b) In case the Chief Controller observes that a staff would require more than five days for each shift on one board, he must bring the fact to the notice of the Assistant/Divisional Operations Manager and take his sanction for extension of the learning period.

c) After the staff has completed learning duties, he shall write and sign the following declaration in a register maintained for the purpose.

"I(Shri/Smt…….. hereby declare that I have taken learning duties on…… board/boards to my entire satisfaction and can, now work independently as a Section Controller on this/these board/boards" The Chief Controller shall write the following remarks below the above declaration and sign it.

"Shri/Smt……. was given learning duties on board/ boards from……to…….. ..I have watched his progress and feel that he can work independently on this/these board/boards"

The Chief Controller may, at this discretion, put such staff a test before allowing them to work independently.

d) In case of Sub-Control Offices where the Chief Controller is not posted, the duties assigned to the Chief Controller shall devolve on the senior most Controller.

7.13: HQ/Divisional Control office of N.F.Railway:

HQ/Division	Location
HQ	Central Control/MLG
TSK	TSK
LMG	LMG, BPB
RNY	RNY
APDJ	APDJ
KIR	KIR

CHAPTER-VIII

COMMAND, CONTROL AND COORDINATION OF EMERGENCY RESCUE OPERATIONS ON THE OPEN LINE

8.01: Introduction:

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 mainline.

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.

8.02: Objectives of incident Management Plan

1. 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, preserving clues by cordoning of 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 and 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 earth quakes.

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 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 mainline.
- 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 Divisional Control Office & OC site.
- Rolling Stock Department is responsible for providing technical assistance to Divisional Control Office and OCS, as required and 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 pilot 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 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 final authority to determine when these activities are complete and shall coordinate these activities with the OCS and the senior Fire services official.
- 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 Division Disaster Management Team When none of the above mentioned personnel are present at the scene, Divisional Control Office shall appoint an OCS 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 OCS has been designated. However, it is the responsibility of 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 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 DRM, Divisional Control Office and OCS and Metro Police.

When it is necessary to notify the Fire Services, and/or to seek medical assistance the following information shall be provided:

a. Identification or 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;

7. Procedure

The Chief Controller/Operations Manager of Divisional Control Office, or designated Divisional Control Office Supervisor shall:

a. Ensure that ARME & ART is turned out on time

b. Appoint the initial OCS

c. Coordinate all field activities and requests through the 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 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 Rail System status;

i. Coordinate and assist OCS with restoration activities;

j. Provide and obtain, from OCS frequent updates on events

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 Railway Act provision).

8.03: The Officer-in-Charge site(OCS) shall:

a. Ensure that the safety of passengers and personnel at the incident scene is maintained; ascertaining that all injured and stranded passengers have been safely evacuated. Till evacuation is complete necessary succor 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 scene.

d. Coordinate all police related activities and requirements with the senior police official at the scene.

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. To the senior official at the scene;

g. And activities at the incident site and keep Divisional Control Office informed of progress;

h. 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;

i. Direct all inquiries and/or request made by the news media to the CPRO Office;

j. Maintain a chronological log of all events.

8.04: 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.

8.05: 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.

8.06: 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 manpower.

Seek GM/PCOM's approval to relay the information to Railway Board 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 rail situation.

8.07: 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 PHODs and HODs may differ from zone to zone.)

a) PCCM

b) CCM/PM

c) CCO

d) CCM/FM

e) Dy. CCM/Catering

2. Nominated Commercial officials on receipt of information of train accident 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/PM or CCM/FM will proceed to the site of accident and One Officer will remain in Commercial Control.

8.08: 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 Rly. Fax

ii) Commercial Control office in Headquarter would be manned by officers round the clock basis. In case of serious accident of passenger carrying trains, CCM/PM will immediately come to Control office. In his absence, CCM(IT)/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 following information:

a) Time and place of accident from Operating Emergency Control.

b) Details of dead/injured Passengers, rescue operations, helps/assistance being rendered at the site of accident, en-route 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/IT will get the reservation charts printed and supplied to control. In addition the addresses as per requisition slips shall also be get collected by CCM/IT & 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 officer.

b) Names and phone numbers of hospitals where injured are admitted/(i) with names of passengers and (ii) location of dead bodies identified (iii) digital photographs of all injured and dead transmitted through computer network to be displayed and at sites or telecast & all enquiry offices.

c) Telephone and FAX numbers of enquiry offices that would have been set up at various stations including at other Zonal Railway.

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 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 and monitor 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, and

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, details of assistance required from Headquarter or the adjoining divisions.

vii) Maintain a log of events.

C) Site of Accident : Sr.DCM in his absence, DCM will attend site of accident and work as site in charge of the Commercial department.

8.09: I. Setting 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 Doctor to be relayed to the Control offices at the division and headquarters. Separately indicating 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 as per rules should be made.

vii) A manual/guide be made available with train crew like; TTEs, AC Coach Attendants, AC Pantry Car Staff, which will inter-alia to 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/IT and Divisional Control and divisional Commercial Officers.

II. Rescue

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 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 in charge.

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. It will be done free of cost.

v) TTEs of the affected train will not leave site of accident till ordered by the site in charge.

vi) Train Superintendent or Conductor or senior most Ticket Checking staff till a commercial officer from division reaches to the site of accident, 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 to 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 and render First Aid and organise relief operations with the available assistance.

viii) In case of involvement of Goods Train, following actions will be taken promptly:

a) Arrangements 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) Adequate tarpaulins to cover the contents so that these are saved from rains etc.

c) Arrangements 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 accident besides intimating forwarding/destination station. The information will be conveyed through the Commercial Control of the division/HQ as the case may be. Also to make arrangements for delivery of the consignments at the site of accident if they desire.

e) Arrangements 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, the consignment involved in the accident is not removed/transported; the same shall be made over to RPF In-charge 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.

III. Safety of Passengers/Passengers 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 identify of deceased/missing.

IV. Catering arrangements It will be ensured by the site in-charge.

i) Sr. DCM will ensure that adequate eatables, water etc. is 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 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 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 railways catering arrangements, nearby Dhabas and hotels should be contacted and arrangements made for opening up stalls at the site.

V) Hospitals: -

i) One assistant officer each in the hospitals will be deputed to look after where injured passengers are admitted or dead passengers are kept. In case of non-availability of 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 identify.

ii) The nominated officer will work in close coordination with doctors and render required help.

iii) Officer in-charge of the hospital will assist kith and kin of the passengers involved, in disposal of dead bodies, release injured passengers.

iv) Deputed official will obtain details like name, address, etc. of hospitalized/dead passengers. He will also obtain the details of injured, nature of injuries with the help of doctors and convey it to the divisional Commercial control.

VI) Payment of ex-gratia

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 some injured passengers/kith & kin of deceased involved in accident have not been paid ex-gratia at the site of accident or in the hospital, arrangements should be made to pay at their residence by deputing officials of the division or seeking help of the other divisions/railway. Such payment will be witnessed by the Pardhan or Sarpanch or any other responsible official of the area.

VII. Enquiry offices at the important stations en-route.

This function will be ensured by the in-charge 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-IX

MARSHALLING YARDS AND FREIGHT TERMINALS

9.01: Introduction and Definition:

A Yard can be defined by the functions it performs. It is the place or the activity centre on a Railway system, where the trains or rolling stock or group of rolling stocks are received, reformed into trains or loads after marshalling and are despatched to their destinations. A Yard is, thus, a classifying and distributing machine with facilities for receiving, sorting and despatching 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 despatching of trains.

9.02: 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 necessity 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 a kin to the heart and its working 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.

9.03: 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 numbers 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 Yard which receive and despatch trains without any shunting on them are classified Transit Yard. In such Yard 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.

i) Objectives of Marshalling Yards:

1. Quick Transit viz.

(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, transhipment 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 to 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 the 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.

ii) 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 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 despatch 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 of 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 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/despatch 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

the layout of it dependent on the availability of plenty of land with the required topography which is seldom possible.

iii) 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 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 grids for through trains bye 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:

In which load can be held ready for departing trains. Separate departure Yards for trains for different directions are provided in large Marshalling Yard.

5. Shunting Neck:

It is a line in a Yard leading to sorting lines on which the actual shunting of the trains maybe 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. By pass or avoiding lines:

It is a line, which skirts the hump, and its object is to avoid engine 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 Yard so that engine 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 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 the nature of the axle box (viz. roller bearing or plain bearing) as also on the weather prevailing. 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.

15. 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.

16. Brake van siding: In this siding, brakevans of incoming terminating trains etc. may be detached for subsequent attachment to originating trains.

17. Special stock siding: These are provided for keeping for special type stock, cattle wagons containing commodities like explosives which cannot be humped.

18. Stabling Lines: In large Yard, 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 inspite of any accumulation of wagons or other setbacks.

19. 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.

20. Yard Capacity: The maximum number of wagons a yard can accommodate at any one time is known as yard capacity. It

21.Working capacity: The amount of traffic that can be received, dealt with an dispoased of by a yard at any working capacity. Working capacity of a yard is obtained by dividing the holding capacity in 24 hours by the total average detention of wagon in hours.

22.Yard Mobility: A marshalling yard becomes congested if treated as holding yard or if more train are put in than are sent out. The maximum result can be obtained if the means of transport are kept continuously in motion. In fact, the working capacity of yard chiefly depends upon fluidity. The moment of this mobility or fluidity is curtailed, the efficiency of the transport system as a whole greatly affected.

23. Yard Congestion : When a yard is unable to cope up with the traffic offering or any kind of trouble reduces its working capacity, it causes hold up of rolling stock. The mobility of the yard is curtailed or lost and heavy accumulation of unhandled traffic takes place. It needs to strained working. It may be inward and outward. The sign of yard congestion are :-

- Heavy yard balance
- Hold up train at road side station.
-stabling of train at intermediate station.
- Frequent late start to train.

iv) 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 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 dialling 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 despatch 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.

9.04: Yard Organisation:

Yard working is controlled by a Chief Yard Master, though small Yards may be controlled by Yard Master. 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 In-charge of the Yard and Yard Masters in each shift are responsible for operational work. In dual yard system, there may be

more than one Yard Masters, e.g. one for Down Yard and another for Up Yard. The next level of supervision is generally related to the shunting engines. Each shunting engine may have an Yard Master/Shunting Master, attached to it, who controls the movements of the shunting engine. Shunting Master 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 Master 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 from the organisation for sorting work besides other staff are also required for various auxiliary functions – cabin staff, box boys (brake or skid porters in hump Yards) etc. apart from the staff of other departments.

2. Trains Branch: CTNC or Head TNC, has over all responsibility for the efficient working of the trains branch. Below them, there are Head TNCs/ Sr.TNCs/TNCs, 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 of trains in Reception and Despatching Yard. They also maintain Wagon Exchange Registers, Phase-wise Detention Register and stock on line position. Daily census entry in ICMS and FOIS etc.The number of TNCs in a Yard will depend on the number of wagons, 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 despatch 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 Masters and Yard Masters on arrival on duty, in general, in regard to advance planning of the work during their shift.

h. Directions to Shunting Masters 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 and carriage examination and 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. (1) to (5).

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 depots, 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 CTNL(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 and the Yards, and want of proper co-operation between the Yard staff, loco shed staff and carriage and 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 sprit.

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 transhipment of contents often lie scattered through out 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 required adjustments of loads and transhipment 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 wagons 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 between the Yard Master, 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 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 layout: The Shunting Master 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, lengthing 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 the wagons by public and departmental consignees cause 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 advice to control to restrict the inflow.

l. In case of heavy congestions requiring block back on the neighboring sections, neighboring Yard should be called upon or directed by Sr.DOM/CTNL by taking upon them some of the sorting and Marshalling work, the congested Yard would normally have done. If necessary a competent Officer or Inspector should sit in the Yard and a direct operation until the congestions 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 neighboring 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 despatch 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, if prevented, it requires careful attention of Supervisors, Inspectors and Divisional Officers for necessary remodeling. If frequent congestion takes place in a Yard or a Yard show poor performance, the entire working should be thoroughly examined to determine the root cause of congestion. The causes of strained working may be a generally 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.

p. Sometimes want of proper working facilities, such as adequate lighting, communication between the different key-points in the Yard and the Yard Master and the Station Master requiring a number of messenger to run about in the Yard for this purpose, affects the working of the Yard adversely.

6. Some of the other factors affecting the 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 mis-marshalled.

(e) Congestion/interruption on the section or in the intermediate or 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 of the different types of movements which are required to be performed may be carried out. At one and the same time it should be possible to perform all the different movements which are to take place at the same time.

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 despatch of the trains to different directions.

(c) Two or more shunting engines working, not to interference 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 Despatch. Bye-Pass Running lines may be provided if possible, when only crew change is required.

(g) There must be adequate facility of light and communication in the different part of 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 the first instance be provided.

8. Marshalling Yard Statistics:(Manual of Statistical Instructions Volume-I)
(Railway Board has decided that statistics shall be maintained in terms of 8-wheeler units. Same be incorporated by the 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 requires 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, transhipment points, goods sheds, departmental sidings and the industrial sidings etc., may as a general rule, be treated as lying outside Marshalling Yards for purpose of calculation of Marshalling Yard statistics.

e. At places, where there are points like the Goods terminal station and/or Brake-of gauge transhipment 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 despatch 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 despatch 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.

9.05: MARSHALLING YARD STATISTICS Statement

For the month of _____

Item	Name of Marshalling Yards stating broad gauge or metre gauge	Remarks
1	Wagons despatched	
	1.01	Number of wagons despatched – Despatched by trains during the month
	1.02	Number of wagons placed from Marshalling Yard outside the Yard by pilots in goods sheds, transhipment/ 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 despatched.	
	Number of trains received	
3	3.01	a) Number of by passing trains b) Number of terminating trains c) Total (a+b)
	3.02	Average detention to by passing trains: Target- Actual -
	3.03	Number of wagons carried by – By passing trains included in items 3.01(a)
4	Number of trains despatched	
	4.1	No. of by passing trains
	4.2	No. of originating trains
	4.3	Total
	No. of wagons dealt with per shunting engine hour	
5	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

9.06: Procedure for Working Out Marshalling Yard Statistics:

i) Wagons despatched:

Item 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 despatched:

Item 2 = Item 1.03 /No. of days in the month

(iii & iv) Number of trains received and despatched:

(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 despatched.

v. Number of wagons dealt with per shunting engine hour:

Item 5.06 = Item 1.03/(Items 5.03 + 5.04)

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.

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.

(c) 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.

(d) 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 the part of the Marshalling Yard area.

Note: (ii) Time spent for locomotive duties recorded separately under item 5.5 will include under 5.3 also. Item 5.5 will include the time taken by shunting locomotive for locomotives duties and minor repairs upto 30 minutes per shift as per Note (i)(b) under item 5.

vi). 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 under different types must be totalled, and both detentions and number of wagons for each type must be multiplied by the factor of equivalence to four wheeler and then consolidated to work out the average detention per wagon, the following example will illustrate the method of calculation of the average detention per wagons.

Example: Suppose Yard A has despatched 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 –(400 x 1 + 200 x 2+ 150 x 2.5)/ (100 x 1 + 20 x 2 + 10 x 2.5)= 7.1 hours

The detention of wagons arriving in one month and despatched in the next will be shown in the month in which they are despatched, but the time must be reckoned from the date of arrival. Stations which maintain a wagon card index may obtain the figures therefore instead of from the wagon exchange register. The number and detention of Brakevans 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. 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" mean 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 and 1.02).

Item 6.4 - Outward Local - This item will include detention to local wagons despatched 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 despatch 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.

vii) 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 size – 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 tortuous 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 in inward consignment there and carting them to customers' premises are totally eliminated and inter modal operation ensures door to door service, which till now was the hallmark of road transport, which had captured nearly 80% of making Indian Railways the second largest mode of transit movement.

Rightly enough the era of modern freight terminals has began. 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 an when the cargo is needed.

iii) Large warehouses where cargo can be stuffed/restuffed/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

Freight terminal operating company and some of the railroad company who have a customer services centre working round the clock to receive customers instructions for change of destinations, rebooking of cargo etc. and this new environment the freight customer may visits the commercial office to execute agreements or long term contracts. The freight terminal is like a factory where the cargo goes 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 of freight terminals have equipped railway system worldwide to win back high profit yielding, finished production from road to rail cum road system which reduces cost to the economy and the customers, substantially reducing the adverse environment impacts of road transport, paving the way for sustainable transport.

The future manifestation of railway yards is likely to be as Logistics Park as railways strives to become a logistics provider rather than a mere transporter. The future manifestation of railway yards is a logistic park, essential for Railways as it shifts towards being a logistic provider from a mere transporter.

9.07: Register, Forms, Files etc. maintained at station:

The following Register, Forms, Files etc should be maintained apart from any orders may be issued from time to time by the Competent Authority:

i) Registers/Forms/Files:

ii) Yard Diary Book

iii) Yard wagon balance Register

iv) Number token Book

v) Sick wagon Register

vi) Register showing analysis of late start of goods train.

vii) Special stock Register

viii) Wagon Detention Register

ix) Guard arrival Register/ Guard's duty Register

x) Vehicle Guidance cum – GTR

xi) Statistical train Report

xii) Circulars & Gazette Notification File

xiii) Files of inward letter

xiv) Guard's order File

xv) Traffic working order File etc.

CHAPTER-X

CONTAINER TRAIN OPERATION

10.01: Container train operation: 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 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. 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.
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, which may be subjected to different tariff and conditions for haulage.
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 any of the Wagons of the Concessionaire are lying idle ("Idle Wagons"), the Concessionaire may offer to the Railway Administration or other Concessionaires, 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 one time 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 exists. 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 Concessionaire's Wagons, 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, anytime prior to arrival of a locomotive cancel its Indent provided however, 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 one time 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.

10.02: Inland Container Depots (ICD) and ISO Container:

ICD is an extension part which is called Gateway Port or exit port. The Railway undertakes a carry ISO containers containing export and import goods between ICD and ports. The procedures, adopted for transportation of domestic containers are followed here also. ISO containers are the properties of private individuals.

Advantages:

- Owner need go to port for their import & export traffic.
- Customers formalities are completed at ICDs.
- Reduces multiple handling of cargo.
- Same cost, time and labour.

CHAPTER-XI

CUSTOMER INTERFACE AND ROLE OF COMMERCIAL STAFF

11.01: Introduction: The physical movement of both passengers and freight cargo is handled by operating staff but it is the commercial staff, who interacts with our customers.

Platform Ticket Checking staff: - Their foremost duty is to enforce rigid access control in station area to prevent ticket less travel and entry of undesirable elements in station premises.

11.02: 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 bona fide use of waiting rooms is being made, they shall be checked by a ticket checking staff every eight hours.

11.03: Booking staff: -

(a) To issue tickets, release and display reservation slips and 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 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.

11.04: 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 TXR staff under advice to SM either at the starting station or at the next train examining station.

(d) Travelling Ticket Examiners are to note 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) Passengers to be courteously treated.-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 prompt and civil manner any question put to them by the public.

11.05: Precautions during journey:-

(a) In cases of long distance through trains coming from or going to other railways, which have yet to 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 TXR staff is required to attend to the safety catches, the TXR staff should be ready with the necessary material and should themselves check up 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) Should it 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 of the station at which the incident occurs, if time permits or at the next stopping station, who 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.

11.06: Waking up passengers: -

(a) Passenger 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 of 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.

11.07: 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 women 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.

(c) A lady travelling alone or with children under 12 years of age in a first class compartment may take with her 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.

11.08: Medical Aid:-

(a) It will be the duty of the train manning staff or station staff to render first aid to any injured person within Railway premises immediately.

(b) If the case is serious one, 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.

11.09: Murder or serious Assaults – (a) 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.

(b) The Conductor or TTE of the train shall have the compartment emptied and locked up after all shutters have been raised from outside immediately the commission of such an Offence is known so that blood stains, marks of struggle, foot prints, finger impressions etc. may remain undisturbed.

11.10: 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.

11.11. Duties of Conductor

(A) Attendance

(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 and 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, specially 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 to

(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, 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 trains are about to start and that no one is travelling on the roof of carriages

(B)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 compartment are properly cleaned, dusted, and watered and shall make necessary enquiries from passengers in this connection.

(iv) He shall see that lights, fans and 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 particulars.

(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 ladies compartment that 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 and complaints of special nature and action taken by him should be recorded.

(xi) During the 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 thalies.

(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 or slamming doors while entering, or leaving compartments. Smoking in Railway premises is prohibited.

(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.

CHAPTER-XII

INSPECTIONS

12.01: Objects of Inspections:

The Railway network is spread over a vast area. It is estimated that for running a train over a section, cooperation and co-ordination of thousand 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 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 in force.
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 willfully or negligently and persisting even after repeated guidance and counseling.
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 behaviour 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 safeguarded.
9. Inculcate discipline and build up the morale of the workers.
10. Check the compliance of previous inspection reports.
11. Analyse efficiency targets vis-à-vis performance.

Inspections, thus 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.

12.02: Types of Inspections:

The following inspections have to be carried out by operating and safety officials:-

(a) Regular/Detailed Inspection (six monthly) –

Each station on the division must be inspected in details at least once in every six months i.e. January to June and July 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/DOM/ Sr.DSO/DSO/ AOM /ARM/SS/SM/TI etc. While all 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 nominate officers. Each officers will be allotted at least two such a stations. The officials concern shall also spend the night at the station. Regular inspections have to be comprehensive in nature.

(b) 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.DSO/DSO or Sr.DOM/DOM concerned personally or telephonically beside making a written report.

(c) 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 3 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

(d) 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 00.00 hrs. to 4.00 hrs. because during this period, the staff is likely to be lethargic and negligent in duties. Similarly, instances of staff sleeping on duty, unauthorised absence from duty and many other irregularities, unsafe and undesirable practices may come to notice between 00.00 hrs. to 4.00 hrs. Frequent night inspections are a must and SS/SM must conduct surprise night inspections fortnightly of their station between 00.00 to 4.00 hrs. and take remedial measures to rectify the irregularities and deficiencies noticed.

(e) 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.

(f) Surprise Inspection by Road –

These inspections have an element of surprise in them. To create a sense of alertness amongst the staff the road inspection should be carried out without informing anybody.

(g) 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 can not 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.

(h) Joint Footplate Inspections –

These are carried out jointly with officials of Mechanical, Electrical (Running), Permanent Way and Signalling branches e.g checking the visibility of the signals, their locations, operations, lighting up, speed restrictions and caution boards rail wheel interaction and loco pilots' and assistant loco pilots' operating behaviour.

(i) 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.

(j) 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.

(k) 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.

(l) Running Trains Inspections –

Whenever an operating officer or an inspector is travelling by a train on duty, he must pay special attention in observing the performance of duties by Guards, Loco pilots, Station staff, Gatemen and others.

(m) Loco shed inspections –

One loco shed shall be inspected once in 3 months individually as well as jointly.

(n) C & W Depots inspections –

Each C & W depot shall be inspected once in 3 months individually as well as jointly.

(o) Accident Relief / Medical Equipment Scale I (ARME) –

Each Medical Van shall be inspected (For details see Accident Manual).

(p) Accident Relief Train (ART) –

Each Break down train shall be inspected (For details see Accident Manual).

12.03: 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 inspection is attached.

Schedule of Inspections by Operating/Safety Officers and Traffic Inspectors

SN	Type/ Nature of inspections	Sr.DOM/ DOM	Area Manager/ Area Officer	AOM(M)	Sr.DSO/ DSO	AOM(G)	TIs	All SSs/ Sup. SM
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 six months.(In detailed-format mention below)	Their station once in six months.
2	Safety Inspections (Non-detailed)	-	-	1 station every month	4 stations every month	6 stations every month	All stations in their jurisdiction once in a month.	Their station once in a month.
3	Surprise Inspections	No quota	No quota	Minimum 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 3 every month)	As often as possible
4	Night Inspections i.Level crossing ii. Station iii. Footplate on goods train	1 per month 1 per month 1 per month	1per 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	1 per month 1per month 1 per month	2 per months under his jurisdi-ction. (i & ii only)
5	Level Crossings during day time	1 per month	1 per month	1 per month	2 per month	2 per 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 footplate inspections	1 section per month by both i. Mail/ Express/ Pass. ii. Goods train	1 section per month by both i.Mail/ Express/ Pass ii. Goods train	1 section per month by both i. Mail/ Express / Pass. ii. Goods train	1 section per month by both i. Mail/ Express/ Pass ii. 2 Goods train	1 section per month by both i. Mail/ Express/ Pass ii. 2 Goods train	1 section per month by both i. Mail/ Express/ Pass ii. 3 Goods train	

8	Joint Footplate Inspections	--	--	--	One section every quarter covering the entire division once a year.- Up and Dn separately by day and night.	One section once a month covering the entire division once a year.- Up and Dn separately by day and night.	As per schedule given by the division time to time.	
9	Surprise speed checks	No quota	No quota	No quota	As per schedule given by the division time to time.	As per schedule given by the division time to time.	As per schedule given by the division time to time.	
10	Running Rooms Regular Inspections	1 major running room as identified by DRM- once a year (alongwith Sr.DEN and Sr.DEE	1 major running room as identifi- ed by DRM- once a year (alongwith Sr.DEN and Sr.DEE	All running rooms under Sr./ DSOs charge of Mechanical & Electrical dept. (alongwith AEN AEE & AME	All running rooms under Sr./ DSOs charge of Mechanical & Electrical dept. (alongwith Sr.DEN & Sr.DEE	All running rooms under Sr./ DSOs charge once a year (alongwith with AEN and AEE	Each running room under their jurisdiction once in a month	
11	Ambush Checks in Automatic signalling territories	--	One during day and one during night	One in a month	One during day and one during night in a month.	One during day and one during night in a month.	One during day and 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	--	--	--	1 Depots every 3 months	1 Depots every 2 months	--	
15	Accident Relief Medical Equipment Scale –I (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 and 13 – All loco sheds, C&W Depots and Medical Vans are to be covered in a year either by DSO or AOM(G). The quotas had shown indicates the minimum inspections. Inspections in respect of above items and other items should be carried out as frequently as possible.

Note: In addition to above, 01 crew lobby inspection(if available under his jurisdiction) per month and 03 brakevan inspection per month must be done by TI.

Some Inspectors to be deputed to supervise, counsel and monitor the working of Guard.

12.04: <u>Format for Detailed inspection Report</u>:

DETAILED INSPECTION REPORT

Station: Date:

Last date of detailed inspection:

Name of Inspection Official:

Operating staffs present at the time of inspection:

Questions	Answer	Other
1. Station working Rule(SWR): i) Do the SWR and the Rule diagram conforms the existing layout with special reference to numbering and classification of points, locking arrangements of points, isolation, level crossing within the station limits and signals? ii) Is SWR supplied in Bi-languages i.e in English & Hindi? iii) Has any Visibility Test object been prescribed in the working Rule: If so test the same and say if it is order. iv) Is the shunting authorized after giving Line clear at the station? If so, do the staff observe the rules in performing the shunting? v) In case of station being on a gradient, are the rules sufficient to cover safe reception of trains and safe shunting at station? vi) Do the station working Rules bears a reference to the working Rules of outlying sidings within the Block section on either side of the station.? vii) Have the SWR of the siding tighter with the Rule diagram been exhibited in SM's Office? viii) On verification of the SWR and RD with the yard layouts do you consider any further improvement or correction necessary ? ix) Have the SWR and RD been kept in proper receptacle?		
2. Assurance Register: i) Have the SM and other Group 'C' Operating staffs working at station signed in this register in token of having understood the rules and layouts? ii) Has the SM certified that he/she has explained the SWR and Rule diagram to all Group 'D' operating staffs working at the station and obtain their signatures in the register in token of their having understood the rules and layouts?		

3. Signals : i) Are the fixed signals are in good working order? If not state particular of signals? ii) Is the Signal failure register clearly and properly maintained? Check up the register and report cases of delay in attendance or any other irregularities? iii) Has ant Loco Pilot reported to SM about obstruction in the visibility of any signal from an adequate distance ? If so, give date of report and say if the obstruction has been removed. iv) Is the Relay Room Key register clearly and properly maintained? v) Are the clamps and padlocks sufficient to meet the requirement? Recommend for additional supply with justification.		
4.Level Crossing Gates within Station Limits i) Are the L.C Gates in good working order and are they being worked according to instructions in the Gate working Instructions. ii)Are the interlocked gates provided with chains & locks for emergency? Are sliding booms provided at gate? iii) Are the non-interlocked locking device and padlocks? Are chains & locks for emergency? iv)Are the gates provide requisite number of lights in working order ? v)Has the Gateman been equipped with Hand signal flags and Lamps and requisite numbers of detonators as per GWI? vi)Test the Gateman about his duties and report results.		
5. Watch reception and dispatch of trains and shunting operations and see whether the staff observe the Station Working Rules and relevant G&SR rules with special reference to rules regarding giving line clear, taking off signals, closing of L.C gates, exchange of signals , speed over turnouts train stopping clearing fouling marks.		
6.Are the vehicles kept in the siding clearing the Fouling Marks?		
7.Are the requisite number of Fouling Mark provided between the converging lines?		
8. Are the stabled vehicles kept well secured by pinning down hand brakes, wedges and safety chain duly locked where necessary.		
9. Are the staff acquainted with process of using safety chains , wedges and pin down hand brakes.		
10.Are the keys of all points and signals normally kept in the key box under lock and key?		
11.Are the staff conversant with the rules for placing detenotors in case of foggy weather?		
12. Do staff use hand signal flags and lamps according to rules.?		
13.Where catch or slip siding is provided. Do the staff set and lock the points in the normal position for the siding except for passage of trains?		

14. Make a test check of the following records to ensure their knowledge of staffs: i)Line clear reply and Enquiry books is there any over writing or erasing? Have the staff signed in the space provided? Make test check of the private number exchanged and report result. ii)Are 369(3b) correctly prepared in all respects? iii)T/409- reasons for issue, speed restriction, place and kilometer where restriction is observe and signature of Loco Pilot obtained. Caution order register properly maintained. iv) Are the trolley and Lorry line clear books prepared correctly and neatly? v) Are Paper Line clear Ticket prepared correctly and neatly? vi) Train Signal Register: Are all the columns correctly, neatly and legibly filled in and is there any overwriting or erasing? A red line is to be drawn up at the time of change of duly and the in-coming and out-going should sign below and above the line respectively. Have the staff on duty put their signatures for each train signaled? Have the reasons for cancellation, detention etc, if any been noted in the remarks column? Report irregularities.		
15. Is there any discrepancy in private number exchanged with adjacent Station? The PN booklet in possession of on duty SM and used PN booklet of station should be checked.		
16. Block instrument: i) Are Block instrument in sealed condition? ii) Watch and report whether the SM on duty pronounces the name of the station while asking line clear or giving Line clear. iii)Watch and report if Block instrument is handled by any unathorised person. iv) Has the signature of incoming Guard been obtained in the in-report register with number of the last vehicles in rear. But where BPAC is provided & working between block station in-report from Guard is not necessary. v) Is the private number booklet when not used, kept in safe custody?		
17. Are the following register correctly neatly and properly maintained. i)PME Register: Name of Staff with designation , Last date of done, Next due date, Date of Birth, Are any staff due for examination? ii) Refresher course Register: Name of Staff with designation , Last date of done, Next due date, Competency certificate No. Are any staff due for course? iii)Accident Register iv)Fog Signal Register v)Night Inspection Register vi) Accident Prevention/safety meeting Register vii)Relay Room key Register viii)Officer's inspection Register ix)Joint Point & crossing Register x)First Aid Box Register xi)Doctors & Hospital Register: List of Doctors & Hospitals with distance, phone numbers(Updated) and conveyance available also check wether list is hang in the SM room or not/ xii)Relay Room Key Register xiii) Staff Bio-data Register xiv) Petty Repair Register xv) Grievance Register		

18. Safety equipments: Inspect the safety equipments and whether they are kept in good working order, neat and clear. Is supply adequate? i)Hand Signal Flags ii) Hand Signal Lamps(Tri- colour Torch) iii) Clamps & Padlocks iv) safety Chains v) Fire Extinguishers vi) Fire Buckets vii) wooden wedges/skids viii)Detonators		
19. If the Station is a Head Quarters Station of Guards where train originate Are there spare sets of full Guard equipments, Brakevan equipments available? Is there a proper record of their receipts and issues?		
20. Is there any ARME at the station? When was it inspected last by Doctors as per schedule?		
21. Check supply of all the Operating forms and report whether the stock is adequate to meet the requirement?		
22. Punctuality of train: Is the time allowed at the station adequate? Suggest alteration with justification.		
Economical working: 23.Examine the staff position and report if there is any excess over the requirements.		
24.Check the wagon Register and report whether all columns are neatly and duly calculated. And detention to wagon are calculated, remarks should be mentioned.		
25.Check the Placement Register and report whether the time of Placement and time of release and loading of wagons, demurrage charges correctly neatly written.		
26. Check the wagon indent and allotment register and report whether all entries are neatly and correctly made.		
27. Suggest ways and means to minimize detention to wagons at the Stations.		
28. Where shunting engines is provided , report it full use is made or shunting engines hours can be curtailed.		
29.Maintence of Books and Records: Inspect the Rule Books and report whether they are neatly and properly maintained and correction slip duly pasted i)G&SR Book ii) Operating Manual iii) Block Working Manual iv) Accident Manual v) working Time Table.		
30. Discipline: Are the staff provided with uniforms? Are the staff on duty in proper uniforms(neat & clean) with name & designation? Do the staff promptly reply to correspondences?		

31.General : i) Are the staff at the station provided with rule books? Have the correction slip pasted in order? ii)Have SM, Yard Master & other Station & yard staffs attended PME and Refresher course in time? iii) Check SWR available at station with validity. iv) Have all station staff has knowledge of SWR. v)Are the Station building and station premises kept neat and Clean? vi) Are the Station rooms and Waiting Halls kept neat and Clean? vii) Is the lighting arrangement at station adequate? viii) Is the arrangement for supply of drinking water satisfactory? ix) Is the arrangement of toilet for men & women are sufficient and clean? x)Report recurrence of irregularities detected during your last inspection and still continuing . xi)Report suggestion for improvements and recommended in your last inspection and not yet acted upon. xii)Have you signed in the books and record your inspection? xiii) Have you noted the result of your inspection with instructions in the station inspection book? xiv)Report any other special features which you consider necessary .		

nature of the Inspecting Signature of the Inspecting Official
Signature of the Inspecting Official

12.05: 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 initialed and dated.

12.06: 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, despatch, 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 emphasis on the correct reception and despatch 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. 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, its availability, adequacy, maintenance and its use.

4. Select specific periods for checking registers books and forms keeping in view the purpose of inspection and time of inspections and time of disposal, 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 him in not only detecting the irregularities being committed but also whether these have been continuing for the past some time.

5. 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.

6. Discuss, as far as possible, the points common to two or more branches, like the Signalling Interlocking branch or Loco 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.

12.07: Inspection for opening a new station: The Operating Officers/Inspectors deputed for opening of new station must satisfy themselves by actual demonstration of the working procedure and by testing of the staff posted that the staff have correctly understood and are capable of understanding the work at the station independently. In addition , they must record in the station Inspection Register what checks they have actually exercised whether the station working rules are correct to provide adequate safety precautions and that the entire machinery at the station in otherwise correctly set for safe working.

Intensive and frequent inspections should be made at the early stage to ensure that the working gets firmly set to the instructions that laid down in the Station Working Rules.

12.08: Submission of Inspection Report: Reports must be submitted by the Inspecting Officials i.e Sup. Station Masters /Traffic Inspectors/Safety Counsellors to the Sr.DOM/DOM or sr.DSO/ DSO concerned where these will be examined.

CHAPTER-XIII

INTERLOCKING

13.01: 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.

1. 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 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 when operated must lock or back lock as necessary the levers operating the points and gate locks referred to above. Once signal is taken off it shall not be possible to alter the points, to unlock the gate lever etc until all signals are taken off have been put back.

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.

2) 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.

13.02 Types of Interlocking:

i) Mechanical Interlocking.

ii) Panel Interlocking (Relay)

iii) Route Relay Interlocking.

iv) Solid State Interlocking.

i) Mechanical Interlocking: The era of interlocking started with mechanical frames. In mechanical signaling, 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, 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.

ii) 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, failsafe 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.

iii) Route Relay Interlocking: Route Relay interlocking is 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.

iv) Solid State Interlocking (SSI): Computer based interlocking 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 durations 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 installations are being nullified.

The SSI system 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-modeling can be carried out in negligible time requiring skeleton manpower for traffic management during the blocks. Unlike PI or RRI, Microprocessors (IC'S) are doing the Interlocking based on pre determined logic circuits.

Advantages of SSI:-

- Increase in section 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 (P.C)
- CTC (Centralised Traffic Control)—permits remote control
- Significant reduction in traffic block time
- Easier & simple operation

13.03: Indirect and Direct Interlocking: -

(a) Indirect interlocking means that the points are set and 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 therefrom; the interlocking is effected by means of rigid connections between levers without the use of keys.

Standards of Signaling and Interlocking: - Interlocking at stations is standardized into different classes viz.I, I(R), II, II(R) ,III, 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 details see para 170 to 174 of “Indian Railway Signal Engineering Manual”.

13.04: Two aspect signalling.

(a) Standard I

(i) Speed – Maximum 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 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 Bracketted Home signals shall be provided. The provision of Starter, Adv. Starter & Working Warners signals is optional.

(b) Standard I.(R)

(i) Speed - 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 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 Bracketted Home signals shall be provided. The provision of Starter, Adv starter signals is optional. Working Warners may be provided for metre

gauge stations where trains run through, if considered necessary, but are not required for other stations signalled to standard I.

(b) Standard II

(i) Speed - 75 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 and the bolt 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 and Adv Starter signals are optional. Where Starter are not provide the'off' position of the warner signal shall be dependent upon the receipt of Line clear on the block instrument.

(c) Standard II.(R)

(i) Speed - 110 kms. per hour.

(ii) Isolation of the main line is essential.

(iii) Points - the facing points should be provided with FPL/Points machine plunger type locks, locking both switches independently and the switches and the bolt being detected independently by relative signals.

(iv) Interlocking - The interlocking between points and signals must be direct and by Mech/ Elect/Electronic devices.

(v) Signal - Outers, Warners and bracketed Home/Routing signals, Starters and Advanced Starter signal are compulsory.

(c) Standard III

(i) Speed – 140 km/h unrestricted speed.

(ii) Isolation - same as for Standard II.

(iii) Interlocking: - the interlocking between points and signals must be direct.

(iv) Signals. – Outers, Warners and bracketed Home and Starters are compulsory.

(d) Standard III(R)

(i) Speed – 140 km/h unrestricted speed.

(ii) Isolation - same as for Standard II(R).

(iii) Interlocking: - the interlocking between points and signals must be direct.

(iv) Signals. – Distant/Double Distant (on section where goods train have a breaking distance of more than 1 km), Home with route indicator, Starter signals and Advanced starters are essential.

d) Standard-IV(R)

(i) Speed upto 160 km/h

(ii) Isolation – as per Standard III(R)

(iii) Interlocking: - the interlocking between points and signals must be direct.

(iv) Signals. – Distant/Double Distant (on section where goods train have a breaking distance of more than 1 km), Home with route indicator, Starter signals and Advanced starters are essential.

13.05: Multiple aspect signalling.

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 - A Distant and a Home & Starter signal in each direction. Under approved Special instruction Starter signal may be dispense with vide GR 3.33(C)

(ii) Standard I (R)- A Distant and a Home Signal with route indicator in each direction.

(iii) Standard II - A Distant, a Home and a Starter shall be provided and Advanced Starter Signal is optional.

(iv) Standard II(R) - A Distant, a Home with route indicator and a Starter and Advanced Starter Signal in each direction.

(v) Standard III - A Distant, a Home and a Starter shall be provided and Advanced Starter Signal is optional.

(vi) Standard III(R) - A Distant/Double Distant, a Home with route indicator and a Starter signal and Advanced Starter in each direction.

(vii) Standard IV(R) - A Distant/Double Distant, a Home and a Starter signal and Advanced Starter in each direction.

SL.No.	Item	Std. I(R)	Std.II(R)	Std.III(R)	Std.IV (R)
	Allowable speed (kmph)	Upto 50	Upto110	Upto140	Upto160
1	Isolation	Y*	Y	Y	Y
2	2 aspect(2A) Semaphore/ Multi aspect signalling	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/Ptm/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	Interlocking	Key/Mech	Mech/ Elec/ Electronic	Mech/ Elec/ 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.% Desirable

At station provided with CPI or high density routes, Means for verifying complete arrival of train by suitable means.

Note: The provisions of the new revised 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.

13.06: Isolation: - A line is said to be isolated from the adjacent line or lines when no movement on the adjoining lines can foul it. Isolation can be achieved by any of the following methods.

(a) Snag dead end,

(b) sand hump,

(c) trap points,

(d) setting of points

(e) permanently locked points,

(f) Scotch Block

(g) Haye’s Derail.

(h) Derailing Switch.

Note:-For the purpose of definition of Isolation (f) scotch block and (g) Haye’s 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 120 metres.

(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 60 m 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. This also provides an efficient substitute for signal overlap vide GR 3.40/4.

(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:

Certain points, including traps are kept permanently locked and

(i) The keys for these points are kept in on duty station Master custody.

(ii) These points have to remain set and locked in normal position.

(iii) 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 coloured red.

(ii) This will be connected with a chain tied up on the earth.

(iii) This is a place across the rail and locked to prevent vehicles 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) Haye's 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

- The distance from the points is about 15 feet.
- 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.

a) Explanation of certain simple 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 and other. (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 is connected with a facing point lock, which prevents facing point lock 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 farmer's 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 later 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 where by a signal can only 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 controls the setting of the route.

CHAPTER-XIV

STATION WORKING RULES (SWRs) AND TEMPORARY WORKING ORDER

14.01: Introduction: General Rules 5.06, stipulates

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

(2) 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 (Devnagri script) form.

14.02: 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.

14.03: Authority to issue SWRs:

i) Under the provisions of GR 5.06, the authority to issue SWRs rests with the Authorised Officer of Railway. The power to issue SWRs has further been delegated to the Sr.DOM/ DOM and Sr.DSTE/DSTE has also been authorized to issue instruction in SWR regarding Signalling, Interlocking, communication facility etc. for all stations within the Division.

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

14.04: 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.

iii) Works requiring the sanction of Commissioner of Railway Safety and notice thereof. (See Appendix IV of G&SR NFR)

iv) SWRs of Special Class Stations

14.05: Procedure for Preparation of SWR

i) The Sr.DSTE/DSTE will prepare/amend the Rule Diagram on the basis of signalling plan/ appendices and send the Rule Diagram and also signalling plan/ appendices in case of interlocked station, to the Sr.DOM/DOM for framing Station Working Rules.

ii) Since the Rule Diagram has a vital bearing on the preparation of the SWRs, the Sr.DOM/ DOM will scrutinize the Rule Diagram and the Signalling Appendices, if any, and have these checked at the site.

iii) The Sr.DOM/DOM will arrange for preparation of the Draft Working Rules by the Traffic

Inspector in the Standard Format, after which these will be checked and approved by the Sr.DOM/DOM personally. In case of interlocked stations the Draft Working Rules shall be checked and approved by Sr.DSTE/DSTE. Sr.DEE/DEE (TRD) shall also be associated in electrified sections.

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.

v) LC Gates controlled by the Stations 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 on Appendix to the SWRs of adjacent block stations of Ghat section.

14.06: 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 are compared at site to confirm accuracy of R.D. In absence of officials signing the SWR having verified it personally, the Traffic Inspector and the SSE (Signal) will, after having jointly inspected the site shall 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.

14.07: 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 correction 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.

14.08: Method of correcting 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 correction slips by hand in the SWRs is not permitted.

Note –In case of any correction slip is under process for sanction of CRS/PCSTE for any particular SWR and further its need to be issue another correction slip on that SWR then new correction slip may be issued on next higher number and after getting sanction of previous one it may be issued later.

14.09. Responsibility of Traffic Inspectors (TI):

i) The Traffic Inspector is responsible to see that SWRs of stations on his section are correct and upto date. He will also be responsible to ensure that the station staff viz. Station Supdt., Station Master, 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) Traffic 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.DOM/ 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.DOM/DOM concerned for necessary amendment/ modification in the SWRs.

14.10. Responsibilities of Station Manger/Station Master in charge:

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/DOM and Traffic Inspector of the section. The Station Manager in charge shall see that all staff having definite responsibilities in train passing at their stations correctly understand and follow the SWR.

14.11. 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 illiterate staff, the Station Manager in charge/Yard Master/ 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 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.

14.12. Distribution of Station Working Rules:

i)The Concerned Station, Yard Office & Cabin.

ii) PCOM, PCSO, PCSTE, PCEE, PCME

iii)Sr.DOM, Sr.DSTE , Sr.DEN(Co), Sr.DEE(OP), Sr.DSO.

iv)Disaster Management Cell (Division & HQ)

v)Sectional TI, SSE(Signal), SSE(P.way)

vi)CHC(I/C), LP and Guards booking lobby

14.13. Standardisation 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/DOM and 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 concerned Station, which is not covered by the format given below :-

(This format has been fixed by Railway Board) :

……RAILWAY No……..

……DIVISION STATION WORKING RULES 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 railwaymen. 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 Divisional Operations Manager and Divisional Signal & Telecom Engineer at interlocked stations and at non-interlocked stations by Divisional Operations Manager and Divisional Engineer should sign 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 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 metres, 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 centre 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 Divisional Operations Manager, Divisional Signal & Telecom Engineer and Divisional 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 the automatic signals, necessary mention of the same need 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 on 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 Gradients if any:The gradients in the yard and the adjacent block sections should be mentioned with their locations. Any gradient which are steep enough to warrant special precaution in train operation should be mentioned.

2.5 Lay out: 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, passing 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/csl.

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 need 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/Tokenless 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 (MLQ/TALQ/MAUQ/MACLS), method of operating the signals/points from Lever Frames/Control Panel/VDU, 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 an 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, 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.

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 changeover 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 changeover 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 operational staff such as Station Master, Switchman, Cabinman, 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 operation 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 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 Despatching A Train

6.2.1.1 Setting of points against block 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 Despatch of train from non-signalled line.

6.2.1.5 Despatch 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 (b).

6.4 Simultaneous Reception/Despatch, 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) 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 Despatch 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 despatch 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:

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 etc., which are not insulated, shall not be allowed to run except on line clear.

(ii) Motor trolleys/Tower Wagon/Material Lorries 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.

(iii) 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.

(iv) Any other restriction on movement of trolleys/motor trolleys/material lorries/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.

Upto 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

(b) Procedure For Emergency Operation Of Points By Crank Handle.

(i) The detailed procedure 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 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 to be verified by SM.

(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 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 should restore the normal working..

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

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 authorised to check the V.T.O 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 Foggy or tempestuous weather or in dust storm when V.T.O. cannot be seen from the SM's Office, 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 to be mentioned clearly.

LIST OF APPEDICES

APPENDIX 'A'	WORKING OF LEVEL CROSSING GATES
APPENDIX 'B'	SYSTEM OF SIGNALLING AND INTERLOCKING AND COMMUNICATION ARRANGEMENTS AT THE STATION
APPENDIX 'C'	ANTI COLLISION DEVICE (RAKSHA KAVACH)
APPENDIX 'D'	DUTIES OF TRAIN PASSING STAFF AND STAFF IN EACH SHIFT.
APPENDIX 'E'	LIST OF ESSENTIAL EQUIPMENTS PROVIDED AT THE STATION
APPENDIX 'F'	RULES FOR WORKING OF DK STATIONS, HALTS, IBH, IBS, AND OUTLYING SIDINGS
APPENDIX 'G'	RULES FOR WORKING OF TRAINS IN ELECTRIFIED SECTIONS.

(To be jointly signed by Sr. Divisional Operations Manager and Sr. Divisional Electrical Engineer)

14.14: TEMPORARY WORKING ORDER

(Details of N.I. Working are given in a later chapter)

Temporary Working order(TWO) is an embodiment of detailed instructions issued and circulated by the Sr.DOM/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.

I. 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 the cases when addition or alteration in the layout of the yard or to permanent signalling and interlocking arrangements are to be made.
3. Overhauling of the signal and lever frames.
4. The nature of the work involves temporary cessation of working of the 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.

II. Procedure for preparation of Temporary Working Order/Instructions:

The draft of 'TWO' is prepared by the supervisor concerned viz. SSE(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 precaution to be observed. This preplanning 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 department concerned. Sr.DEN/DEN/ Sr.DSTE/DSTE/Sr.DEE/DEE will send the draft 'TWO' to the Sr.DOM/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 work.

CHAPTER-XV

NON – INTERLOCKED WORKING OF STATION

15.01: 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 over hauling of lever frames, yard remodeling, introduction of panel/RRI/EI 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 safeguards ingrained through normal functioning of various signaling equipment are missing and as such responsibility of the part of staff increases manifold. N.I. working puts staff under severe strain and hence prone for 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.

15.02: Additional Instructions :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.

A. Requirement 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 wellplanned pre-change over works (insertions of point & crossing 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. 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 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 RRI.

(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

3. NI working can be divided into 2 distinct categories, namely minor and major works.

(i) Minor works – Overhauling of cabins at road side stations.

(ii) Major works – Changes in yard layouts, overhauling of cabins etc. at comparatively bigger terminals and junction stations.

MINOR WORKS

(A) 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.

(C1) Duration of NI working for Minor Works :

1. A road side station would normally have about 21 lever in each end cabin (including spare levers).

2. S&T department must suitably augment the strength of their NI gang so that each cabin can be completed in one day.

3. NI working at the 1st cabin should start at 8/- hrs. in the morning and by 18/- hrs. the same must be interlocked and handed back to traffic.
4. The same procedure should be repeated the next day for the 2nd cabin.

(C2) General Instructions for Train Operation :

1. Speed restriction of 15 kmph. shall be imposed over all facing points.
2. No train/wagon should be stabled on any running line of the NI station.
3. The common line should not be used for reception of trains coming from opposite directions.
4. 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.

(C3) Train Running on double line section during NI working :

1. Twin single line should be suspended during the duration of NI working and section worked as conventional double line only.
2. No temporary single line working should be introduced during NI period, except in case of an accident or blockade of through communication.
3. At road side stations on double line, route must be set for platform line in each direction and clamped and padlocked.
4. In case there is more than one platform in each direction, route must be set for one nominated platform.
5. At all such stations no precedence should be arranged.
6. During the NI period station should basically function as a halt station.

(C4) Train Running on single line section during NI working :

1. Ideally, if possible, only one platform line should be nominated for train running.
2. The route must be set for this platform line in each direction and clamped and padlocked.
3. No precedence or crossing should be arranged at this station.
4. In case it is not possible to nominate only one line, then 2 specific lines should be nominated for Up and Down movement.
5. In that case, while crossings would have to take place, no precedence should be arranged at this station.

(C5) Staff requirement :

1. Sectional TI and SI will be overall in-charge of NI working at the station.
2. Additional staff if required should be managed locally .

MAJOR WORKS

(B) 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.

(D1) Duration of Non Interlocked Working :

1. NI working must not be simultaneously introduced at more than one station in a Division.
2. NI must be planned during temperate weather, to avoid wrong actions on account of harsh and inclement weather.

3. Period of Non – interlocked working must be kept to the bare minimum as it is a potential safety hazard.
4. Staff of all departments must work round the clock in three shifts so that the work can be completed at the earliest.
5. 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.
6. For NI working of more than 3 days, plans will be finalized in consultation with CTPM, CPTM and HOD of RE/Construction Organization at Zonal level to assess the duration and arrangements of NI working.
7. 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.
8. For NI working of more than 7 days personal approval of the General Manager must be obtained.
9. No NI working should last for more than 14 days.

(D2) Sanctions, clearances and preparatory works :

1. Signal Plan must be finalised in Hdqrts. at least 45 days in advance.
2. 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.
3. Under no circumstances should this period of 1 month be relaxed.
4. 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.
5. 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.
6. Preparatory work in connection with OHE work must also be done in advance, including shifting of neutral section, if required.
7. Lessons learnt during previous NIs must be gone through in detail so that shortcomings of earlier occasions are avoided.

(D3) Level of Supervision/Responsibility :

1. Responsibility to ensure availability of proper arrangement for NI working shall be of Construction/RE organization.
2. 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.
3. PERT chart should be made out detailing various activities to be completed on a day-to-day basis.
4. For round the clock working PERT chart should be made out detailing various activities to be completed on a shift to shift basis.

5. Dy. CSTE/Dy. CE/Dy. CEE as applicable shall make themselves available in non-interlocked area where the work is being undertaken.
6. The concerned Project in – charge (XEN, DSTE/Con. etc) shall camp near the non-interlocked area till completion of non-interlocked working.
7. Overall in charge for NI working will be Sr. DOM/DOM as the case may be for both Safety and Operations.

(D4) Green Notice :

1. Construction officials responsible for carrying out the work should send a 'circular notice' to the Sr. DOM/Sr. DSO at least two months in advance.
2. 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.
3. Sr. DOM/Sr.DSO on receiving such 'circular notice' get special instructions prepared for that station. These are then issued to all concerned.
4. Green notice is to be issued by Sr.DOM. It should incorporate the following :
   (i) Details of existing yard layout and its various provisions.
   (ii) List of all works to be completed by Civil Engg./S&T/Elec. before start of NI.
   (iii) List of all works to be undertaken by Civil Engg./S&T/Elec. during NI period.
   (iv) Additional facilities to be made available after commissioning of new works.
   (v) Existing facilities that are to be dismantled.
   (vi) Details of yard layout to be made available after completion of NI.
5. Signalling Plan must indicate permissible routings and simultaneous movement facilities to be made available.
6. Signalling Plan must invariably indicate whether any of existing facilities for train movement are to be (i) either curtailed, (ii) modified or (iii) restricted.

(D5) 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.

1. 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.
2. 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.
3. Every possible train movement of reception and despatch must be clearly documented,
   (i) Along with time of movement.
   (ii) With exact sequence of points, whether in normal or reverse.
4. 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 can be changed. In case of conflicting moves, the less important moves have to be cancelled, rescheduled or diverted.
5. Crossing and precedence must be restricted to the bare minimum with few specific routes being selected for most movements.
6. 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.

7. 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.
8. 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.
9. 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.
10. Changes in PRS reservation system for cancellation, diversion, rescheduling etc. must be done in advance as per advance period of reservation.

(D6) Advance preparation for Train Running :

Stoppages on Platform :

1. Duration of stoppages of Mail/Express trains must be reduced to the extent feasible.
2. 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.
3. Running of trains with single SLR must be prohibited.
4. Shunting operations must be restricted to the bare minimum and preferably avoided altogether as far as possible.
5. Booking of through carriages, inspection carriages, etc. to the NI station must be restricted.
6. Quick watering of coaches must be ensured by deputing additional staff as required.
7. Nominated stations for watering of coaches may also be changed if alternate stations are available.
8. Extra TXR staff on platforms for attending to defects in rolling stock and promptly attending to complaints.
9. Extra train lighting staff must also be deputed on platform duty for promptly attending to complaints.
10. Special squads of commercial and RPF staff must be deputed on platform duty for checking ACP etc.
11. All efforts must be made to minimize detentions.

Crew Changing :

1. Loco Supervisor must be kept on round the clock duty on the platform for quick change over of crews.
2. If possible crew changing for through passing trains may be planned at adjoining stations.
3. If necessary, LIs may be deputed to accompany the loco pilot from one station before NI station till one station after NI station.
4. Traffic Supervisor must be kept on round the clock duty on the platform for quick change over of guards.
5. At notice stations, computerized print out of caution orders must be used for saving time.
6. Similarly, extra porters should be deputed for delivering these caution orders to loco pilot and guard.

Locomotives :

1. Engine changing for through trains must be curtailed.
2. Locomotives must be freely extendable beyond territorial jurisdiction.
3. If it is unavoidable, then changing of locos may be done at either side of NI station.
4. For avoiding changing of locos from Diesel to Electric and vice versa, train routings may be changed during the duration of NI working.
5. For traction changing, half shunt of locos may be freely resorted to.
6. Attaching of locos in rear should be resorted to in case of stations where trains reverse.
7. Sending of light engines to sheds must be restricted. For this purpose, an out pit may be opened, if necessary.

Controlling of Trains :

1. In case of major terminal stations, a mini control office may be opened at the station. This mini control will liasion 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.
2. Station under going NI must not be permitted to be brought under any pressure whatsoever at any time during NI working.
3. All relevant notices must be issued in advance.

(D7) Goomty Arrangements :

Location and number of goomties is an extremely important aspect of advance planning for NI. Sr. DOM/Sr. DSO should personally approve final arrangements regarding goomties.

1. Cabins should not be used as goomties.
2. For a group of maximum of three sets of points operated from the ground, one goomty should be made.
3. Ideally, only 2 sets of points should be controlled from a single goomty.
4. 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.
5. A group of 3 – 4 goomties at one end of the yard should be put in one zone.
6. Under no circumstances should 2 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.
7. 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.
8. At site it must be ensured that staff are not required to walk long distances for setting of points.
9. Both ends of each point must be clearly visible from the goomty itself.
10. A goomty must be provided near the first stop signal for prompt issue of OPT forms etc. as required. Another goomty must be provided at the last stop signal to ensure correct dispatch of trains.

(D8) Staff Arrangements :

Staff Requirement :

1. Each goomty should have one SM and two Pointsman in each shift. These extra SMs posted in goomties shall be called goomty SMs. SM posted with indoor SM will be termed as co-ordinating SM.
2. For cabin operated points, extra commensurate staff as required (SM/cabinman/ pointsman) should be provided. However, cabins should not be used as goomties as far as possible.
3. Goomty SMs during their duty hours shall be fully in-charge of working of points/levers under their charge. They shall discharge all obligations of the cabinman/pointsman working at the station/cabin. They shall work under the direct supervision and instructions of the coordinating SM on duty.
4. 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.
5. 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.
6. 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.
7. Preferably those staff should be drawn from outstation who have
   (i) Adequate knowledge of NI working.
   (ii) Previous experience of the same.
8. 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.
9. 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.
10. 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.
11. At each non-interlocked station one Asst. Scale officer of operating department will be nominated for over all supervision.

(D9) HOER :

1. Under no circumstances HOER 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.
2. For catering to unexpected casualties such as leave, sickness etc. during the NI period, RG and LR staff must invariably be provided for.
3. 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.

(D10) Duty Rosters shift wise :

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 :

1. Duty rosters must be drawn up as per guidelines given below.
2. These should be drawn up for the entire duration of NI period.

3. Duty rosters drawn up should be openly displayed and given wide publicity.
4. No staff shall be permitted to mutually exchange his duty roster with any other staff, without prior permission of his departmental officer at site.
5. Level 'N + 1' shall be responsible for ensuring that level 'N' has followed all instructions, etc. as laid down above.

Last Night Shift Duty:

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

First Night Shift Duty :

1. 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.
2. Second preference should be for staff who have previously worked at that station.
3. 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.

Day Shift Duty :

1. Comparatively junior inexperienced staff from outstation should be deputed for day shift working.
2. Teams for different goomties should be so formed as to include at least one staff having previous experience of NI working.
3. For day shift working, more number of staff may be deputed per goomty, if required, to cater for comparatively inexperienced staff.

(D11) Temporary Working Instructions (TWI) :

1. When NI is undertaken, inter – locking provisions stipulated in SWR are no longer available. So the SWR in its existing form becomes invalid.
2. 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.
3. Static information of SWR will continue to be valid. These include :
    (i) Inter – station distances.
    (ii) Description of yard layout.
    (iii) Level crossing gates.
4. 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.
5. Portions of SWR that will get replaced pertain to :
    (i) Ensuring clearance of running lines.
    (ii) Granting of line clear.
    (iii) Reception/despatch of trains.

(iv) Working of level crossing gates.

(v) All checks that are done by means of :

(a) Slots.

(b) Lock bars.

(c) Point locks.

(d) Signals.

All these checks have to be taken care of manually.

6. 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.
7. TWI should list out different conditions required to be fulfilled for reception despatch of train :
   (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 one 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.

(D12) Field level Advance Preparation :

1. 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. In any case these should be ready at least 15 days in advance of NI working.
2. Station Superintendent/Traffic Inspector who is overall in-charge should be fully aware of their responsibilities/duties. Temporary working instructions should clearly stipulate these unambiguously.
3. Each Station Masters/Assist. Station Master, Cabin Man and point man deployed on shift duty should be supplied with copies of temporary working instructions. In addition SM and Cabin Man shall be supplied with yard layout diagrams and pull charts for their guidance.
4. The temporary working instruction shall be supplied to SS /SM/Cabinman and Pointsman in advance for study by them and for explaining to the staff.
5. The instruction should be prepared in Hindi, English and Vernacular language and assurance to the fact that they have understood shall be obtained.
6. Ready made 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.
7. 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.
8. These pull charts must be printed, laminated and displayed in goomties as also given to each staff concerned.
9. 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.

10. 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.
11. 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. Clamps should be actually fitted to check that there are no obstructions.
12. 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.
13. In any case, cotter bolting of points must always be preferred as compared to clamping and padlocking since it is a much faster method.
14. Normal/reverse position of points should be painted on tongue rail to indicate position of the road.

(D13) Mock Drill and Staff Assurance:

1. Before the SM/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.
2. With regard to semi – literate and illiterate staff :
   (i) SS/TI should explain detailed working.
   (ii) Test their knowledge.
   (iii) Satisfy himself that they can work independently.
3. 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.
4. This should be carried out in all the 3 shifts to ascertain difficulties, if any, which may be encountered during NI working.
5. Teams already formed for different shifts should be deputed as per roster.
6. “Mock drills” should be carried out without actually disconnecting signal gears, points etc.
7. 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 N.I. and the number of trains planned to handled should be accordingly revised.
8. Written assurances are required to be obtained before staff connected with train passing duties are allowed to work independently.
9. This written assurance should be taken from the staff only after :
   (i) They have participated in the “mock drill”.
   (ii) Worked independently as per their laid down roster.
   (iii) Successfully carried out all responsibilities entrusted to them during the “mock drill”.
10. No staff should be deployed unless proper entries are made in the “Assurance Register” and relevant signatures obtained.

(D14) Dissemination of information :

1. 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.
2. For this purpose loco/traffic inspectors, senior subordinates will be nominated to visit these lobbies, with yard plans and camp at these lobbies.
3. 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.DSO/ Sr.DME/Sr.DEE on return.
4. Adjoining divisions/railways including notice stations and inter-change points should also be intimated of the detailed program pertaining to NI working.
5. All control staff including CHC, Dy. CHC, Section controllers, Power controllers, TLCs, TXR control etc. should be appropriately briefed.
6. 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.
7. Adequate publicity must be given through newspaper advertisements, electronic media, announcements at stations etc. informing the public of the likely repercussions on train running.

(D15) Telecommunication, Lighting and Medical :

1. 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.
2. 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.
3. Additional fail safe communication between control office and the NI station must be provided as a backup to existing section control channels.
4. Arrangements for public address system should also be made so that the same can be used for warning the public etc.
5. Loud speakers must be provided on each goomty for making announcements regarding train movement.
6. Walkie – Talkie sets must be provided to all supervisors working at site.
7. 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.
8. Arrangements of staff and recharging facilities should be available for charging of batteries of telecom equipment including walkie – talkies.
9. General lighting in yard should be adequate.
10. 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 SM/Cabinman in charge of that goomty.
11. Adequate generator backup should be provided. Spare bulbs should also be provided at each location.
12. 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.

(D16) Safety Equipment:

1. Safety equipment required for each location such as goomty, cabin, level crossing gate etc. must be spelt out in detail and full complement arranged.
2. Adequate spares must be arranged for safety equipment such as of hand signal flags, detonators, fusees, clamps and pad locks etc.
3. LED based flashing Hand Signal Lamp must be provided to each such location for better visibility.
4. Cotter bolts, cotter pins and clamps & padlocks must be thoroughly tested to be in proper working condition.
5. Spare numbered crank handles must be provided in goomties where point machines are predominantly working.
6. Each goomty must be provided with the following safety equipment :
   (i) Clamps, padlocks, detonators, fusees.
   (ii) Flags, hand signal lamps etc.
   (iii) Relevant pull sheets, yard diagrams etc. duly laminated. (iv) Torches, emergency light, in addition to normal lighting.
   (iv) Umbrellas, caps, raincoats as required.
   (v) Cotton Gloves for staff handling points etc.
   (vi) Table, chairs in tent or covered area.
   (vii) Containers and glasses for drinking water.
   (viii) Thermos for tea/coffee and provision of snacks and meals for staff deployed from other station or /headquarters.
   (ix) Mosquito/insect repellant creams.
   (x) Magnetto, and VHF walkie talkies, Public Address Equipment.
   (xi) Private number books, paper, pens.

(D17) Security arrangements :

1. Adequate RPF security staff round the clock must be arranged at following locations :
   (i) SM's office.
   (ii) Central place at the station.
   (iii) Level crossing gates.
   (iv) Outer most goomties on either end.

(D18) Introduction of NI working :

1. Before permitting introduction of NI working DRM/ADRM will satisfy himself regarding arrangement of staff, safety equipment, lighting, telecommunication and ground position.
2. 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.

3. On the notified day, for introduction of NI working, Signal Inspector concerned shall give a general disconnection memo for gears proposed for NI workinng.

(D19) Train Operation during NI period :

Working of Signals :

1. Speed restriction of 15 kmph. must be in force over all points and crossings. Speed restriction Board of 15 kmph. must be exhibited at the foot of the first stop signal.
2. 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.
3. 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 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.
4. Last stop signal should not be disconnected throughout NI working except at the fag end.
5. Movement of trains to and from the block sections should be controlled by taking off the last stop signal.
6. Normally, no Paper Line Clear should be issued to the loco pilots as authority to proceed in the block section.
7. 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 :

1. 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.
2. Trains must be allowed to enter cautiously at 15 kmph.
3. 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.

(D20) Failures :

1. 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.
2. Details regarding such cases must be promptly intimated to DRM and Sr. DSO.
3. 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.
4. Cases of bursting of NI target should be appropriately dealt with and individual responsibility should be fixed up.

(D21) Revised Station Working Rules :

1. After completion of NI working, new works are to be commissioned.
2. Since the yard layout, facilities etc. have changed, the previous SWR is no longer valid.
3. A new SWR duly approved by CRS is to be brought into effect after completion of NI.
4. Staff assurances for the revised SWR must be taken afresh.

(D22) Completion of NI Working:

1. NI working must not be terminated unless and until each and every item originally scheduled for completion has been successfully complied with.
2. 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.
3. The installation shall jointly be tested by Traffic, S&T and Engg. officials and for their correct functioning.
   (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.
   (iii) Engineering officials shall check the proper housing of points gauge level etc.
4. Before issue of Safety certificate and taking over of stations, the Transportation/Safety Officer shall instruct the station staff responsible or working the interlocking installation and test them in their knowledge of the signalling arrangement.
5. Engineering and S&T officers shall give a certificate stating that all works as per the approved plan are completed.
6. 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 prompt to notify then and there.
7. On the day of completion of work, branch officers concerned shall visit the work site to ensure completion of work as per program.

(D23) Post NI analysis :

1. 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.
2. These lessons learnt should be compiled at one place for successive NIs, so that they are available for future reference.
3. A copy of the same may also be sent to other divisions for reference purposes.

CHAPTER-XVI

OPERATING STATISTICS

16.01: Railway Statistics:

Essential for planning prioritizing and exceeding activities connected with operation.

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 tonnes 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,

Engine 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 is 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 = Earning per passenger

(b) Passenger earning (Primary): Passenger kilometres (fundamental) = Earning per passenger kilometre. (c) Passenger kilometer (fundamental): Number of passenger (Primary) = Average distance travelled by a passenger also called lead of passenger traffic.

(d) Wagon kilometres (fundamental): Wagon days (fundamental) = Wagon kilometres per wagon day.

These 'Derived Units' highlight special features of transportation output and are useful in evolving suitable management strategies

16.02: Classification of Railway Statistics:

The principal heads under which the railway statistics are generally grouped are indicated below:

1. 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 and tonnage lifted and wagons loaded for current information and the statistics of revenue and expenditure as booked in monthly and yearly accounts.

2. Operating statistics:

Operating statistics are broadly be 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, and engine failure statistics etc.

(iii) Rolling stock holding & availability, repairs& maintenance % age 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

3.Rolling stock and workshop repair statistics:

Under this head are grouped statistics dealing with POH of coaches, wagons, locomotives and other information relating to workshop activity.

4.Administrative statistics:

These statistics relating the staff matters, numbers, by categories and classes of staff. Other statistics Number of stations by Class, halt stations Standard of interlocking, Medical statistics relate to sickness of staff etc Engineering statistics give details of track and bridges requiring attention – ultra sonic tests done or overdue, track renewals, distress bridges etc.

5.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 railway 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 Statistical Instructions, Volumes I and II respectively.

16.03: 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 IIB & C).

2. Some of the important statistics include.

16.04: Operating ratio: The ratio of workings expense (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 line open for traffic)

A - Passenger Train Performance.

4. 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:

5. $$\text{Punctuality} = \frac{\text{RT + NLT}}{\text{Total no. of Mail/Express trains}} \text{ X100}$$

RT = Trains arriving Right Time

NLT = Trains not loosing time

2.Vehicle Kilometres per Vehicles Day:

This figure indicates by the vehicle days which are 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 load)

(c) The idle periods provided for in rake links.

3. Since in the short run, train composition is not susceptible 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 kilometres 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.

$$\text{Vehicle Km Per Vehicle day} = \frac{\text{Coaching Vehicle km}}{\text{Vehicle day}}$$

3.Average Speeds:

This figure represents the average time tabled speeds of passenger trains. The higher this figure, the better the service to the passengers

4. Shunting Kilometres per 100 Train Kilometres (Passenger including proportion of Mixed) :

1. This figure indicates the amount of unproductive service that has to be performed per 100 train kilometres (Passenger including proportion of mixed). Since the amount of shunting to be done on a passenger train depends upon various local factors, the figure will vary from Division to Division and from Railway to Railway, traffic conditions remaining constant, is indicative of wasteful shunting.
2. The figure is arrived at by multiplying by 100 the quotient of shunting kilometres divided by train kilometres (passenger including proportion of mixed). It can be depicted by formula given below:-

$$\frac{\text{Shunting Kms} \quad \text{x 100}}{\text{Train kms.}}$$

B – Wagon Usage

i) Average Starting Wagon Load :

1. 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.

2. The result is calculated by dividing the number of tonnes loaded by the number of wagons loaded (in terms of four wheelers), CR and TR vans as also wagons used for live stock and departmental purposes, however, are excluded.

$$\text{Average Starting Wagon Load} = \frac{\text{Tonnes Loaded}}{\text{No. of Wagons Loaded}}$$

ii) Wagon Kilometres per Wagon Day:

1. This figure is a measure of wagon mobility and indicates the average number of kilometres 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.

2. This result is obtained by dividing wagon kilometres by wagon days which is the product of daily average number of wagons on line and number of days in period.

$$\text{Wagon Kms. Per Wagon day} = \frac{\text{Wagon Km.}}{\text{Wagon Days}}$$

Net Tonne Kilometres per Wagon Day :

1. 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 effect the figure of wagon kilometres 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 effect this figure.

2. The numerator in this case is the net tonne kilometres (excluding departmental) and the denominator wagon days.

$$\text{Net Tonne km. Per wagon day} = \frac{\text{Net Tonne kms.}}{\text{Wagon days}}$$

iii) 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 transhipment 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.

$$\text{Wagon Turn Round} = \frac{\text{No. of effective wagon holding}}{\text{Loaded Wagons + Loaded received wagons}}$$

iv)Average Wagon Load during the Run :

1. 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.

2. For obtaining this figure net tonne kilometres are divided by loaded wagon kilometres, (the figure relating to departmental trains are excluded).

$$\text{Average Wagon Load during the run} = \frac{\text{Net Tonnes Kms}}{\text{Loaded Wagon kms.}}$$

Goods Trains Performance

v)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 kilometres 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, quality of coal and quality and adequacy of water supply, 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 watering stations, facilities 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.

vi) 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.

$$\text{Average Net Train Loads} = \frac{\text{Net Tonne kms.}}{\text{Train kms.}}$$

vii)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.

viii)Shunting Engine Kilometres per 100 Train Kilometres :

1. This figure indicates the amount of non-revenue earning work done per 100 train kilometres (Goods and proportion of mixed). Its value is affected mainly by the load of goods trains, and the amount of terminal work involved.

$$\text{Shunting Engine kms. per 100 Train kms.} = \frac{\text{Shunting kms. x 100}}{\text{Train kms.}}$$

2. However, for the same division or/railway, the pattern of traffic remaining the same, rise in this figure is indicative of wasteful shunting.

ix) Net Tonne Kilometres per Engine Hour :

The figure of net tonne kilometres per Engine hour is a very useful index of the efficiency of freight working on a division. Net tonne kilometres indicate the amount of revenue earning work done while engine hour measure the cost of if doing it.

$$\text{Net Tonne Kilometers per Engine Hours} = \frac{\text{Net Tonne kms.}}{\text{Engine hours}}$$

A decrease in net tonne Kilometres per engine hour may be due to factors such as:

1. Shunting engine hours not using cut down in proportion to the decrease in traffic offering.
2. Increase in departmental, assistance required, assisting hot required and light engine running.
3. Decreasing in the average 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.

x) 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 despatched 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.

$$\text{Average Detention per Wagon} = \frac{\text{Total Detention Hours}}{\text{No. of Wagons despatched}}$$

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 layout. 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.

$$\text{No. of wagons dealt with per shunting engine hour} = \frac{\text{No. of Wagons dealt with}}{\text{Shunting Engine hours}}$$

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 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 respects 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.

$$\text{Quantity of fuel consumed per engine km by service} = \frac{\text{Quantity of Fuel Consumed}}{\text{Engine kms.}}$$

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:

$$\frac{\text{Quantity of Fuel Consumed}}{\text{Gross Tonnes kms X 1000.}}$$

Traction Energy consumption per engine km and per 1000 gross tonne kms is worked out exactly in the same way, replacing 1000 litres of diesel by kwhs.

CHAPTER-XVII

FREIGHT OPERATIONS INFORMATION SYSTEM (FOIS)

17.01: I. INTRODUCTION

In keeping with 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. Railways in this millennium 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 to 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 Systems (FOIS). The system indigenously developed is fully functional in the B.G. system of Indian Railways.

1. Freight Operations Information Systems Mission – FOIS

To give a total 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 absolute 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.

Provides Continuous Cargo Visibility and enables the Freight customers to have instant access to information regarding the current status of their consignments in transit for just in time inventory.

2. Strategic Advantages Derived From the FOIS System

- 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 rediverting 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 to 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, benefitting both IR and the trade & industry, by eliminating manual transactions which necessarily add to the burden of logistics management.
- Providing requisite Foundation for a total logistics system furnishing real time information of the chain of physical distribution, an essential element in reducing inventory costs.

- Monitoring the freight traffic right from originating point to last mile management.

Advantages of FOIS System:

- Information provided is quick, accurate and same for everyone.
- Reducing time and paper work.
- Managers will have more time in respect of planning.
- As correct information received, congestions and traffic bottleneck will be avoided by regulations of trains and loading of wagons.
- Restrictions message for loading of wagons may be imposed.
- Distribution of empties for loading will be arranged by FOIS scientifically.
- The current status of each and every wagon through FOIS will remove the chances of unconnected wagons.
- Booking particulars of any wagon could be obtained in a few seconds through FNR(Freight Number Records).
- Customer enquiry service will provide prompt information to rail users regarding present location of their wagons and ETA at the destination.
- Accountal system, RR generation earnings and other outstanding will be promptly available.
- No missing/unconnected wagons.
- Maintenance record of Loco/Wagons.
- Train/stock/wagon interchange position.
- Wagon/loco holding position.
- Yard detention/delay on run information(HOR)
- Arrival/departure/placement/release information.
- Terminal position (loading/unloading) and ODR wise rake outstanding.
- Quick settlement of claims.
- Details of crew/Guard position.
- Loads on run.

3. Scope of FOIS Systems

Presently two subsystems of FOIS are already in use after extensive field trials and validation.

RMS

TMS.

a) Rake Management Systems –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 Stock Holding
- Reporting of consist Wagon wise
- Invoice based loading originating tonnage and revenues.
- Wagon wise Interchange
- Statement of missing Wagons/wrongly delivered

b) Terminal Management Systems –TMS

- Computerized booking and delivery of consignment
- Station Accounting
- RR generation/Transmission
- Improved Customer Interface

4. Crew Management has been developed . Control charting of trains currently being done and will also be integrated with FOIS. The above two sub systems have been fully developed and tested and are ready for implementation.

5. FOIS Design Architecture FOIS is designed and developed in conformity with the state of art technology which is scaleable, maintainable, with open systems architecture and is based on the Indian Railways 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 assumptions: -

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.

Global perception is more important, with respect to tracking of consignment and Rakes rather than of individual wagon, locomotive and train. 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.

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.

Integrity of Operation and Commercial data is an absolute necessity. RMS and TMS application are conceptualized, to provide the integration with the other subsystems as and when these are developed.

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.

6. 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 at CRIS office. These servers are connected to the Zonal Hd. Qrs., Divisional Control Offices, yards, interchange points, and good 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 and acts as repository of all the global data and also provides global services to maintain referential integrity of the databases including master files.]

7. 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 with in each zone so that every location has at least two paths to reach CRIS. Each zonal HQ has been connected to 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 has been provided for reliable and fast means of data transfer.

8. 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) The 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 good shed functions and generation of RR.

9. 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:-

- Railways to get staff identified and train them to work on PCs
- Railways to prepare the sites for installation of hardware including provision of electrical and civil facilities.
- Maintenance of channels & data com equipment has been given to CSR of the zones.
- 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.

10. Benefits

i) Continuous Cargo Visibility

- Rake based consignment tracking and pipeline
- Invoice based loading –Originating Tonnage & Revenue
- Information on trains on the run, the ETA at next point and the work to be performed.
- Vehicle guidance of all trains on run.
- Daily report describing the performance of all through trains operated in a controlled territory for the day.
- Actual/Estimated arrival and departure particulars for a particular train at any or all the reporting points
- Yard or on the run delay information.
- Train & stock Interchange
- Wagon wise Interchange

ii) Optimised Asset Utilisation

- Improved Locomotive Utilization by reduction in Light Engine running and reduced in effectives
- Statement of missing or wrongly delivered wagons and finally its elimination.
- Elimination of unconnected wagons
- Increased Availability of Repair Capacity
- Stock Holding
- Loco Holding

iii) Increased Revenue Savings in wagon fleet would result in corresponding saving in the recurring cost of maintenance of wagons

. Reduced Locomotive power and Rolling Stock Maintenance Cost

. Savings in Time & Cost of handling in yards, cost of empty haulage

. Ensures optimal crew management and monitors statutory limits for running duty and overtime payments

. 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 .

. Drudgery of manual processes like maintenance of registers etc. is eliminated.

. Particulars of crew on train with hours spent on duty.

. Re-deployment of major portion of staff involved in wagon tracing and accounts checking activities. .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-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.

. Quick settlement of Claims

. 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

II. Application/Software Application/Software 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 has been developed in Visual Basic and resides in the client machine located at the reporting location . Data is stored in the central server locate at CRIS.

1. 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-

Train cycle: It starts the moment a load is identified as a train and the following tasks are used for online reporting: -

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

Yard Cycle: It starts as soon as a terminating load 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:-

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).

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 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 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/Withdrawl 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.

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.

Train Related Tasks

Train Ordering: TO/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.

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 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 some time specific reports.

17.02: 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.

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 absence of the same, your PC may get damaged. The earthing to neutral voltage 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 from fluctuations.

Your PC is not connected to the mains directly. Instead, the Power supply is 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 a 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 change over 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 all over.

If you locate your UPS very close to your monitor, the display will wobble. Please ensure

that 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 need arises) follow this sequence

Mains → UPS → Monitor → Printer → CPU.

The reverse is followed when switching off.

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.

Virus Protection:

Viruses come to you PC through pirated software 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 everyday 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 OCC. You must update your anti-virus programs to enable it to take care of new viruses.

There are tell tale signs of virus on your PC. Please be on lookout for these signs, which are listed below: • Unexplained disk drive activity light or floppy drive light Reduction in RAM Availability

- "File Copied" message appears without copying anything
- Failure of a memory resident program to operate properly
- System behaves slowly or in a chaotic manner

- Bad clusters on the disk
- Increased number of files on disk
- Increase in size of executable programs
- Change in file's date and time stamp, without modification
- Program running slower; taking more time
- Program/Data file corruption/disappearance

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 Railnet. 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 98 (Second Edition). 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.

COMMAND.COM

IO.SYS

MSDOS.SYS

Similarly, ensure that RMS file – which resides in Program Folder of your Hard Disk - is never tampered.

17.03: Datacom Equipment & Connectivity

In this chapter, we shall deal with some pertinent issues regarding Connectivity. Your PC is connected not only to 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 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 this equipment is 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 between various PCs connected on a LAN is automatic & Router has no role. It is only

when the data requires being 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 actually 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.

Also ensure that the power feed is having a proper earthing arrangement. The earthing norm of 2-3V to be maintained.

Power supply to Router should be routed through a UPS. 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 change over switch should be accessible easily.

The Router should be kept in a dust, smoke & moisture free environment. Please use Racks provided to house the Router. Since Router is 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 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 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, ISDN connection gives a higher voltage (≈ 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 Router are to be ensured.

Nothing should be placed on 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.

We have two types of Modems on Railway – G703 (at service provider's premises) & V35 (at our 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 channel.

As always, you have to ensure that Modem is always kept "ON".

Also ensure that the power feed is having 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 you take 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 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 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 problem with 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. You have 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 in it. A channel connects your system through Modems & Routers. In addition to leased channels, you also have ISDN connections & VSAT (Very Small Aperture Terminal) connections to enhance your Connectivity. Connectivity refers to the immediate links that your PCs on LAN (at a Node) has 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 following command

Start → Run → Ping [IP Address of Remote Router] → OK

Only an entry like “Request Timed Out” or “till 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 trouble-freely.

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 is having 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 rubber cap of RF unit is in place and the cord going to 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 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 your 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 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 “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 – first, a CAT5 structured cabling from Router/Hub to I/O box (a 3” x 3” x 2” white box) & second 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 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 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 user.

You should keep records both of Channel Uptime & Node Uptime. It is easier to maintain record of Node uptime. Simply record in a register the daily position of availability of a node.

(Along with the reasons of failure for doing analysis.) It is very essential to keep check on the health of secondary channel when primary channel is up.

Give summary position of the entire day to your Zonal OCC at odd hours.

For finding the channel uptime, you have to schedule 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 entire day, will give channel availability of each channel at your Node. Record this also in a register, giving message to Zonal OCC through Messaging Feature of RMS.

There should a fixed regime of reporting of failure to be in place so that in case of a failure trouble shooting is fast.

A list of phone numbers of service provider should be readily available both at div headquarters and zonal headquarters.

You also have to keep 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 OCC tasks & mis-programming of Routers.

Within LAN, you can share information occasionally. However, running regular & heavy program may reduce the availability of 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

SYSTEM ADMINISTRATION

17.04: Operational Control Center (OCC)

For successful implementation of FOIS over NF Railways each Division shall have to undertake 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). 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 system.

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.

17.05: 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 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 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 local procedures. In case, when abnormal working has been introduced on account of failures, OCC to co-ordinate for proxy reporting and restoration of normal working.

Each division should nominate a Sr. supervisor who shall be responsible for timely update over his division and accountable to 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 input 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 OCC who will enable the nominated device to report for the failed location/site.

17.06: 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 at yard - Divisional Control or sub control office will report

d) In case of failure at Division - Zonal OCC will report

e) In case of failure of complete Zone – Disaster management will come in use.

17.07: Management of Network: -

Having route/media diversity and adequate spare equipment has provided sufficient redundancy. It should always be ensured that redundancies are always in working order. Monitoring the functioning of Network with the help of NMS software installed is also the function of zonal 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 remote PC or Router. List of IP addresses of your zone should be available with OCC. You can ping by following command

Start → Run → Ping [IP Address of Device] → OK

For finding the channel uptime, you have to schedule 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 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 up gradation.

Monitoring payment processes of rentals of communication channels.

Trouble shooting for other equipment failures in association with central OCC and ordering its replacement from the spares.

17.08:Maintenance of equipment:

Regarding maintenance of equipments, OCC shall keep a record of hardware components provided at each locations/sites and their failures at zonal headquarters and its division. 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 chord, operating system & RMS program. (A step-by-step procedure is given in Annexure – III. If all of these are there & still your PC does not respond, bring it to the knowledge of 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 concerned vendor or as prescribed by the maintenance practice of that div/zone . Addresses of vendors should be readily available.

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 were 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.

17.09: 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 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.

a) Interchange

b) Stock and Demand

c) Loco inventory

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.

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 customers satisfaction, enhancement in business achievements and productivity (redeployment achieved, overtime curtailed), reduction in work pressure amongst staff, less diversions etc.

From the analysis of application by OCC, it is expected that items for up gradation of application further will get identified. However before undertaking development OCC will weigh every new requirement for its return justifies it and then only forwards 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 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 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 refreshers courses of TNC, GC, SM, TXR, Trains, Power, C&W and Commercial Controllers, Guards, and Loco pilots.

There will also be an element. This training is essentially for understanding of procedures and application tasks.

In case of those who have to man OCC and perform its functions an extended module will be prescribed in addition to training in procedures and application tasks.

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. OCC will thereafter monitor progress of training on their railways and ensure that regularity is maintained.

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 user list & his password is disabled by CRIS. Assigning passwords gives responsibility to user. This password helps in keeping the security trail i.e. the reporting done carry the id of the user.

Password management task is being passed on the zones so that they can manage password on their own without getting CRIS involved. Besides RMS password there is Windows password, which you use at the time of logging in your PC, if you are using this password then all the users of that device should know it.

Reports available in RMS module :

17.10: CONFERENCE SET

Interchange forecast summary: gives desktop summarized view of forecast & interchange of current date. It is updated by I/C forecast and arr. /dep reporting task.

Running interchange: gives detailed view of forecast & interchange and also gives running position of trains forecasted. It is updated by I/C forecast and arr. /dep. reporting task.

Current interchange: gives summary information of interchange with break-up of empties and loaded stock, stock (4w) interchanged. It also provides summary of jumbo and box rakes interchange It is updated by I/C forecast and arr. /dep. reporting task.

Likely shortfall : gives summarized view of interchange along with trains likely to shortfall along with the reasons of their shortfall. It is updated by I/C forecast and arr. /dep. reporting and I/C shortfall reporting task.

Train interchange shortfall: gives shortfall /excess of yesterday interchange along with reason of shortfall in despatch. It is updated by I/C forecast and arr. /dep. 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 interchange points upto 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, I/w no. taking, Rake placement/rel tasks.

Terminal performance : gives terminal performance for a selected period It is updated by arrival / departure reporting, I/W no. taking, Rake placement /rel tasks.

Terminal history: gives details of individual rakes handled at the terminal for a selected period .It is updated by arrival / departure reporting, I/W no. taking, Rake placement /rel tasks.

Terminal performance and running position: gives status of load at terminal along with its insight. It is updated by arrival /departure reporting, I/W no. asking, rake placement/rel 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, I/W no taking, Rake placement /rel tasks

Rake position: gives break up of rakes over a division/zone Under following heads:U/R,U/L,O/W,I/W and Empty. It is updated by arrival / departure reporting, I/W no. taking, Rake placement /rel tasks

Rake integrity: gives details of all attachment/detachment/sick reporting on a 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 I/W,O/W and empties. the flows between the 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 pipeline 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/rel and arrival/departure task.

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.

Facility to see details of individual rakes on selecting any cell is also available. other stock icon in the conference set run on the same query BCN,BCX, CRT,BOXN,BOX,SHERPA SHERPAN,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.

MANAGERIAL REPORT

Interchange Yesterday

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 I/C point.

It is updated by the Interchange forecast and Arrival/Departure Reporting tasks.

Current

Interchange monitoring this query gives view of current I/C, 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/departure 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/departure 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 and 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 BPC details, the arrival/departure, rake formation /dissipation, placements/release reporting tasks.

CC rakes BPC Position: this query gives running details of close 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. 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/drake 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 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

Demand & Loading

Yesterday

Commodity wise loading and outstanding This query displays loading information for a Division/ zone against particular station in terms of the no. of rakes 4w, piece meal, 4w, 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, updates 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

Option is also available for viewing terminal wise unloading details in term of balances.

Arrival/departure, rake formation /dissipation, placements /release reporting tasks updates this query.

Loading performance This query displays loading information for a Division/zone against particular station in terms of the no. of rakes 4w, piece meal, 4w, 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 submenu for O/S loading division wise and commodity wise loading and o/s. Demand reporting and placement/rel. 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 o/s over a zone with ODR Demand reporting and Piecemeal placement /release tasks update this query.

Loco Power interchange gives summary of Zonal loco I/C and also a summary of holding of locos type wise over a zone. Arrival/departure and loco reporting tasks update this query.

17.11: OPERATIONS CONTROL

Interchange

Yesterday

Train wise interchange This query displays I/C load wise of a division I/C point wise for specified

date. View is available for specified I/C point and direction. The details of loads, like load name, L/E, type, loco, unit, I/C date/time for handed over and taken over is listed separately. This information is updated by load planning, arrival/ departure tasks.

Load interchange analysis This query displays I/C load wise of a division I/C point wise for specified period. View is available for specified I/C point and direction. The details of loads, like load name, L/E, type, loco, unit, I/C date/time for handed over and taken over is listed separately . There are filters provided for originating zone/div/station and terminating zone/division / station so that various analysis can be done on I/C data. This information is updated by the arrival/ departure and I/C 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 classified in terms of through and terminating. Empty stock is shown separately. This query displays and distribute output fields like No./units for each classification with total(No./Unit), for both receipts and for every I/C 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 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 I/C point. The train I/C 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 4- w units I/C point wise. Summary of I/C is also given railway wise. I/C forecast and arrival /departure 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 loads details along with the current location and status with the expected arrival/ departure time and date at the I/C 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/division / station. It also gives the I/C 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 and are running on that date. It gives loading details and I/C 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/ division) It is updated by arrival / departure reporting, rake Formation/dissipation, I/W no. taking, Rake placement /release tasks.

Stock holding: The query displays yesterday position of the total holding for 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 en-route reporting tasks.

Rakes at 24 hours: The query displays information of rakes at 24 hrs on yesterday. Rakes 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 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 Railway 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.

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. 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, Arrival/Departure 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 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 static database in the system.

Invoice details gives details of invoices made 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 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 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.

Statistical Report (Reports)

INTERCHANGE

I/C Summary gives I/C 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 updates this query.

Diversion register gives diversion details for a specified period Filters available for originating station commodity; i/e Diversion task updates this query

17.12: Maintenance procedures for FOIS:

CHECK LIST FOR DAILY MAINTENANCE OF HVNET VSAT PREREQUISITES

1 Minimum 1KVA On line UPS – dedicated to VSAT

2 Dedicated Electronic earth less than 1ohm

3 Earth to neutral Voltage should be less than 2 volts

4 Air conditioned dust free environment with clearance of at least 8” in front and rear of 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 OV)

8 Do not allow moisture to enter in the RF unit. Plastic tape should be put on all the Connectors at the ODU. A properly designed rain protection over can also be used to prevent the same.

ON-OFF PROCEDURE

9) 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.

10. Single phase 230 ohms 50Hz with input circuit breaker of 3amps for protection PRECAUTIONS

11. Do not disconnect the IFL cable from DIU without switching power supply off. This may damage equipment.

12 Protect your antenna/FL cable/ODU from tampering by unauthorized person.

13 To prevent damage to the DIU turn power off before connecting/disconnecting any telephone failure to remove power may damage the VDPC card.

14 Do not use rotary telephones with VSATs. Use only Touch tone (DTMF) telephones.

15 Do not place equipment, which produce dust near the DIU (Certain copier of computer primers produce carbon dust, which can cause malfunction.

16 Prevent moisture from getting inside DIU

17 Limit the distance between VSATs DIU to telephone instrument 15 meter for proper operation.

18 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

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

17.13: Crew Management system (CMS)

CRIS has developed a 24X7 Crew Management system(CMS) application managing its crew

for operating trains on the Indian Railway network. CMS project deals with all categories of train crew who are required to operate all type of trains on Railways.

Objective

1. Optimum and effective utilization of crew through monitoring of mandatory requirements
2. Effective scheduling and assignment of train crew
3. Schedule rests (12/16) of the crew based on total duty hours completed.
4. Paperless lobby-calls for booking through SMSs, caution order. circular. sign ON/OFF
5. To generate computerized mileage report for direct submission to P Branch for payments.
6. To check Loco Pilot for drunkenness at time sign on & off duty to ensure safety.

Features

1. User friendly-24X 7. Browser based application running on thin clients.
2. It has n-tier J2EE architecture using struts frame work supporting open standards
3. Seamless integration of sub systems like BA, BIO, Camera with the existing business application.
4. Single sign on features.
5. Comprehensive data validations during capturing.
6. Industry standards security features.
7. Highly customizable and scalable : reduces deployment time
8. Extensive help support 24 X 7
9. User friendly, 24 X 7 browser based application running on thin clients.

Integration

1. FOIS for freight Train planning, Sign On/Off crew data.
2. ICMS for train information.
3. COA for issuing caution order for safe operation.
4. RBS for new routes and updated distance between stations.
5. IPAS for releasing salary though mileage generated by CMS.

Benefits

1. Efficient Crew utilisation due to inherent transparency.
2. 0peration with Safety being use of Breath Analyser
3. Automation through SMS and manpower saving.
4. Financial Benefits due to no manual interference for mileage calculation,
5. Better & Fast Planning for crew availability
6. Monitoring of SEC & SFC of electric & diesel locomotives

17.14: 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), Captures train running at Originating/ Terminating and interchange points and the causes of detention. Data input 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 predominantly at Station/Coaching Yard level. Status: Implemented.

iii) COIS Data Entry Module: Support module of ICMS, to maintain database pertaining to the information of Rake Links, Yard Infrastructure, Coach Master, Train Schedules etc. Data input 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 shifts etc), Data input 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 at Zonal HQ level. Status : Under system study.

2) ICMS-SYSTEM ARCHITECTURE

- User connects through browser interface (like Internet Explorer)
- Separate URL for PAMS ,COIS and DATA modules (for ex: http/…/cois , http…./pam , http/…/data and so on)
- Users have Thin clients at location
- Back-end: RDBMS (Oracle based)

3) ICMS-DATA FEEDING

i) **Master Data:** Common Master database for PAMs 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 PAMS 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 - 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 Resolve
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
Arrival Reporting	

(iii) ICMS-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
- 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 :
- 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.

17.15: REMMLOT

REMMLOT, a network oriented system connecting microprocessor based diesel/electric locomotives in the field with centralized server based management system through GSM network

communication & GPS.

REMMLOT(Remote Monitoring and Management of Locomotives and Trains) Mainly consists of LTMS (Locomotive & Train Management system) and LRMS (Locomotive Remote Monitoring System). LTMS is a centralized server hosted on the internet for Railways and is a 24 x 7 service provider accessed via a static IP address.

Generates reports like health status, fault status, datapack, event recorder data, life time counters data & other information related to running of locomotives and trains to be used by Railway management for decision making.

LRMS is a rugged, on board, embedded system mounted in the locomotive and communicates with LTMS through GSM network for various applications as per user requirements which Integrates with locomotive computer and GPS receiver to receive appropriate data from locomotive computer.

17.16: ANTI COLLISION DEVICE (ACD)

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 signaling 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 the non-signaling and inter locking system it does not replace any existing signaling 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 onboard (Mobile). ACDs for Locomotives and Guard vans and track-side (Stationery) ACDs, Level O 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 system of locomotives.

System provides audio-visual “Train Approach” warning to road users at level crossings. At Manned LC Gates, when 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.

17.17: LOCOTROL: LOCOTROL is a control and radio communication system that enables coordinated braking and traction power distribution between lead and remote locomotives for enhanced trailing load capacity which reduce in stopping times and reducing stopping distances.

It enhanced the hauling capacity, better rail adhesion, improved fuel efficiency; increased system throughput, lowered brake pipe charging time and reduced operating costs with reduce manpower.

Core Capabilities

- Control up to 4 radio-controlled remote Locomotives consists per train per direction.
- Optional message repeaters improve communications in troubled areas.
- Optimized outcomes with every type of interfaces of braking system and locomotive control system.
- Enables longer and heavier trains.
- Allows trains to stop faster and smoother by reducing stopping times and distances.

CHAPTER-XVIII
CONTROL OFFICE APPLICATION (COA)

18.01: Introduction – General Information

1.1 Control Office Application:

Control Office Application (COA) is comprehensive software for the automation of Control Charting at a railway divisional control office. COA is intended to replace the tedious manual plotting of running trains on a chart. The core functionality of the control charting with ergonomics is intended to provide the Traffic Controllers good look and feel and user friendly work environment. The benefits of COA for 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.

1.2 Scope of COA

COA covers the following core functionalities Control Office Operations. They include: -

- Train Ordering
- Maintain Train Information
- Manage Train Movement (Abnormal Working, Stabling, Banker Movement)
- Report Unusual Occurrences.
- Management of Maintenance Blocks
- Caution Orders
- Plot Graph.
- Advance Plotting _ System / Manual
- Maintain referential data
- MIS Reports
- Yard Management Siding
- Miscellaneous Functions
- 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. .

1.3 Intended Audience

- Operations Managers
- Train Controllers
- Key functionaries of sister departments.

1.4 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-XIX
SHUNTING AND SECURING OF VEHICLES

19.01: Shunting

Shunting and control of –

a) The movement of vehicle or vehicles with or without an engine or of any engine or any self-propelled vehicle, for the purpose of attaching, detaching or transfer or for any other purposes, is called shunting.

b) The shunting operations are required to be controlled by fixed signals or hand signals or by verbal directions vide GR 5.13(1).

19.02: Kinds of shunting-

The following are the kinds of shunting-

a. Hand shunting

b. Flat or flag shunting

c. Loose shunting

d. Fly shunting

e. Slip shunting

f. Hump shunting and

g. Gravity shunting

a. Hand shunting-

Hand shunting means shunting of wagons by manual labour. No hand shunting of wagons is permitted unless it is under the supervision and orders of a responsible operating official. The operating official supervising hand shunting shall see that such shunting is conducted safely and in accordance with the rules in-force and that, after shunting has been completed, the wagons do not foul any points, crossing, running line or cause any obstruction in the way of other movement. On no account must, labourers and others be permitted to get between wagons when shunting is in progress. All pushing of wagons shall be done from the rear of the last vehicles. Labourers and others must not be allowed to hand shunt vehicles by pushing them at the buffer, they must push vehicles from between the buffer in case of BG or at the side of vehicles outside the rails in case of MG or NG.

Hand shunting is not permitted in yards situated on a grade steeper than 1 in 400.

b. Flat or flag shunting-

Flat or flag shunting is the movement of wagons in an ordinary yard i.e. flat yard by continuous forward and backward engine movements.

c. Loose shunting-

Loose shunting means shunting when vehicles after receiving an impetus from an engine are

allowed to run forward unattached with the engine; the vehicles must be accompanied by a man to tighten/pin down the brakes. For prohibition of loose shunting see GR 5.21 and Subsidiary Rules thereto.

d. Fly shunting-

Fly shunting is more or less like loose shunting except that in this case two or more vehicles or sets of vehicles not attached to each other are pushed by an engine and are made to take different roads, by the points being reversed sharply, after the leading vehicle or vehicles have passed over the points and switching the following vehicle or vehicles on the other line.

Fly shunting is strictly prohibited on this railway.

e. Slip shunting-

Slip shunting means uncoupling an engine while drawing forward vehicles and switching it into one line or siding and the following vehicles into another line or siding at a slower sped. Slip shunting is strictly prohibited on this railway.

f. Hump shunting-

Hump shunting applies to Hump yards. Hump shunting means shunting through the medium of a hump, an artificial grade, over which vehicles are pushed up by an engine on one side and allowed to gravitate down the opposite slope in the appropriate classification lines.

For restrictions of hump shunting see 'Note' to SR 5.21/1 (d)

g. Gravity shunting-

Gravity shunting applies to gravity yards where there is continuous and gradually falling gradient through the reception lines of trains, sorting and dispatch sidings in which wagons rolled by gravity after the train engine is uncoupled. In such shunting operations, wagons move down the falling gradient on account of the force of gravity and are controlled by wagon brakes by the yard staff viz; Pointsmen, Shunting Masters etc.

Note- On this railway there is no Gravity Yard.

19.03:Speed during shunting operations-

a. The speed during shunting operations shall not exceed 15 Kmph except in case of shunting wagons/vehicles containing passengers, live stock, explosives, dangerous goods and tank wagons, when the speed shall not exceed 8 Kmph.

b. In case of shunting BOX, BOIS, BRH, etc, the maximum impact speed of a single wagon must not exceed 5 Kmph.

c. The maximum impact speed when shunting a group of five BOX, BOIS, BRH, etc, wagons coupled together with transition couplers at either end should not exceed 5 Kmph.

19.04: Responsibility of Loco Pilot for shunting-

The Loco Pilot shall not, however, depend entirely on signals and shall always be vigilant and cautious. They shall not exceed the speed limits prescribed for shunting under any circumstances.

19.05: Responsibility of station and yard staff regarding shunting-

a. The Station Master/Yard Master shall see that shunting of trains or wagons/vehicles is

carried on only at such times and in such manner as will not involve danger.

b. The station working rules and yard working instructions shall clearly specify the responsibility of staff to supervise and conduct shunting operations at stations and in yards, and the specific responsibilities of each staff with regard to-

(i) Commencement of shunting operations after ensuring safety

(ii) Correct setting of points, traps, scotch, blocks etc, and taking off/showing of signals of shunting.

(iii) Conduct of shunting in accordance with the shunting rules; and

(iv) General supervision of shunting operations by accompanying the part of the train being shunted.

b. All shunting operations in connection with trains or vehicles/wagons at station and in yard shall be done by shunting staff under the orders of the Station Master/Yard Master or such other staff as may be authorized in this behalf.

c. At station where Yard Master is provided, all shunting operations in connection with trains or wagons/vehicles shall be personally supervised by Yard Master/Station Master, in accordance with the instructions laid down in Station Working Rules/Yard Working Instructions. At terminal stations, all shunting operations shall be done under supervision of the Guard of the train without exceeding his duty hours if there is no Yard Master or shunting Master. The supervision as mentioned above shall also include assurance that relevant points are correctly set, correct signals are given to the Loco Pilot and that correct wagons/vehicles are attached or detached, and the relevant safety rules are duly observed.

At way side stations where there is no Yard Master or Shunting Master, the responsibilities with regard to supervision of shunting shall devolve on the Guard of the train concerned.

d. Shunting operation must not commence unless ordered by the station master/yard master on duty. The station master/yard master shall not allow any shunting in such a manner as would prevent from giving line clear, or receiving or dispatching any train and unless, on controlled section, the permission of the controller has be obtained.

e. The Pointsmen/Cabinmen performing shunting shall be under the orders of the shunting supervisor and they shall be responsible for correct setting and locking of relevant points, traps, scotch blocks, etc. and also for observing safety rules during shunting operations.

f. Responsibilities of staff for shunting in the marshalling yard, when not covered by the foregoing rules on account of local condition, shall be specified in the Yard working Instructions and the yard staff shall be responsible for observance of those instructions also.

19.06: Control of engine during shunting-

a. No engine is allowed to be out of the loco limit and enter into the traffic yard unless permitted by the station master or the yard master on duty, as the case may be. Such permission should be given by taking off the fixed signal where provided for this purpose and also by proper hand signal through a competent railway staff except where otherwise specially mentioned in the station working rules/yard working instructions.

b. At station where regular shunting engines are provided or when train engines are to be engaged for the time being in shunting, the engine or engines performing shunting may be accompanied by a competent member of the operating officials, where necessary.

c. When in traffic yard, the Loco Pilot shall obey the lawful orders of the Station Master or Yard Master or of the person in charge of shunting operation in all matters affecting starting, stopping or movement of engine for the traffic purposes.

19.07: Additional precautions when a complete train is to be shunted-

a. Whenever a complete train of any description is to be shunted from one line to another or placed in or taken out of a siding such as in the process of crossing or giving precedence to another train, the Station Master/Yard Master shall issue clear instructions to the Guard and the Loco Pilot of the train indicating-

(i) The direction in which the shunting movement shall commence;

(ii) The extent up-to which such shunting will be done and

(iii) The line on to which the shunting is be performed.

b. When the train is to be backed into the dead end siding or on an obstructed line, the person in charge of shunting operation will bring the train to an halt at a place sufficiently in advance of such dead end siding or the obstruction and thereafter he may, if required, allow the train to be backed and finally brought to a stand at a safe distance from the dead end of the obstruction, as the case may be.

c. On completion of shunting as also during shunting, the person in charge shall see that the train is standing clear of the fouling marks with points and crossing of all others concerned line or lines over which other train or trains may have to pass.

d. The precautions which are to be taken in terms of paras (a), (b) and (c) above are in addition to those laid down in General and Subsidiary Rules and also in the Station Working Rules/ Yard Working Instructions.

19.08: Additional precautions when shunting passenger carrying trains-

a. In addition to observance of rules mentioned in rule 19.07 , the following additional precautions are necessary when shunting a passenger carrying train-

The fact that the train is to be shunted shall invariably be announced as warning to the passengers. At stations where loud speaker/PA system are provided, Shunting to be done ensuring safety of passengers through frequent announcements by PA system".

b. The person in charge of shunting operation should ensure that all doors are closed and that all foot boards are clear of passengers. Where PA system is available, frequent announcement may be done for performing shunting to ensure safety of the passengers.

c. The engine performing shunting shall first come to a halt 20 metres away from the train and thereafter perform shunting very carefully under the supervision of the operating official in charge of shunting. The coupling shall be tightened and Air brake/vacuum brake connected for safe movement of shunting operation.

19.09: Additional precautions when shunting in and out of goods and transhipment/ repacking shed-

a. When shunting is to be done in and out of goods or transhipment/repacking shed where loading or unloading may be in progress, the official in charge of shunting must warn the workers that shunting is about to commence and shall obtain permission of the official in charge engaged in loading and unloading wagons.

b. When a train or wagon(s) is being backed on to a line where labourers might be crossing or where there are wagons on which labourers are working or waiting to work, the person in charge of shunting operation must send a man in advance to warn the labourers and get them out of the line before any movement is made. The Loco Pilot must also sound engine whistle to warn the labourers.

19.10: Additional precautions when shunting a material train –

a. When shunting of a full or a part of a material train is to be done, the person in charge of shunting operation must take particular care as follows-

(i) Before commencing movement, securing devices have been removed.

(ii) Hand brakes are released if require to do so

(iii) Lever of hand brakes are put on the hangers and

(iv) No labourers are lying beneath the vehicle and they are warned that shunting is about to commence.

(v) Hand Brake/Air Brake pinned down/'ON' position.

b. The instructions mentioned in para(a) above are in addition to those given in GR 4.63 and Subsidiary Rules thereto and also in addition to other instructions as and when issued locally.

19.11: Extra precautions when attaching or detaching coaches carrying passengers-

a. Where PA system is available, frequent announcement may be done for performing shunting to ensure safety of the passengers. The movement will not commence until all doors are closed and foot boards are clear of passengers. When a passenger coach has to be detached due to hot axle or damage, etc, the shunting movement should not commence until passengers have been detrained from such coach.

b. The engine performing shunting shall first come to a halt 20 meters away from the train and thereafter perform shunting very carefully. Before commencing shunting the coupling shall be tightened and full vacuum/Air brake created to prevent the coach (s) from being run away.

19.12: Rough shunting of vehicle- Rough shunting of vehicles causes damage to property, rolling stock, etc and is prohibited under all circumstances.

19.13: Shunting with coupled/Multiple Unit (MU) Locomotives- Shunting with Coupled/ Multiple Unit (MU) Locomotives is allowed under supervision of a Competent Railway servant. One Pointsman/Competent Railway servant should be available in the Locomotive along with the Shunter to guide him during shunting operations.

19.14: Shunting of vehicles containing explosives, dangerous and inflammable goods and loaded kerosene or petrol tanks-

a. Generally such vehicles must be separated from the engine by at least 1 wagon/brakevan not containing explosives dangerous or inflammable goods or livestock.

b. Loose or hump shunting of such vehicles or against such vehicles is prohibited.

c. No naked light or hand signal lamp(Except Tricolour Torch) or smoking should be permitted near the wagon containing explosives or dangerous goods.

d. Sparks should not emit either from the chimney or damper of the engine.

Note :- The engine should have a spark arrester.

e. The speed of shunting operations with such vehicles should not exceed 8 Kmph.

19.15: Shunting at stations on or near gradients-

a. In performing shunting at stations situated on or near a falling gradient steeper than 1 in 400, any special instructions contained in the Station Working Rules must be strictly adhered to.

b. In yards situated on gradients steeper than 1 in 400, no loose or hand shunting of any vehicle is permitted, (see SR 5.20/1)

c. To perform shunting by engine over a portion of line on steep gradients, neither isolated nor protected by slip siding, the engine shall be attached towards the falling side of the gradient. See also GR 5.20 and SRs thereto

During shunting, when vehicle/vehicles are detached, brakes must be pinned down/ tightened, safety chain and sprags/wedges used to protect against rolling away particularly if shunting has to continue on adjacent lines or there be any likelihood of passing or arriving of any train by on the adjacent line.

19.16: Shunting during stormy weather-

a. Station master on duty or such other person in a yard responsible for shunting, shall see that necessary steps have been taken to prevent vehicles escaping to running lines or to adjacent stations.

b. Shunting shall be confined to as few lines at one time as possible, each vehicle placed on a line being coupled to any others already there. Hand brakes of very vehicles shunted shall be put down and when shunting on any one line is finished, all vehicles must be coupled up and the end vehicles be spragged or chained and padlocked.

19.17: Additional precautions during coupling and uncoupling-

a. End falling trucks- when flaps of low- sided end – falling trucks are falling, staff should not get in between two couple or uncouple, until buffers are pressed together and must not raise their heads between the end flaps.

Such trucks, when empty or not loaded with loads which require the flaps to be down, must have the flaps fastened up.

b. In all cases, the staff must avoid getting between vehicles in motion to uncouple or to couple them.

c. While coupling and uncoupling vehicles during shunting operations, shunting staff must get clear of the vehicles before they are allowed to move.

d. Vestibuled vehicles- such vehicles should be coupled and uncoupled when they are at rest and the buffers are touching. Train examining staff are responsible to secure the vestibules so that they do not work out.

e. Coupling and uncoupling from front of an engine with a cow-catcher should be done only when the engine stops.

Note: similar precautions should be taken to couple and uncouple vehicles from tender-side of an engine, if the tender is fitted with a cow- catcher.

f. While going in between the vehicles with their buffers within a yard of each other, staff should go under the buffers in case of BG vehicles and on the sides in case of MG and NG vehicles.

g. Standing on Tie-Rods, Axle-boxes, buffers of vehicles and engines, during shunting is strictly prohibited.

h. Couplings of vehicles should not be allowed to hang during shunting operations and should be hooked on to the brackets provided for the purpose.

19.18: Shunting by train engine at starting and terminating stations-

a. No engine of any train shall leave a terminating station or yard for engine shed unless authorized by the station master or the yard master on duty.

b. Except as provided for in sub- para (c) below, as a rule, train engine shall not be called upon to perform shunting at starting and terminating stations either in connection with their own trains or the yard work. This does not preclude taking away to loco shed by a train engine, the loco coal or other wagons brought by it which does not involve any shunting.

c. When necessary the train engine may be called upon to perform shunting at starting and terminating stations generally in the following cases:-

(i) To detach any wagon on its own out going train, such as not to go wrongly attached, and other wagons found in excess of the load prescribed.

(ii) To put its own train or a vehicle brought by it into proper siding as ordered.

(iii) To clear an obstruction.

(iv) Where yard shunting engine is not provided

(v) While a train engine is employed for shunting at starting and terminating stations, it should be ensured that the statutory limit of hours of work of running staff is not thereby exceeded except when it is necessary in the case of an accident or to clear an obstruction. In case of exigencies however train engine of terminating train may be used to clear the lines to accommodate next train subject to statutory limit of the train crew and without disturbing the normal link.

d. Till statutory limit of the train crew and without disturbing the normal link.

e. Engines working goods train may be called upon to do shunting for one hour before departure at engine changing stations where shunting engines are not available such shunting needs not be necessarily in connection with their own trains.

19.19: Shunting by train engines before and after working trains-

(1) The Operating Department is entitled to the free use of train engines for 15 minutes, before starting and 15 minutes after arrival. No shunting order therefore is to be granted if the shunting performed by the train engine does not exceed 15 minutes immediately before the actual departure of the train form the starting station or after actual arrival at engine crew/ changing or terminal station.

Note:- The shunting must be completed and the train engine attached to its train at least 20 minutes before the booked departure in the case of passenger trains and 30 minutes for non TXR point & 20 minutes for TXR point before the booked departure of mixed and goods trains.

(2) The minimum time for which a shunting order will be granted is 15 minutes i.e. for a period of less than 15 minutes no shunting order will be issued.

Note:- Operating Officials concerned must order out train engines sufficiently early to complete the required shunting at least twenty minutes before the booked departure of passenger trains & thirty minutes from non-TXR point & twenty minutes from TXR point before the booked departure of mixed and goods train, so as to eliminate late starts. If engine come out of shed late and unavoidable shunting has to be performed before the departure of the train, traffic can still claim the 15 minutes free time allowed in the case of shunting by train engines prior to the actual departure and actual arrival. The reminder of the time will be covered by a shunting order for the actual time.

19.20: Shunting by shunting engines-

(1) when a permanent shunting engine is required in a yard the Sr. Divisional Operations Manager concerned shall apply for it, sanction of allotment of shunting engine shall specify clearly the number of shunting engines to be employed at one time in a yard and the timings at which the engines will be required. The Station Master or Yard Master may vary these timings temporarily or permanently, if and when necessary but a notice of four hours shall be given to SSE(Loco) for supplying the engine at altered timings if an engine is required to be lighted up and if an engine id not required to be lighted up, the SSE/Loco shall comply with the requisition. When the change of timing is of a permanent nature, the Sr. Divisional Operations Manager shall be informed to confirm the change.

(2) In emergencies or special circumstances, if an additional shunting engine is required, the Station Master or the Yard Master shall put up a requisition with Loco Foreman with the concurrence of the Chief Controller and the SSE/Loco will comply with it. If the additional shunting engine is required for any length of time, the Sr. Divisional Operations Manager must confirm the requirement and obtain approval of the Pr. Chief Operation Manager.

(3) When a permanent shunting engine is not allowed to a station where a shunting engine is required regularly for part time, arrangement shall be made to supply from the nearest shed or to utilize train engine. Such arrangements must be approved by the Sr. Divisional Operations Manager with an intimation to the Pr. Chief Operation Manager.

(4) As a rule, a shunting engine shall not be run out of Station Limits. However, in cases of emergency such as assisting disabled train or for loading or unloading, it may be sent out not beyond the next station limit with the permission of Station Master or Yard Master or

Control where one exists. In cases of unavoidable necessities such as accidents, rescuing purpose, Urgent placement and clearance of drop loads at adjacent station. a shunting engine may be sent beyond the next station limit; duly piloted by LI or any competent railway servant.

(5) Shunting by a shunting engine beyond the fixed shunting hours should be avoided but, in unavoidable circumstances, this may be arranged in consultation with SSE/Loco and adequate justification should be maintained for it by the Station Master or Yard Master as the case may be.

19.21: Precautions for Hose Pipes-

(i) Hose pipe couplings must not be left hanging loose but must be properly secured on the dummy plugs provided for the purpose.

(ii) To couple the hose pipes, they must be taken one in each hand and lifted sufficiently high to enable the bottom horns of couplings to be hooked together, and then when lowered the top plug of one coupling will fall into the slot of the other.

(iii) To uncouple the hose pipes, they must be lifted straight up when the plug at the top will come out of the slot and the coupling will separate.

(iv) On trains, in case engines are attached, when connecting or disconnecting hose pipe couplings, the staff must be careful not to have in their hands waste or any other substance which might be drawn in to the pipes by suction.

(v) Care must be taken in uncoupling hose pipe couplings so that the rubber washers are not displaced or lost.

(vi) Shunting staff and others are cautioned that in passing between vehicles, they must not step on the hose pipe couplings or interfere with or damage them.

(a) On arrival of a Goods Train in a Marshalling Yard, before breaking up the train, the hose pipes will be connected to the dummy plugs by Train Examining Staff detailed for the purpose during the incoming examination of the train. When the train examination staff is not readily available and engaged in other works this duties automatically devolve the on duty P/Man.

(b) After formation for the outgoing train, the traffic yard shunting staff will ensure that the hook couplings of all wagons have been connected and tightened before handling over the train of examination to the TXR staff

(c) Train examination staff deputed to examine the outgoing goods train shall couple up the hose pipes of all wagons and must ensure that this is done before a Fit Memo for the train is issued.

(d) The Guards must check before starting from the train originating station that the hose pipes are connected properly.

(e) During shunting at wayside stations, the Guard and the station traffic staff should ensure that the hose pipes of wagons which are uncoupled are put on to the dummy plugs. The station Master of wayside stations shall be held personally responsible for ensuring that the staff performing shunting understand and comply with those instructions.

(f) The Train Examining Staff employed on “Sick Lines” will see that all the wagons going out from the “Sick Lines” have their hose pipes connected to the dummy plugs.

(vii) When automatic vacuum braked vehicles are placed in sidings, the brake, must be released and the vehicles secured by the application of the hand brakes if so fitted or sprags or chains.

19.22: Special attention of staff to some of the General and Subsidiary Rules-

In regard to the conduct of shunting operations, the attention of staff is also drawn to some of the General and Subsidiary Rules to which the staff concerned shall make themselves fully acquainted with. These are SRs 3.08/2, 3.39/2(d), G&SRs 3.14, 3.46, 3.56, 5.13 to 5.23, SR 4.62/10, G&SRs 8.05 to 8.15.

Securing of Vehicles

19.23: Securing of vehicles/loads/trains/locomotives at stations and in block section. Precautions to be taken for stabling loads/trains and securing of vehicles/loads/trains/locomotives at stations as well as securing of trains stranded in block section are as below:-

1. Action by Station Master Traffic Staff when vehicles/load/train is to be stabled at Station:-

(a) The vehicles/load/train be chained and padlocked using at least two chains, one at either end;

(b) At least four sprags/wooden wedges be used, two each below the outermost pair of wheels at either end;

(c) Hand brakes of at least 6 wagons from either end must be fully tightened. In case coaching vehicles are stabled, Guard's hand brakes in SLR(s) must be applied. The hand brakes must be operated under the personal supervision of the Guard, and in the absence of Guard, by SM on duty;

(d) The vehicles of stabled load/train should be coupled together. In case the stabled load has to be split for any reason, each such split part should be treated as .a separate load for the purpose of securing;

(e) The points must be set, clamped and padlocked against the blocked line and towards dead end or trap point (if available). Scotch blocks must be used, if available;

(f) Stop Collars must be placed on relevant signal and point buttons/slides/levers etc.;

(g) Remarks should be made in TSR and/or SM diary in Red ink to the effect that 'Line No. is blocked and all precautions for securing the load have been taken' as prescribed above;

(h) After any load/train/loco is stabled, the station master must inform the section controller supported by private number that all laid down precautions for stabling and securing the load/ train/loco have been taken.

(i) In case of big yards, where vehicles remain stationary on the yard lines, other than running lines, the above precautions may be relaxed. However, hand brakes & skids/wedges shall be used for securing of vehicles at that end of the yard where escaping of vehicles is apprehended. This should be incorporated in SWR of the station/yard.

2. Additional precautions to be taken while stabling vehicles/load/train at a station with gradient of 1 in 400 or steeper may have been prescribed under approved special instructions (by CRS) and mentioned in SWR of respective station. These should be followed scrupulously. In addition, following precautions must also be observed over and above those prescribed under approved special instructions:-

(a) Before vehicles are uncoupled, the hand brakes if available should be applied, sprags/wooden

wedges/skids, should also be used to prevent vehicles from rolling down

(b) As far as possible, the vehicles/load/train should be stabled on a line which is isolated from other lines, particularly running lines.

3. Action by Loco Pilot/Assistant Loco Pilot before leaving the loco in case load/train is stabled with locomotive attached or light engine(s) is/are shut down or stabled:-

(a) Application of both SA-9 and A-9 brakes;

(b) Application of hand brake and parking brake;

(c) Secure the loco with wooden wedges provided on the loco;

4. (a) Loco Pilot while on duty should not leave loco unmanned. In case he is required to leave the locomotive unmanned, he should do so only after receiving written authority from the Station Master/Yard Master and ensuring 3 (a), (b) & (c) above;

(b) Before leaving the station/yard, the Loco Pilot and Guard should jointly record in a register to be maintained with Station Master that the load & loco has been secured as prescribed above.

5. Action to be taken by Loco Pilot/Assistant Loco Pilot and Guard when the train is stalled in block section due to accident, failure, obstruction or any other reasons:-

(a) Loco Pilot/Assistant Loco Pilot and Guard should protect the train as per provisions of G&SRs 6.03; (b) The train should be secured by applying loco brakes (SA-9, A-9 & hand brake) and hand brakes of at least six wagons at either end of the train. The hand brake should be operated by Assistant Loco Pilot from leading end and by the Guard from the rear end. In case the train is being worked without Guard, the duties of the Guard shall devolve on the Assistant Loco Pilot. In case of coaching trains, the Guard should apply hand brakes of the SLR in addition to the application of loco brakes by the Loco Pilot.

6. Station Staff, Guard, Crew and Section Controller should be aware of gradients at Station Yards/Sidings and block sections.

7. Frequent counseling in this regard should be done by concerned Supervisors.

8. The Railways must ensure availability of adequate number of sprags & chains of approved design at stations and wooden wedges on locos.

9. A securing of vehicles register is maintained at station in the following format:-

1	2	3	4	5	6	7	8	9		10	11	12
SN	Train No. with Eng No. and Load	Date & Time of Arrival	Stable on Line No.	Securing Devices used	Detail of Loco/ Wagon where securing devices used	Details along with position of wagon hand brake applied (At least Six from both side)	Signature/ Name of LP, Guard, Pointsman and SS/SM	Private No. exchange with section controller		Departure Time and Date	Signature of SS/SM	Remarks
								station	control			

CHAPTER-XX

DERAILMENT INVESTIGATIONS

20.01: "Accident investigations – A tool to prevent recurrence". In most case 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 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 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 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) 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 dates as given in the accident reporting form must be recorded for locomotive to produce before the Accident Enquiry Committee. The track and coach/wagon is to be examined jointly and the data and information collected are to be recorded jointly signed by the Sr. Subordinates available at the site.

20.02: Investigating into a derailment

A) 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 stationmaster. Whether station staff adopted any abnormal method of working
- Sudden reversal of points
- S&T failure reported before the accident – how and when was it 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.

B). Measurement of gauge and cross level of points and crossing

Gauge and cross levels in switch and lead

a) At 450 mm ahead of Toe of Switch.

b) At ATS between two stock rails.

Station No	Main Line			Turn out		
0	G	XL	V	G	XL	V
1						
2						
---						

c) Gauge and cross levels for Main line and Turnout side. Versine of stock rail for Turnout side up to end of lead

ATS/HEEL

Note: 1) Station no. 0 to be marked at heel of switch for straight switch and ATS for curved switches. Subsequent stations shall be marked at every 3 m Versines to be recorded on 6 m chord length commencing from station no.1.

2) Versine reading shall be taken for turnout side except for symmetrical split turnout where it shall be taken on mainline side.

3) In case of gap between T/R and S/R, that should be added to gauge measurement.

C) The gauge and cross level measurements shall be done at the nominated stations as indicated in the proforma. The track geometry at the turnout should not be inferior to that applicable to the route. However, gauge just ahead of actual toe of switch shall be as follows–

(i) All BG turnouts of 1:12 BG 60 kg with 10125 mm O.R. curved switches (on wooden, steel or PSC sleepers), 1:12 BG 52 kg with 10125 mm O.R. curved switches on PSC sleepers and all thick web switches (52 kg/60 kg) on wooden/PSC sleepers i.e. all turnouts with switches having switch entry angle≤0°20’00” = Nominal gauge.

(ii) All other turnouts excluding those (i) above i.e. turnouts with switches having switch entry angle>0°20’00” = Nominal gauge + 6 mm. (As per IRPWM para 237.1.g)

D) Gauge and Super-elevation in Turnouts–

a) It is a good practice to maintain uniform gauge over turnouts. Tolerance in gauge at various

portions of turnout during new laying/renewal and maintenance shall be as follows:

Switch/lead/Crossing portion of turnout	New Laying/ Renewal	Maintenance
Switch portion	As per para 403	As per para 224(2)(e)(V)
Lead portion	As per para 403	As per para 224(2)(e)(V)
Crossing portion	0 mm to 4 mm with respect to gauge prescribed in standard drawing	

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 should be brought to same gauge as in the points and crossings, as a good maintenance practice.

20.03: Accidents involving collision, SPAD, rolling back of a train etc.

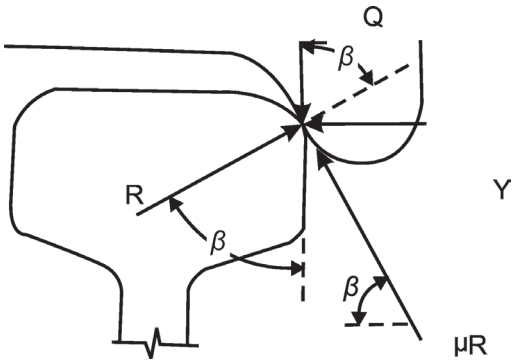
Accidents involving collision, passing signal at danger, rolling back of a train etc. are generally caused by violation of train operation rules and it is not very difficult to trace the irregularities committed. The most difficult accidents, from investigation point of view, are the ones where wheel 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 derail 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 lose contact with the rail and 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 follow:

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 in 1908:

$Y/Q > \tan\beta - \mu/1+\mu\tan\beta$

The ratio Y/Q is called derailment coefficient.

(While investigating into derailment, all track vehicle defects and features and operational aspects which cause one or more 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 obstruction to the derailed wheel. Examination of train brake power, position of zero brake power vehicles and heavily loaded vehicles must be critically done. Additionally, loco speedometer chart must be checked for 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. Readings 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.

20.04: Derailments at points and crossings:

Points and crossings are meant for changing the road of a train and it has 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.

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.

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 turn out.
- At heel for tongue rail for straight road and turn out.
- At middle of tongue rail for straight road and turn out.

The Gauge must be correct at all places except at the toe where it may be 6 mm slack for

housing the tongue rail.

It can be appreciated that conditions created by slack gauge' are not permitted near the switch is reproduced below:

"(8) 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 I 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."

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. 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 nost 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 turnout to be measured for checking smoothness (with 6 metre chord at 1.5 metre intervals)

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 make 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.

20.05: 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 and 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 - The distance between the two running edges of left and right rails is known as Gauge. The standard gauge is 1676 mm. Permissible variations are as per Para 224(2)(e)(V) and Para 224 (2) (f) (xiii) of IRPWM for maintenance purpose and as per Para 403 of IRPWM for new laying of track.

Sleeper to sleeper variation of gauge-2 mm (IRPWM para 316(2) (a)

Gauge in Floating Condition: While it is desirable to maintain correct gauge, variation in gauge may be there due to. age and condition of the rail, sleeper and fastenings. The limits of gauge as per measurement in floating _ condition, for the guidance of the Engineering officials regarding condition of track from passenger comfort perspective, shall be as given below, provided that generally a uniform gauge can be maintained over long lengths. In case of exceedance of these limits, the results of last TRC/OMS shall be analysed for planning suitable maintenance action. (ACS-150 DATED 26/08/2019) Broad gauge:-

a) On straight	- 6 mm to + 6 mm
b) On curves with radius 440 m or more	- 6 mm to + 15 mm
c) On curves with radius less than 440 m	Up to + 20 mm

Note– These tolerances are with respect to nominal gauge of 1676 mm

Gauge on Curves: The gauge on curve shall be to the following standards–

(1) On new lines and on lines where complete renewal or through sleeper renewal is carried out, the track should be laid to the following standards–

Radius in metres	Gauge
a) Broad Gauge (1676 mm) i) Straight including curves of radius upto 350 m and more	-5 mm to +3 mm
ii) For curves of radius less than 350 m	Upto +10 mm

(2) Alignment of Turn out to be checked by measuring versines. The versines of turn-in curves on loops should be recorded at stations at 3.0 m intervals on 6.0 m chord length during the inspection of points and crossings to check the sharpness of the curve and rectified as necessary. The turn-in curve should also be checked for condition of sleepers and fastenings.

Twist in Floating Condition (Para 224(2) (f) (xii) of IRPWM):- It is desirable to maintain the track geometry for a comfortable ride at the Sectional Speed The limits of twist as per measurement in floating condition, for guidance of the Engineering officials regarding condition of track from passenger comfort perspective, shall be as under (to be measured on a base of 3.0 m) (a) On straight and curve track, other than transition - 3.5 mm/m (b) On transition of curve - 2.1 mm/m (Local defects above Designed value). In case of exceedance of above limits, the results of last TRC/OMS shall be analysed for planning suitable maintenance action. (ACS-150 DATED 26/08/2019) As per Para224(2) (f) (xiii) of IRPWM Following track parameters, in floating conditions, for guidance of field officials are stipulated for maintenance of track where speeds are low such as worksite, yard line, etc

Speed band (in kmph)	Peak value of UN in mm at 3.6m chord	Peak value of Twist in mm at 3.0 m chord	Permissible gauge range
45	22	18	-10 to +27mm
30	24	21	-10 to +27mm
15	33	25	-12 to +27mm

(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 meters 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 meters, by its degree. Versine is calculated as:

$V= 125.C^2 /R$

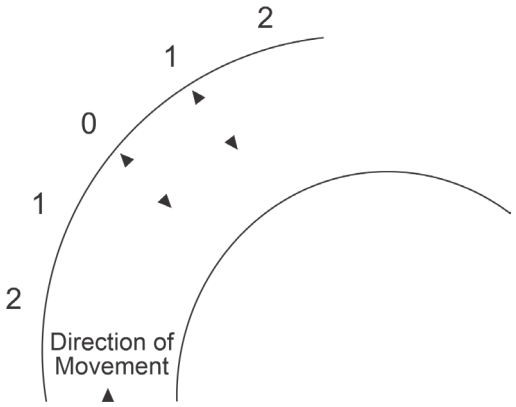
R - Radius in meters

C - Cord length in meters

V - Versine

IRPWM para 421(2): The running over a curve depends not only on the difference between the actual versine and the designed versine but also on the station to station variation of the actual versine values. This is because, it is the station to station variation of versine which determines the rate of change of lateral acceleration, on which depends the riding comfort. Service limit for station to station versine variation for 3 speed group viz. Below 140 kmph and upto 110 kmph, Below 110 kmph and upto 50 kmph and below 50 kmph, should be considered as tabulated below–

SN	Speed on curve	Limits of Station to Station Variation of Versine (mm)
1	Below 140 kmph and upto 110 kmph	10 mm (15 mm for speed of 110 kmph); or 20% of average versine on circular portion, whichever is more
2	Below 110 kmph and upto 50 kmph	20 mm; or 20% of average versine on circular portion, whichever is more.
3	Below 50 kmph	40 mm; or 20% of average versine on circular portion, whichever is more



The super elevation is calculated as:

$C = G.V^2 /127R$

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, Band 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

(5) Ballast : It is a very important member in the track structure. It helps in maintaining track Geometry. The ballast resistance is affected by 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:-

Broad Gauge

In case of	Minimum depth for all BG routes
Track renewals(complete track renewals and thorough sleeper renewals	300* mm
All Doubling, Gauge conversion & new line construction works	350 mm
Loop lines	250 mm

. *Where possible a depth of 350 mm may be provided.

Sidings

Private and other sidings	Sidings with permissible speed up to 50 kmph	300 mm
	For Sidings with permissible speed more than 50 kmph	350mm

(6) Rail

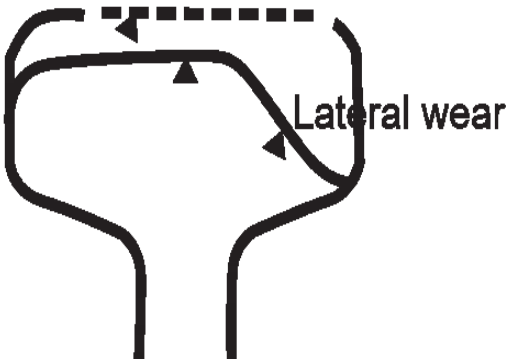
The accident caused by rail fracture does not leave much room for investigation. The fractured rail is to be tested to find out the nature of the failure. The visual inspection can reveal whether the fracture was new or there was some old flow in the rail.

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



The limits of vertical wear of rail have been laid down in IRPWM Para 302 (b)

Gauge	Rail section	vertical wear
B.G	60 kg/meter 52kg/meter 90R	13mm 8mm 5mm

Lateral wear limits have been given in para 302(b) of IRPWM

Section	Gauge	Category of Track	Lateral Wear
Curve	BG	A and B routes	8 mm
		C and D routes	10 mm
Straight	BG	A and B routes	6 mm
		C and D routes	8 mm

Para 242(6) specifies creep in excess of 150 mm shall not be permitted. In LWR and CWR creep indication post are provided at the centre of LWR/CWR and in between centre of LWR/CWR and breathing length on either end at every kilometre depending on the length of LWR/CWR.

(7) Sleepers :If sleeper suffer any damage or loss in property, it can cause derailment. While recording the gauge and level readings the condition of each sleeper must be carefully sleepers near point of mount.

(8) Rail Fasteners : For different - type of sleepers, the rail fasteners are different Wooden sleepers - Dog spikes, Round head spikes, Steel keys Steel trough sleeper - steel keys

Pre-stressed 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 about of creep permitted as 150mm. 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 side way. 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 max. heat and also near the bridges, level crossings etc. where the track is firmly held in ground.

(B) Defects of Rolling Stock

- Defects in wheel and Axle Broken & Hanging fittings
- Defects in Bolster and Assemblies
- Defects in spring gear, axle guard and trolley
- Defects in Brake gear
- Excessive Clearance in side bearer, pivot etc.
- Hot box/Roller bearing failure
- Under frame and under frame members out of alignment
- Poor brake power
- Broken or disengaged Baffle plates in the empty/unloaded tank wagons
- 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-XXI

CONCEPTS OF ELECTRIC TRACTION

21.01: 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.

21.02: 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 interrupters' usually rated at 600A are 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 isolator 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 are 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.

1.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 upto 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.

2.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.

3.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.

21.03: 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 and batteries and battery chargers required for the control of interruptors and other similar equipments.

OVERHEAD EQUIPMENT

21.04: <u>Catenary and Contact Wires</u>

1. The overhead equipment above the tracks comprises of the following: -

a) A stranded cadmium copper wire of about 65 mm2 section or stranded aluminium alloy wire of about 116 mm2 section for catenary.

b) A grooved hard drawn copper contact wire of 107 mm2 cross-section (when new) supported from the catenary by means of droppers of 5 mm diameter spaced not more than 9 m apart.

2. The catenary and contact wire together have an equivalent copper section of 157 mm2. 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.

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 mm2 section is provided.

21.05: 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 oversize consignments on such lines, special precautions have to be taken.

21.06: Span of Supporting Mast/Structures

The span normally used for supporting the OHE from masts/structure 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 I 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.

21.07: 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.

21.08: Overlaps: The OHE conductors are terminated at intervals of about 1.5 km with an overlap generally as shown in Fig. 2.02, 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) Un-insulated 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 isolator except at neutral sections.

21.09: Regulated and Unregulated OHE

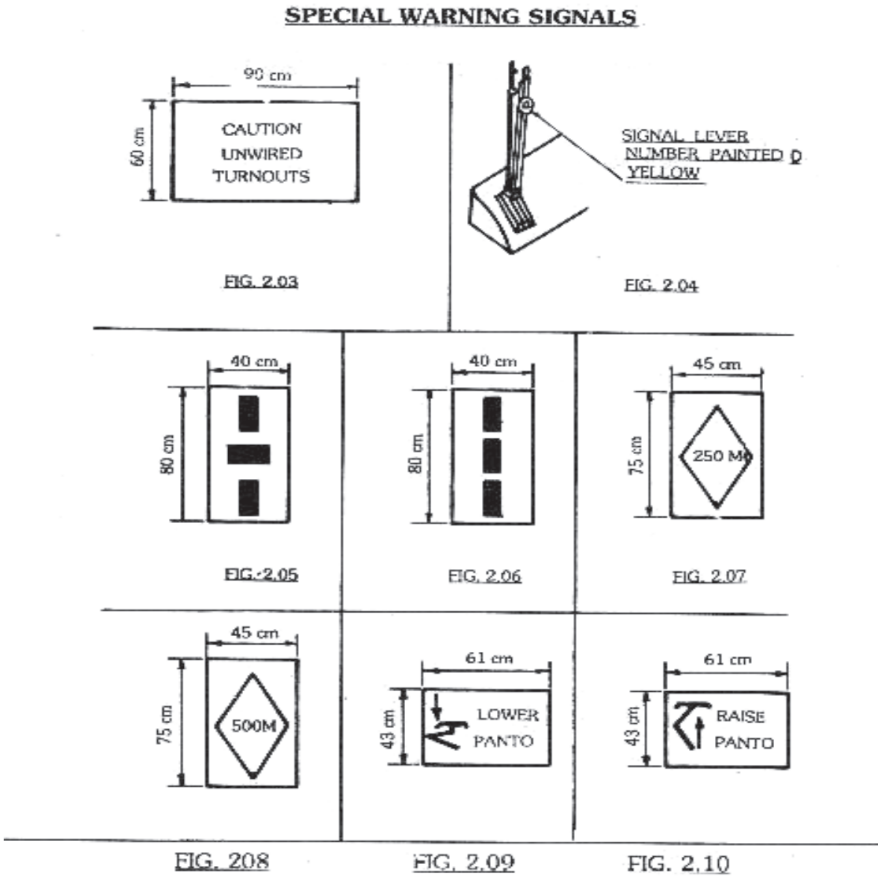
OHE with automatic tensioning called ‘regulated OHE’ is generally provided for all main lines, but for large isolated yard and unimportant lines, automatic tensioning is dispensed with in the interest of economy and only unregulated OHE is used.

21.10: 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 are fit for speeds upto 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 80 km/h.



GENERAL DESCRIPTION OF ELECTRIC ROLLING STOCK

21.11: 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, WAG9WAG9M

(b) WAP1, WAP2, WAP3, WAM1, WAM2, WAM3, WAM4, WAP4, WAP 5, YAM1

(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.

21.12: 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 250 km/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 these 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

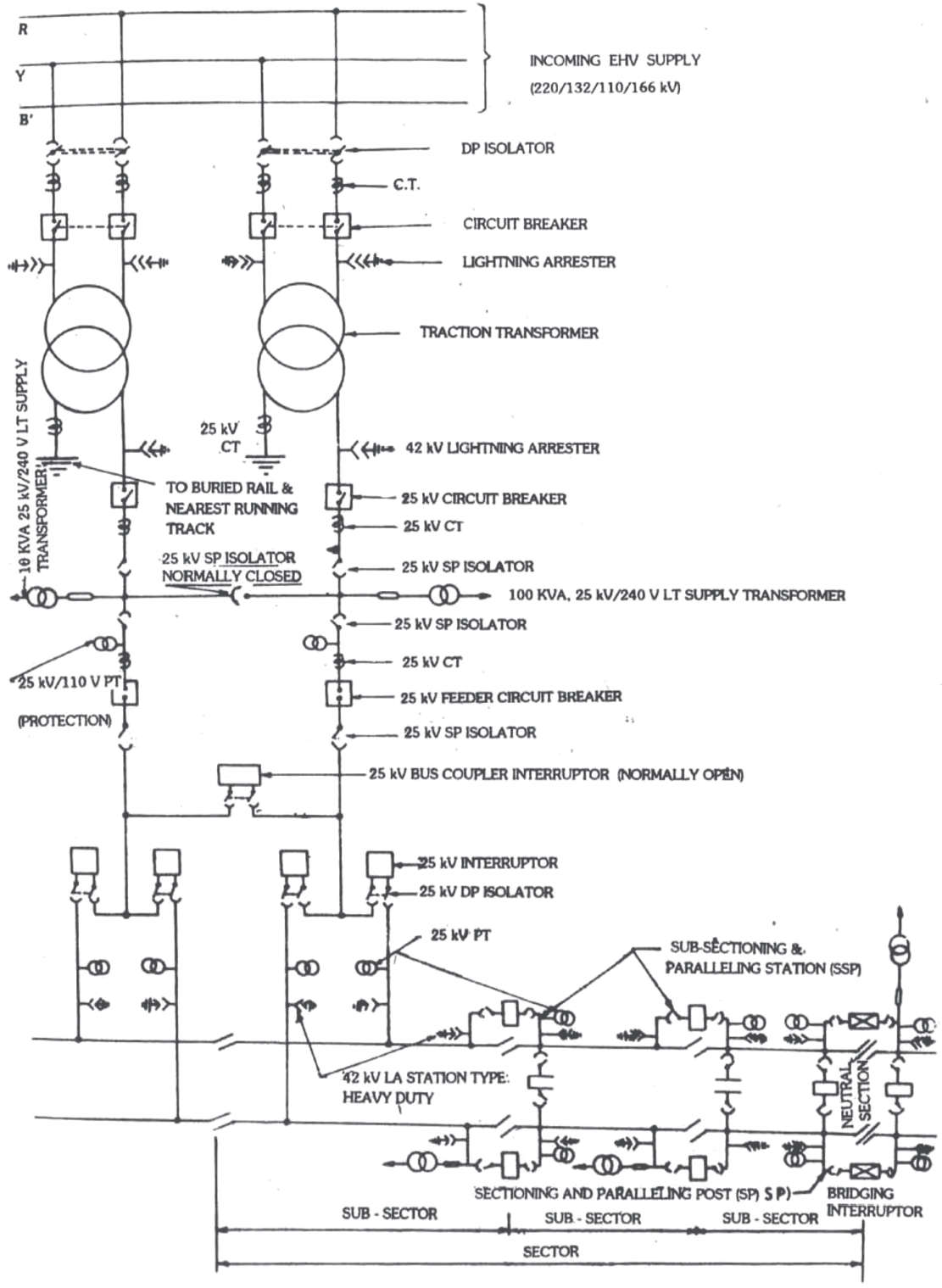
In case of traction motor great emphasis is being given on improving power to weight ratio, keeping in view the limited space available on locomotive for mounting the same. There is continuous effort to improve the performance of traction motor by making them lighter/compact, at the same time more reliable. 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 specially 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)



CHAPTER-XXII

CREW LINKS, LOCO LINKS AND POWER PLAN

22.01: Procedure for calculating crew requirement of a Division

1. Running staff review should be carried out after every year by the division.
2. Before preparing review, loco pilot's links of all the sheds should be got prepared and vetted by personnel branch.
3. Statement of avg. hours on road and no. of goods.
4. Trains ran during last one year for each section should be ready duly approved by Sr. DOM/DOM.

   A list of shunting points and DMTs running to be prepared and signed by Sr.DOM/ DOM.
5. Mail/Express/Passenger Loco Pilots requirement to be worked on the basis of loco pilots/crew links.
6. For goods crews the requirement should be worked out as per power plan signed by Sr.DME(P) and Sr.DOM. 7.67 Crews are to be demanded for one freight POL. Separate crews to be demanded for the activities which cannot been covered in power plan e.g., Light engine and Empty coaching rakes running etc.
7. 30% leave reserve and 10 % trainee reserve should be demanded for this additional requirement.
8. Shunters should be demanded @ 1 against 8 hrs. point. Also rest giver @ 1 for 6 shunters to be demanded. Leave reserve and trainee post to be demanded separately.
9. Requirement of Assistant Loco Pilot should be same as that of Loco Pilots (Excluding motormen where no Assistant Loco Pilot is required).
10. Running staff review duly signed by Sr.DME/Sr.DEE should be put up to Account Department for vetting.
11. After accounts vetting sanction of DRM be taken and Sr. DPO will issue circulars of revised sanction.

+ 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%.

22.02: Points to be kept in view while preparing Loco Pilot's links

1. Loco Pilot/Crew links are prepared by CPRC/CTLC and got verified from Personnel Branch. Objective of crew links is to ensure optimum utilization of crews.
2. Train timings to be checked from the latest timetable.
3. Links to be prepared before promulgation of new Time Table.
4. Maximum duty hours in anyone trip should not be exceeded.
5. Avg. duty hours in a fortnight should not exceed 125 hours.

6. Minimum no. of rests in a month should be 5 of 22 hours. or 4 of 30 hours including night in bed from 22 hours. to 6 hours. from sign off to sign on.

7. Efforts should be made to include all the sections in the link to avoid road learning again and again.

8. Minimum out of station rest in case less than 8 hours duty in the previous trip should be 6 hours from sign off to sign on. In case of duty is 8 hrs or more, then 8 hrs rest to be given. In case of short trips of less than or equal to 5 hours then duty performed plus one hour will be sufficient.

9. Minimum home station rest should be

(a) If duty performed in the last trip is less than 8 hours., then 12 hours.

(b) If duty is 8 hours. or more, then 16 hours.

(c) If staff is required to work train less then stipulated rest then breach of rest allowance is payable to running staff.

10. Link having the maximum earning kilometerage to be worked by senior most Loco Pilots and so on.

11. Separate links to be prepared for superfast trains such as Rajdhani / Shatabdi Exp., late running trains should be kept in mind to avoid link failures.

22.03: Points to be kept in view while preparing Locomotive links

1. Loco/Power links are prepared by HQ 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. Loco link to be prepared in such a manner that at the end of the stipulated period Loco to be worked back towards nominated shed for schedule servicing.

5. Idling of Loco at outstation to pick up link to be kept at minimum.

6. All Loco in the link are in good fettle to maintain the Link timings.

22.04: Power Requirement (Power plan)

1. To be prepared once in a year.

2. Average No. of trains run on each section per day and Average hours on road for last one year duly signed by Sr.DME(P) and Sr.DOM to be prepared.

3. Formula: Section wise average freight POL (Power On Line) for the last one year 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 Loco's which remain in outage but not added in POL for the purpose of calculation of average kilometers to be added in the

bare requirement.

6. To arrive total POL last one year average POL of shunting Loco Link WDS-6 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 one Loco as overlap against six Locos. Add 10% for major repairs.
9. Kms formula: Total kms earned on the Average per day during last one year divided by average Loco utilization.

22.05: Loco maintenance schedule

(I) & (II) 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), Railway Board letter No. 2006/Elect(TRS)/138/1, dated 13.11.2006

Maintenance schedule	Periodicity	Duration
Trip Inspection(TI)	After 3000 kms or one trip, whichever is later	2 hrs
IA	40 + 3days.	4 hrs
IB	80 + 3days	6 hrs
IC	120 + 3days	8 hrs
AOH	12 months + 15 days	6 days
IOH	36 months + 1 month or 4(6 lakhs for wAP-1/4 loco) lakh kms. whichever is earlier .	9 days
POH	6 years+ 3 months or 8 lakhs kms. (12 lakh for WP-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

(iii) 3-Ph.ABB Locomotives

(Railway Board Letter No.97/Elect (TRS)/440/18/44 (3Ph, dated 23.02.07)

Coaching Locos (WAP5/WAP7 Locos)

Maintenance schedule	Periodicity	Duration
Trip Inspection	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 working days
IOH	4.5 years + 6 months or 12 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)

Maintenance Schedule	Periodicity	Duration
Trip Inspection	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 day

DIESEL LOCO SCHEDULE & DURATION

Schedule	WDM2	WDM3A/B/C/D	WDM3A/B/C/D (30 days)	WDG3A	WDG3A (30 days)	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

ELECTRIC LOCOMOTIVE FEATURES

S.No.	Description	WAM4	WAP1	WAP4	WAP5	WAP6	WAP7	WAG5 A/B	WAG5 HA/HB	WAG6	WAG7	WAG9	WAG9 H	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	TA-O659	TA-O659	TA-O659	6FXA-7059	HS-15250A	6FRA-6068	TAO-659	HS-15250A	ASEA-L3M450-2	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

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22.06: Details of Brake Power certificate

DETAILS OF BRAKE POWER CERTIFICATE

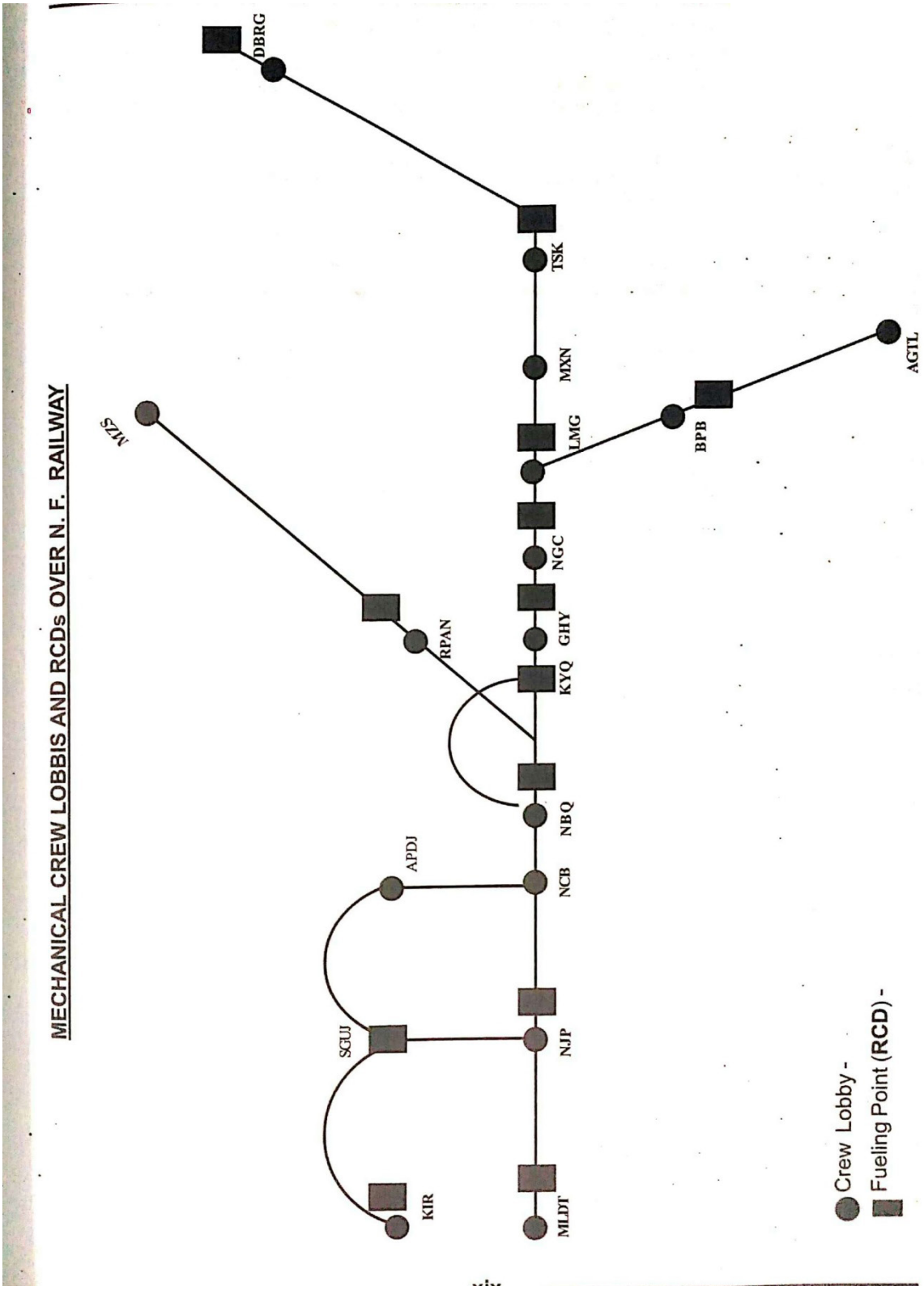
S.No	Type of train	Validity	Brake Power%		Conditions for invalid BPC & Other instructions
			Originating station	En-route station	
1	Ordinary End to End Rakes Vacuum brake rake, Air braker rake other than Premium	Examination-Loading-Unloading-Examination, ie., one time loading	85-Vacuum brake stock 90-Air brake stock	75	The BPC will become invalid, if - i) No destination mentioned on the BPC of Loaded train ii) Empty rake does not reach loading point within 04 days (for Vacuum brake stock) iii) Train composition is changed by 10FWUs or Four 8 wheeled wagons or more iv) Train is stabled more than 24 hours in examination yard.
2	Premium Air brake Rakes VOXN, 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 - i) Rake integrity is disturbed by more than Four 8 - wheeled wagons ii) Train is stabled more than 24 hours in examination yard Instructions for Premium End to End rakes: i) After lapse of 12 days, rake to be offered for examination at the first nominated intensive examination point in the direction of movement. ii) After lapse of 15 days, rake either empty or loaded shall be offered for examination at the first exam point in the direction of movement iii) Premium BPC shall be issued from the nominated "A" category depot. iv) Normal End to End BPC shall be issued if the rake is not offered for examination in empty condition or at nominated "A" category exam point. v) After each loading/unloading, the rake shall be subjected to GDR check
3	Close 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 whichever is earlier. C..Rly. does not have such rakes	100	90	The BPC will become invalid, if - i) Rake is not running in nominated circuit. ii) Rake is stabled more than 4 hrs at examination station. iii) Rake has completed either stipulated Kms or days iv) More than 4 wagons are replaed between two Periodical Maintenance Examination ie., PME Instructions for Premium CC rakes: i) Rake shall be offered at its Nominated "A" category base depot ii) Rake shall be formed off POH/ROH wagons only iii) After each loading/unloading, the rake shall be subjected to GDR check iv) BPC shall be revalidated by C&W staff wherever TXR staff is provided v) Wagons to be attached shall be good examined wagons.
4	Container rakes BLCA+BLCB	6000 kms/0 days Circuits - TKD - JNPT-DADRI/TKD-JNPT/TKD/AQ depot run on fre4e circuit basis	100	90	The BPC will become invalid, if - j) Rake has completed either Stipulated Kms or days. ii) Rake is not running in nominated circuit Instructions for Container rakes: iii) Rake integrity is to be maintained iv) Revalidation of BPC by TXR staff after every unloading/loading v) Rake shall be formed from New wagons or Off POH/ROH wagons vi) Utilization of wagons in 6000 kms. Rake - New wagons up to 12 months/Off POH/ROH wagons up to 09 months.

22.07: Various Machines used for Track Maintenance

Various Machines used for Track Maintenance

S. No	Type of Track Machines	Purpose of Deployment	Deliverables	Minimum Stipulated Block Period				Maximum Stipulated	
				To & fro time (in*)	Setting & winding up time (in*)	Working time	Total	Output/Effectivehour (new m/c)	Minimum Ty. Speed Restriction, if any.
1	09-3X	Plain Track Tamping	It corrects track geometry i.e. alignment, twist, cross level, longitudinal level and pack ballast under sleepers. This machine can pack three sleepers at a time.	15	10	3:35	4:00	1.6Km	Nil, except in summer with 50 kmph, if not followed by DTS
2	CSM	Plain Track Tamping	DO. But can pack two sleepers at a time.	15	10	3:35	4:00	1.2 Km	do
3	UNO	Plain Track Tamping	DO. Generally deployed at work site. But can pack one sleeper at a time.	15	10	3:35	4:00	0.5km	do
4	DUO (0)	Plain Track Tamping	DO. Generally deployed at work site. But can pack two sleepers at a time	15	10	3:35	4:00	0.8km	do
5	WST	Plain Track Tamping		15	10	3:35	4:00	0.8 km	do
6	BCM	Ballast screening of Plain & Turnout Track	It screens track ballast by removing muck, thus, improve drainage & elasticity of track for safe & comfortable running	30 as 3 m/c go in block	40	2:50	4:00	0.2km	20kmph or 40kmph if DTS+ TTM deployed behind it & stipulated safety instructions followed.
7	FRM	Shoulder Ballast Cleaning	It is used to carry out cleaning of shoulder ballast by removing muck, drainage of track and elasticity improving of ballast bed.	30	30	3:00	4:00	0.4km	Nil, except in summer with 50 kmph if not followed by DTS
8	UNI	Turnout packing	It corrects turnout track geometry i.e. alignment, twist, cross level, 1ongitudinal level and pack ballast under sleepers	15	10	3:35	4:00	1 T/Out	Nil
9	DGS	Consolidation of newly tamped track	It build up lateral resistance & consolidation of track faster and helps to relax speed restriction early	15	10	3:35	4:00	1 km	Nil
10	TRT	Laying of Track	It is a fully mechanized system of complete Track Renewal	40	50	2:30	4:00	0.36km	30kmph or 40 kmph if DGS deployed and ballasting, rail joints are done as per IRPWM
11	PQRS	Laying of Track	It is a semi mechanised system of track renewal wherein pre fabricated rail panels are laid and existing panels removed with minimum labour	25	20	3:15	4:00	0.24km	20kmph
12	T-28	Turnout Replacement Machine	It is a fully mechanised system of complete turnout with minimum manual labour	10	10	2:40	4:00	1Turnout per 4 hour	20 Kmph
13	UIV	Utility Vehicle	It is a mechanized system of transporting heavy material like rail, sleepers, etc, from one station to another in traffic block.	15	10	2:45	4:00	50 rails per hour in one BFR	Nil
14	BRM	Ballast Regulating Machine	It is a mechanized system of track ballast equalization, regulatation and profiling.	20	20	3:20	4:00	2km	Nil

*As per Board's Joint Ciruclar.


MECHANICAL CREW LOBBIS AND RCDs OVER N. F. RAILWAY
DBRG
TSK
MXN
LMG
NGC
GHY
KYQ
NBQ
NCB
NJP
MLDT
MZS
RPAN
APDJ
SGUJ
KIR
BPB
AGTL
Crew Lobby -
Fueling Point (RCD) -

CHAPTER-XXIII

DUTIES AND RESPONSIBILITIES OF RUNNING STAFF

23.01: Introduction: In addition to such duties and responsibility as may be entrusted to individual Running staff under the General and Subsidiary Rules and such other rules and instructions as may be in force from time to time, the following staff will also be responsible for observing the instructions contained in this chapter.

23.02: Liability for Duty: All running staff, viz Guards, Loco Pilot, Asstt. Loco Pilot, including those fostered to work a particulat train shall, when ordered by Station Master/ Yard Master/ SSE(Loco) /Shed-in-charge, report for duty without question to work any other train whether running earlier or later.

23.04: Absence from Head quarters/Out stations / residence /Running Room:

(a) Running staff should not absent themselves from their head quarters station/out stations without obtaining permission from the Station Master/Yard Master or SSE(Loco)/Shed-in charge as the case may be.

(b) When leaving their residence or running rooms, they shall leave word as to where they may be found, it required.

(c) In granting permission as referred to in para (a) above, the Station Master/Yard Master or SSE(Loco) shed In-Charge shall obtain concurrence of the Controller or the Power Controller on duty, as the case may be.

23.05: Booking of Running staff

(a) All Guards will be booked for duty by the station Master/Yard Master, and the Loco Pilot, Assistant Loco Pilot by the SSE(Loco)/Shed-in-charge.

The running staff shall as far as possible, be booked for duty on the principle of “First in”, “First out”, due respect being paid to the class of trains, for which they are qualified to work.

In the case of fixed links they will work trains according to such Link.

(b) When a running staff is to be sent spare by a train, the staff due ‘out’ first shall be booked to work the train, and the staff next for duty will be booked as spare.

On arrival at destination the staff arriving “as spare” shall be considered first for duty and the staff who worked the train shall be considered second for duty.

In case of two running staff arriving with their trains at the same time, the one who has been for the shorter period on duty, should be booked out before the other.

(c) Staff of the general roster returning from privilege or sick leaves, shall be booked out with first train after midnight following the date on which their leave expires. The names of staff of the same roster returning from the 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.

(d) Staff of the permanent link, on returning from any leave, shall be booked to work the first train of his link that is being worked by non-link staff even when the non-link staff is from

the reserved list. In case of two or more trains being worked by non-link staff on that day, the permanent link staff shall replace the Junior most man. Ultimately the junior staff among those temporary put on higher link will be withdrawn.

(e) In booking the running staff general instructions regarding the hours of work and period of rest of the running staff shall be kept in view

23.06: Change in booking-

(a) Running staff shall not exchange their duties without obtaining written permission from the competent official in charge.

(b) Should a member of the running staff fail to report for duty in time or be taken ill after being booked, the concerned official in charge shall send for the man next in turn for duty according to the roster and recast the roster.

(c) At station where Station Duty Guards are posted, they shall assist the Station Master/ Yard Master and carry out any instructions they may receive from the competent official incharge. The Station Duty Guard shall be prepared to go out with a train immediately should circumstances necessitate his being ordered out.

(d) When a roster has to be recast all concerned must be advised in good time of the revised booking.

(e) Running staff may be directed to work by any train irrespective of direction during their duty hours enroute.

(f) Running staff may be directed to perform shunting duty at wayside station whenever required by Railway Administration during their duty hours enroute.

23.07: Duty Roster and Duty Lists-

(a) Duty roster shall be maintained at Guards headquarters stations/ out stations and at each running shed where the concerned running shed where the concerned running staff on arrival with their trains shall sign their names with time of arrival

(b) Fixed links of Guards, Loco Pilot, Asstt. Loco Pilot working trains according to such links as prescribed by the DRM, shall be displayed in the Station Master/Yard Masters office/ Loco shed and Running Rooms. Any temporary change in the fixed links shall be notified to the concerned running staff by the Station Master or Yard Master or SSE(Loco) or Shed in-charge, as the case may be .

23.08 : Notice of Sickness:

(a) When a running staff who through sickness finds himself unable to go out with a train for which he has been booked, shall give the station Master/Yard Master/SSE(Loco)/shed-in-charge to enable a relief being arranged.

(b) Running staff absenting themselves from duty without leave or without giving notice of sickness three hours before, shall be marked absent and dealt with accordingly.

23.09: Duty Hours of Running staff

1. Total duty hours at a stretch from ‘sign on’ to ‘sign off’ for the running staff should not exceed 11 hours.

2. Running duty at stretch should not ordinarily exceed 9 hours. Such duty extend further provided the Railway administration gives at least 2 hours notice before the expiry of 9 hours to the crew that they would be required to perform running duty beyond 9 hours, with the stipulation that the total duty from 'sign on' to 'sign off' shall not exceed 11 hours.
3. In case of train does not reach the destination , normal crew changing point of the point where the reliever has been arranged, within the overall limit of 11 hours, and such a point is approximately one hour journey away, the Running staff shall be required to work to that point provided the maximum hours in that trip does not exceed 12 hours.
4. For Loco Pilots of all Mail/Express trains, the running duty (for the purpose of preparation of Link only) should not exceed 8 hours. However P&C time shall not be included within 8 hours.
5. The above provision for running duty hours and total duty hours shall be applicable to all Running staff including Loco Pilots(Mail/Express), Loco Pilot (passenger), Loco Pilots(Freight), motormen and Guards except wherever stated otherwise.
6. Subject to exigencies of service, Headquarter rest of all Running staff will be 16 hours irrespective of the duration of their incoming trip. Further, in exigencies of service, the existing provision will continue to be the minimum condition.
7. In respect of Loco Pilots (Shunting) who are presently working on fixed roster basis, the existing provisions will continue.
8. In severe Operational exigencies like acts of God, earthquakes, accident, floods, agitations and equipment failure etc, the controller should suitably advise the staff that they may be required to work beyond the limits prescribed.
9. Subject to exigencies of service, a maximum limit of 125 duty hours per fortnight should be laid down for all Running staff.
10. The limit of stay away from Head quarters for Running staff should be fixed at 72 hours.
11. Continuous night duty for Running staff should be limited to 4 nights with fourth night towards headquarters.
12. Call notice period should continue to be part of the headquarter/outstation rest.
13. Min. out of station rest in case 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 hrs. will be sufficient.
14. Min. no. 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.
15. The existing provisions of the Railway Act, 1989 and Railway Servants (Hours of work & Period of Rest) Rules, 2005, other than these mentioned above, will continue to be in vogue.

23.10: Guards and Loco Pilots to examine circulars, notices, Gazettes etc.

(a) Every Guard and Loco Pilot before starting with train on each occasion, shall examine and make themselves thoroughly acquitted with all circulars, notices , instructions, Gazettes

etc. filed on the Guard/Loco Pilot order files or displayed on the notice board. They must ascertain there form whether there is anything requiring their special attention on that section over which they have to work. They shall particularly note the traffic working order, caution orders and advices of defective signals inforce affecting the running of train in the section.

(b) If a Guard or Loco Pilot does not understand any order/instruction issued to him, he shall at once refer to the Station Master/Yard Master /SSE(Loco)/ Shed Incharge, as the case may be for clarification or for any other information he may require.

23.11: Taking spirituous or fermented liquor on duty-

The running staff when on duty and within 8 hours before coming to duty should not take any alcoholic drink, sedative. narcotic, stimulant drug or preparation. If he is found in a state of intoxication while on duty, he shall be liable to severe disciplinary action which may extend even to dismissal from service Also connect GR 2 09 and SRs thereunder.

23.12: Medical Aid to injured passengers-

It is the duty of the Guard of a train to render first aid to any injured passenger (s). Ticket number, compartment number, whereabouts of the passengers and other necessary particulars shall be noted in the Guard's journal.

23.13: Walking on foot-boards or passing over carriage roofs-

The Guards are forbidden to pass over the carriage roofs or to stand or walk on the foot-boards of carriage in motion.

23.14: Learning Road Certificate-

(a) No Loco Pilot, or Assistant Loco Pilot or shunter passed Loco Pilot or 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.

(b) A Loco Pilot/Shunter passed Loco Pilot/ Assistant Loco Pilot who has become unfamiliar with the road due to his absence for a period of more than three months from the section concerned, shall 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 shall be given learning duty to refresh his knowledge of the road. (see GR 3. 78 and SRs thereunder).

(c) SSE(Loco) concerned shall take assurance from the Loco Pilot/Assistant Loco Pilot passed Loco Pilot/Assistant Loco Pilot, as a token of their learning the road.

23.15: Competency Certificate-

(a) No Loco Pilot/Guards/Assistant Loco Pilot shall be allowed to work a train unless he holds a valid competency certificate.

(b) Officers and inspecting officials of the operating, safety, Electrical and Mechanical Departments will Frequently test check the competency certificates during their Foot plate and Loco shed inspections to ensure that all Loco Pilot/Guards/Assistant Loco Pilot working trains have with them valid certificates.

23.16: Documents to be prepared for a train-

The following are the documents in use for the class of train-

(a) Guard's Rough Journal Book (For all classes of trains)

(b) Vehicle Guidance-cum-General Train Report on the prescribed forms. (For all trains)

(c) Guards Through Report on the prescribed form.

(d) Statistical Train Report on the prescribed form, (For all trains)

(e) Any other documents which may be prescribed by special instructions in respect of particular trains or particular circumstances.

23.17: Carriage of Passengers in Brakevan-

(a)No person other than Guard In-charge of the train on duty is permitted to travel in the brakevan of any train with the following exception-

(i) Railway servants travelling on duty with passes are permitted to travel in the Brakevan of any train provided their duty passes bear specific endorsements to this effect.

(ii) Holders of Metal passes are permitted to travel in the Brakevan if travelling on duty,

(iii) The staff desirous of travelling in the Brakevan inform the Guard before entering the Brakevan and obtain his permission.

(b)Passengers may be allowed to travel in the Brakevan of Goods trains in very exceptional circumstances as indicated below-

(i) Such permission may be given only if no suitable passenger train is available.

(ii) NO lady will be permitted to travel in the brakevan of goods trains.

(iii) As a rule, permission shall not be given for travelling in the brakevan of through Goods train, except for journeys between stations where these trains normally stop

iv) If it is necessary to stop a goods train out of course for this purpose, an "Out of course' stoppage memo will be given to the Loco Pilot of the Goods train where it is required to be stopped for purpose of entrainment and/or detrainment.

v) The person should purchase a First class ticket or should in possession of a first class season ticket to cover the journey involved. He should also execute an Indemnity Bond,which should be prescribed by the Law Officer.

(vi) The station Master on duty should give him a Certificate of emergency at the station from which he wishes to entrain, as under:-

Certificate of Emergency

…… is authorized to travel in the brakevan of goods train No…..from to……on . …… He holds first class ticket/First class Pass No…… station …….

Date …… Station Master

(vii) The certificate of emergency and the first class ticket season ticket should be shown to the Guard of the Goods train and both should be surrendered to the Station Master at the destination station.

(viii) In the case of Members of Parliament, same procedure will apply except that instead of the ticket, first class pass cum identity card issued to the members will be sufficient The members of parliament will give the usual journey voucher at the destination.

(ix) The number of persons permitted to travel in the Brakevan in addition to the Guard should not exceed five.

(x) The only exception that can be made in this number is when in emergent circumstances, staff of the Security service police, Repair gangs of Tele Department have to travel on duly, provided the Guard is not inconvenienced in performing his duties.

(xi) The Station Master of the station between which a person is allowed to travel in the brakevan of the Goods train will keep a record of such journey in a suitable register.

(xii) Requests for permission to travel in the brake van of a Goods train should be obtained in writing by the Station Master from the person concerned indicating the special emergent circumstances warranting this facilities.

(xiii) On Controlled Section, the Station Master shall obtain the prior sanction of the Deputy Controller on duty before giving permission to travel in the brakevan of the goods train.

(xiv) On non-controlled section, the Station Master on duty may himself grant such permission.

23.18: Additional duties of Guards while working a train-

Besides the provision of the General Rule 4. 34/4. 35 and the Subsidiary Rules thereto, the Guard in-charge of a train shall also be responsible to satisfy himself in regard to the following, and when any defect or deficiency in the train is noticed. It must be immediately brought to the notice of station master/yard Master and rectified before starting the train.

(a) Goods train-

While examining the train, the Guard should walk from Brakevan to the Engine on one side of the train and return to the Brakevan examining the other side of the train. He shall pay special attention to the following-

(i) That the hand brake of the brakevan is in working order, the brake blocks should be adjusted if they do not act property,

(ii) That the Brakevan equipment is complete, and that the last vehicle has a tail lamp (lit & unlit). (see also S R 4. 16/1),

(iii) That the couplings are properly tightened up and also the couplings not in use are resting on the hooks and not allowed to drag on the ballast,

(iv) That the entries in the vehicle guidance tally with the wagon on the train,

(v) That the wagon brakes are ‘off’ and the brake levers are on their hangers,

(vi) That the doors including side and end doors of all the stock, loaded or empty, are properly closed and well secured and do not swing out,

(vii) That fittings and equipment on open trucks are complete and loose fittings such as, chains,

stanchions, ropes etc. are secured,

(viii) That the wagons shown as empty in the vehicle guidance are really empty,

(ix) That in case of covered loaded wagons, the seal label on each side is intact and that the wagons required to be rivetted are actually rivetted on each side.

(x) That in the case of open loaded wagons which are sheeted, the sheets and ropes are firmly secured and that the knots on the lashes are sealed and the seals are intact. In case open loaded wagons are not sheeted, that the check line on the goods are intact,

(xi) That heavy loads are securely fastend and that fastenings on trucks loaded with girders, machinery, long timbers etc. have not slackened or the loads shifted. If the load on any truck has shifted, it must be re-adjusted, re-secured and the wagon certified fit to run before the train is allowed to proceed or else the truck shall be detached,

(xii) That a wagon does not appear to be overloaded or unevenly loaded as far as can be judged by visual observation,

(xiii) That the train is correctly marshaled and the vehicles which are required to be separated from the engine, brake van or from each other are attached correctly in accordance with the rules.

(xiv) That total number of vehicles and gross load of train do not exceed

The maximum prescribed for the section and the class of engine working the train.

(xviii) That if wastage of contents of bags of grain, seeds etc is noticed through crevices of wagon doors, and floors the Guard must immediately bring such cases to the notice of the Station Master/Yard Master on duty and Railway protection Force staff, if available, and take steps to stop further wastage.

(xix) That the tanks or wagons containing petroleum and other inflammable articles are properly marshalled as per rules inforce, and also that there is no leakage of the contents and a certificate has been issued by the train examining staff in this regard. In case of any leakage, bring it to the notice of train examining staff/station Master/Yard Master immediately and see that necessary steps have been taken to prevent further leakage or the tank/wagon detached if circumstances warrent.

Note :-Smoking or taking or having any fire naked light, matches, or other articles of inflammable nature or any agency which produces or sparks, near any vehicle containing petroleum or other inflammable articles or near any place where such goods are stored or are being loaded unloaded or handled is STRICTLY PROHIBITED.

(b) Passenger Train-

In addition to such items as are given under sub-para (a) above

which may apply to passenger train also, the Guard while working

a passenger train shall also-

(i) Be civil and obliging to the public at all times and when advising passengers, not to infringe any safety rules of the railway. He shall do so politely and give his name when asked for,

(ii) Ensure that a copy of Reservation list is available when this duty is not specially assigned

to other staff. such as Train Conductor or Travelling Ticket Examiner on the train.

(iii) During journey, look after the safety and comfort of Passengers, more particularly of women and children, and assist them when getting in and getting out (see also General Rule 2 10 & SR thereto).

(iv) Attended to complaints of passengers regarding cleanliness of carriages, water supply in Lavatory cisterns. lights and fans and any other complaints and have them rectified, if possible.

(v) Make it a practice of walking along his train at stations to see if passengers want any assistance or information and keep a careful look out for irregularities if any,

(vi) Taking charge of his train must carefully check all way Bill, luggage luggage, Parcels, covers, cash bags etc.

23.19: Disposal of equipment on retirement or transfer on or when leaving service-

(a) When a member of the Running staff is sent to another division either on loan or on transfer for short period or is put on some other duty temporarily in the same division, he shall retain his equipment,

(b) When, however, a Running staff retires, leaves job or is permanently transferred from the list of running staff to any other duty, he must make over his personal equipments to his Station Master/Yard Master/SSE(Loco) “shed-in-charge, as the case may be. Rules books are the property of the Administration and shall be returned to the office concerned by the holder on his leaving the service. Last supply of the uniform should also be returned to the office concerned arid a certificate to this effect must be obtained.

CHAPTER-XXIV

FIRE FIGHTING

24.01 Object :

Safety against fire hazards of passengers and goods entrusted to the Railway is of the utmost importance and Railway staff should ensure that all precautions are taken to avoid losses caused by fire.

The instructions given below are issued for general guidance of all Traffic Staff. They must make themselves thoroughly familiar and act whenever necessary in accordance with those instructions. GR 6.10and SRs thereto already have brief about 'Fire in railway premises and trains'.

24.02 About Fire:

A fire requires three basic components

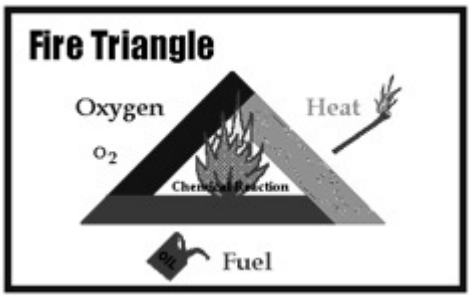
i) Enough oxygen to sustain combustion,

ii) Enough heat to raise the material to its ignition temperature,

iii) Some sort of fuel or combustible material

Oxygen, heat, and fuel are referred to as the 'fire triangle'. To control the fire, at least one of them must be removed. Essentially, fire extinguishers put out fire by taking away one or more elements of the fire triangle. Fire safety, at its most basic, is based on the principle of keeping fuel sources and ignition sources separate.

24.03: Fire Triangle



1. Air (Oxygen) : If air is removed, the fire will suffocate because of lack of oxygen and put off. Water-based foam sprayed on to the fire will act as a blanket between the fire and the air. Similarly, a layer of dirt shovelled onto the fire will act as a blanket. The removal of air from a fire is a form of attack that is normally limited to small or easily accessible fires.

2. Heat : The removal of heat or the cooling of a fire is the most common form of suppression. In most cases water is used to essentially soak up the heat generated by the fire. This heat turns the water into steam, thereby robbing the fire of the heat used. Without energy in the form of heat the fire cannot heat unburnt fuels to ignition temperature and the fire will eventually go out. In addition, the water can act to smother the flames and suffocate the fire. Chemicals can be added to water to improve the heat removal properties of water, or to improve the ability of the water to stick to unburnt fuel.

3. Fuel : If fuel is removed, the fire will starve and be extinguished. In railways, physical removal of combustible things away from fire will help to put off the fire.

24.04 Classification of Fire :

Not all fuels are the same, and if wrong type of fire extinguisher is used on the wrong type of fuel, it will worsen the situation. Different fuels create different fires and require different type of fire extinguishing agents. It is therefore very important to understand the four different classifications of fire.

(a) CLASS A: Class A fires involve common combustibles such as wood, paper, cloth, rubber, trashand plastics where cooling, blanketing, or wetting extinguishing agent is needed. They are common in typical commercial and home settings, but can occur anywhere these types of materials are found.

(b) CLASS B: Class B fires involve flammable liquids, gases, solvents, oil, gasoline, paint, lacquers, tars and other synthetic or oil-based products. Class B fires often spread rapidly and, unless properly secured, can reflash after the flames are extinguished. Extinguishers for this type of fire include carbon dioxide, dry chemical and halogenated agent types.

(c) CLASS C: Class C fires involve energized electrical equipment, such as wiring, controls, motors, data processing panels or appliances where a non conducting gaseous clean agent or smothering agent is needed to put off the fire. They can be caused by a spark, power surge or short circuit and typically occur in locations that are difficult to reach and see. The most common type of extinguisher for this class is a carbon dioxide extinguisher.

(d) CLASS D: Class D fires involve combustible metals such as Magnesium, sodium, Potassium, titanium, aluminum, etc. Combustible metal fires are unique industrial hazards which require special dry powder agents. Special dry powder extinguishing agents are required for this class of fire.

(e) CLASS K: Class K fires involve combustible cooking media such as oils, fats, grease, etc., commonly found in commercial kitchens. The new cooking media formulations used for commercial food preparation require a special wet chemical extinguishing agent that is specially suited for extinguishing and suppressing these extremely hot fires that have the ability to reflash. A wet potassium acetate, low pH-based agent is used to put off this class of fire.

24.05: Types of Fire Extinguishers:

It is important to use the correct fire extinguisher for the type of fuel. Using the incorrect agent can allow the fire to reignite after apparently being extinguished successfully. Some type of fire extinguishing agents can be used on more than one class of fire. Most fire extinguishers will have a pictograph label telling you which fuels the extinguisher is designed to fight.

(a) FOAM (AFFF) : AFFF(Aqueous Film Forming Foam) fire extinguishers extinguish the fire by taking away the heat element of the fire triangle. Foam agents also separate the oxygen element from the other elements. Foam extinguishers can be used on class A & B fires only. They are not for use on Class C fire due to the shock hazard.

(b) CARBON DIOXIDE (CO_2) : CO_2 Fire Extinguishers extinguish the fire by taking away the oxygen element of the fire triangle and also by removing the heat with a very cold discharge. CO_2 can beused on Class B and C fires. They are usually ineffective on class A Fires.

(c) DRY CHEMICAL POWDER (DCP) : Dry chemical fire extinguisher extinguish the fire primarily by interrupting the chemical reaction of the fire triangle. Today's most widely used

type of fire extinguisher is the multipurpose dry chemical that is effective on Class A, B and C Fires. This agent also works by creating a barrier between the oxygen element and the fuel element on Class A Fires.

NOTE : Please note that difference between the dry chemical extinguishers and dry powder extinguishers is that the Dry powder extinguishant will cake and form an exterior crust when heated by the fire. The crust formed will exclude air from the chemical reaction, resulting in extinguishment of the fire, and dissipating heat. A regular dry chemical extinguisher will simply blanket the burning material, interrupting the chemical reaction at the fuel's surface.

24.06: How to use Dry Chemical Powder Type (DCP) Fire Extinguisher :

These are commonly used extinguishers in railways. These types are suitable for tackling petroleum, gas, electrical fire and controlling fires of textile fibers. Sodium based chemical powder is used on a fire which undergoes chemical reaction.

How To Use :

(i) Carry to the place of fire and keep it up right.

(ii) Remove the safety clip.

(iii) Strike/Press the knob located in the cap.

(iv) Sealing disk of the gas cartridge gets broken and allows carbon dioxide gas to escape to the main shell and powder is pushed out.

(v) Direct the stream of the powder at the base of the flame.

(vi) For effective result, stand at about 1.5 to 2.5 m. away from the centre of the fire.

(vii) Move forward while moving the nozzle rapidly from side to side in sweeping motion.

(viii) When using on outdoor fires operate from the up wind side for effective spray.

24.07: Provision of Fire Extinguishing Equipment :

At places where mobile units are not provided but only simple firefighting equipments such as hydrants, fire extinguishers and fire buckets are provided, normally the following is the minimum quota of fire buckets, drums and fire extinguishers to be kept at stations :

SN	Description	Fire bucket 11 to 14 ltrs. round bottom	Minimum Fire Extinguishers
1	Small stations and RRI cabins	6	2
2	Central SS office	-	2
3	Flag Stations	-	2
4	Goods shed	6	2
5	Parcel Office	6	2
6	Electric/Diesel loco	-	04 (2 in each cab)
7	Brakevan	-	2
8	AC Coaches	-	2

9	Pantry Car	-	4
10	Motorman cabin of EMU/DMU/MEMU	-	2
11	RMS Van	-	2
12	Inspection Carriage	-	2
13	Each Generator Car	-	4

(i) The ratio of water and sand buckets should be 1:1.

(ii) The fire buckets should be secured by stand with chain and lock. The buckets should be Covered to protect from sunlight and rain.

(iii) Sand should be in dry condition and sand should be replaced as and when it becomes wet. Water should be replaced on every Monday.

(iv) SSE(C&W) of the base depot of the rake is responsible for providing fire extinguisher and to ensure its timely maintenance in all cases except at station/RRI cabin/Central SS office/ Goods shed/Parcel office where it is the responsibility of SS/SM incharge.

24.08 Fire Alarms :

A proper fire alarm is the quickest means to warn staff about the outbreak of fire. Now-a-days, smoke detecting alarms are being provided in trains and offices to alert the staff. Where accident hooter/siren is provided, this may be used to sound continuously for 5 minutes to alert the staff. At stations where such alarms are not provided, on noticing a fire, the station bell to be rung or sounded at once continuously for 5 minutes.

22.09: Fire Prevention in Railway Premises :

Most fires are caused primarily due to negligence in one form or the other. If not detected andextinguished in the initial stage, they may result in heavy loss of life and 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 its early stage by making proper use of first aid fire fighting appliances provided. Some important precautions against fire which should be kept in mind and observed, are given below :

(i) Smoking or lighting a flame in railway premises and in trains is prohibited which should be strictly followed.

(ii) Places of work should be kept clean and free from waste paper cuttings, scraps, rubbish etc.

(iii) Dustbins must be provided for throwing scraps and combustible waste materials and these should be kept at a safe distance from the building.

(iv) Over loading of electric circuit should be avoided and electrical installation should be checked periodically.

(v) Petrol, paints, explosive materials and gases should not be kept in stores and godown which do not confirm to the standard specification for such storage as specified in IRCA Red Tariff No. 20.

(vi) Rules for marshalling and shunting of inflammable, explosives and other dangerous goods as laid down in this Manual and Red Tariff No. 20 should be strictly observed.

(vii) Supervisory staff should ensure that staff working under them are conscious of fire hazards. Circulars and standing orders issued from time to time on this subject are got noted by all the staff and strictly followed.

(viii) Updated telephone numbers of available fire brigades nearby should be displayed outside the SM office. Correctness of telephone numbers should be frequently checked.

(ix) Smoke alarms/detectors should be provided in big offices.

(x) Fire fighting appliances should be kept in places easily accessible and the staff must know the location where the fire appliances like hydrant hose-pipe, extinguishers, buckets, etc are installed. Further, fire fighting appliances should be periodically checked.

(xi) The Station Master and Supervisors concerned shall see that adequate number of water buckets and sand buckets are properly kept filled with water and sand respectively. These buckets should be replaced immediately in case of any damage.

(xii) Water supply points should be inspected twice in a month by the SSE/SE/JE(Works).

(xiii) Fire drills are to be conducted with all staff once in a month.

24.10: Action to be taken in Case of Fire in Railway Premises:

(i) Any Staff whether on or off duty noticing fire shall —

(a) Raise the fire alarm immediately as prescribed in para no.24.08

(b) Take all possible action to extinguish the fire without any loss of time.

(c) Use the available fire extinguishing appliances properly and promptly.

(d) Inform the control of Railway Fire Brigade, City Fire Brigades, Civil Police, RPF Control/Post giving them in brief the correct location of fire and also the material involved, if possible.

(ii) In addition to above, immediate information should also be given to concerned Railway officials of the department whose property is involved in the fire.

(iii) The senior most railway official present at the site of fire, shall see that every action is being taken to extinguish fire to prevent theft and other miscreant activities. RPF/ Police official present at the site of fire will be responsible to guard the property during the occurrence and after. The senior most fire fighting official present at the site of fire, will ensure proper utilisation of the Fire fighting facilities.

(iv) Rescue anyone in danger and send the injured immediately to the nearest hospital, save documents and property from being gutted.

(v) As far as practicable, the documents and all moveable property adjacent to the fire should be removed to a safer place under the direction of the responsible staff of the department concerned. A list of the property/ documents so removed should be prepared in duplicate.

(vi) In case of fire in a sealed wagon, the seals, locks/rivets should be immediately broken (in absence of key of the lock) and the door opened in presence of Station Master/Yard Master/Goods Supervisor/ Goods Clerk as the case may be or in presence of Guard when fire on a wagon is in mid-section.

(vii) 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.

(viii) Keep the doors and windows of the room, coach wagon etc. closed till such time fire appliances are ready for use on fire or till the time of arrival of fire brigade. Keep the gates open and road free from obstructions for easy access of fire brigade engines.

(ix) Push away coaches and wagons and remove other combustible materials, if any, from the vicinity of fire in order to check its spread and all shunting movement in the vicinity of the affected area should be stopped.

(x) 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 nearest water or hydrant. 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.

(xi) 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 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 on the fire.

(xii) Cause of fire should be investigated and ascertained without delay and any material, clue found or detected must be preserved, if sabotage is suspected.

24.11: Fire in Trains and Locomotives :

Fire on a running train is more disastrous than on a stationary one, since wind helps spreading of the fire to other coaches/wagons. Moreover, passengers sometime jump out of a running train on fire resulting in increased casualties.

(a) Main causes and sources of fire in trains :

(i) Carrying stoves, sigris, gas cylinders, kerosene oil, petrol, fireworks, acid, etc. in passenger compartments and booking of motor vehicles without completely decanting petrol/diesel.

(ii) Making fire/using fire near paper, wood, petrol or such other inflammable articles.

(iii) Lighted match sticks, cigarette ends carelessly thrown.

(iv) Short circuit in electrical wirings.

(b) How to prevent fire accidents in trains :

(i) Provision of highly-sophisticated VESDA (Very Early Smoke Detection Apparatus) fire and smoke detection system in all coaches will help to avoid fire accidents. It can sense carbon monoxide easily once a fire breaks out inside a bogie.

(ii) Installation of fire-retardant cables and a multi-tier electrical protection system bogies will prevent sudden fire caused due to electrical snags.

(iii) Installation of fire barrier and thermic lock in vestibuled doors of LHB(Linke Holfmann Busch) will help to prevent or check spread of fire.

(iv) Installation of sprinklers in pantry and power cars will help to prevent fires.

(v) Do not allow to carry inflammable/Combustible articles like petrol, kerosene oil, diesel, films,fireworks, gas cylinders etc., in train.

(vi) Do not allow to light a cigarette in trains. Smoking is already prohibited in trains and stations.

(vii) Do not allow to block the pathways in coaches with heavy luggage which restricts exit of passengers from coach in case of fire.

(viii) Do not allow selling of food items using cigars/stoves by vendors. If detected stringent penalty to be imposed.

(ix) A minimum gap of 6 inches in between roof of the SLR/VP and consignment is to be maintained to pre-empt the incidence of fire due to friction as mentioned in IRCM manual.

(x) No motor vehicle should be booked without ensuring complete decanting of petrol/diesel.

(xi) Adequate and proper maintenance of electrical devices in the coaches as per laid down norms.

(xii) All electrical points provided in the coaches for laptop/mobile charging should be thoroughly checked as these are continuously used in the train journey.

(xiii) Emergency feed of electric supply from adjoining coaches should be made only in unavoidable circumstances and that too for a short period. It must be ensured that the connections for such emergency feed are properly secured. It should also be ensured that the condition and fitment of emergency feed terminals are checked both during primary and secondary maintenance.

(xiv) Proper maintenance and upkeep of electrical devices, boilers, refrigerators, burners, gas cylinders, gas manifold, exhaust fans, chimneys and wiring system in pantry cars.

(xv) Use of overload, over voltage protection devices, standard size fuses, MCBs, Earthing, etc., in coaches, pantry cars and power cars.

(c) Action to be taken in case of fire in train :

(i) LP of the train should immediately switch on his flasher light. Crew of any train coming from the opposite direction seeing flasher light should immediately control speed and proceed with caution.

(ii) In case of fire in a running train, every railway staff available on the train including TTE shall immediately try to stop the train and plunge into action to save lives and property.

(iii) Pull the Alarm Chain and stop the train immediately.

(iv) All the railway staff at site should advise the passengers to remain calm and not panic and vacate the coach only if there is actual fire. In case of double line section, passengers should be advised not to detrain on the other line to avoid being run over by train coming from the opposite direction.

(v) Evacuate passengers from burning coaches. Open the emergency windows of the coach to escape after the train is stopped. In AC coaches, hammer can be used to break the window glasses to escape from the coach. In case of vestibule coaches, it will be advisable for passengers to go to adjoining coaches through vestibules rather than get down from the affected coach on to the adjoining track, which can be dangerous.

(vi) Try and put out the fire before it becomes a big blaze by using water, blankets, fire extinguishers or by any other means.

(vii) More people expire due to suffocation from smoke rather than due to actual burning. If you

smell gas or vapour, or even in case of excessive smoke, hold a wet cloth loosely over your nose & mouth and breath through it in as normal a manner as possible.

(viii) Insist that passengers should save themselves first and not to bother about their luggage which can be retrieved later on.

(ix) Building up confidence of injured passengers by suitable advice is of great importance.

(x) Once the train is stopped, isolate the burning vehicle from other vehicle by uncoupling.

(xi) In case fire is discovered when the train is near a tank or watering station, the Guard and LP shall use their discretion to proceed there, but no such attempt shall be made until the portion of the train in rear of burning vehicle has been detached.

(xii) Inform all concerned to assist in extinguishing the fire.

(xiii) In case of fire from electrical short circuit, switch off the source.

(xiv) Once the incident is over and the train starts again the affected coach should invariably be checked at nearest C&W/Electrical maintenance point. The train should move only after proper certification about safety and if necessary competent maintenance staff should be deputed to escort the coach.

d) In the event of fire on an Electric installation:

Provision as laid down in SR.6.10/04 should be followed.

e) In the event of a fire on a Diesel Engine/DMU:

(i) The LP/Motorman shall immediately pull the circuit breaker and shut down the engine. The train shall be brought to stop at once.

(ii) The Guard shall give all possible assistance to the LP in putting out the fire.

(iii) Fire extinguishers of approved type shall be provided on each diesel locomotive and motor coach of DMU when these are turned out from the home shed. The SSE(Loco) in charge of the shed shall inspect the fire extinguishers and ensure that these are in good working condition.

f) Fire caused by Petrol or other inflammable liquids, acids or gas:

(i) Segregate the affected wagon, coach or area involved.

(ii) On opening a wagon do not enter in to it immediately. One would thus, avoid fumes, which may be dangerous.

(iii) Use foam type fire extinguishers and sand and not water or soda acid type fire extinguishers.

(iv) Do not bring naked lights near the site of fire.

(v) Warn the people living in the surrounding areas within one Km. radius.

(vi) Stay away from ends of tanks, as tanks normally burst from the ends.

(vii) Cool tanks that are exposed to flames with water from the sides only after the fire is put out.

(viii) Withdraw immediately in case of rising sound from venting safety device or any discolouration of tank due to fire.

(ix) Inform the nearest Fire Stations intimating that the fire has been caused by Petrol or any other inflammable liquids, acids or gases.

g) In case of fire due to Explosives/Inflammables/Dangerous Goods :

(i) Extinguish by closing the valve or isolating LPG feed to fire by other suitable controls.

(ii) Following steps may be taken if no undue risk is involved:

(a) Move cool cylinders to a safe place after ensuring closing of valves.

(b) Cool the hot cylinders by spraying water from a safe position. The person directing the spray should take up a position where he would be protected from possible explosion.

(iii) If cylinder containing inflammable/toxic gas develops leak during transportation, remove it to an isolated open place away from any source of ignition and advise the filler or consigner as required.

(iv) Inform the Chief Controller of Explosives by fax/telephone immediately.

(v) Inform officer in charge of nearest fire/police station.

(vi) Inform departmental officers concerned.

(vii) Pending the visit of the Chief Controller of Explosives/his representative, the wreckage and debris shall be left undisturbed except to save lives.

(viii) After getting information from the Chief Controller of Explosives that he does not wish any further investigation, the restoration work may be commenced.

24.12 Inspection of Fire Appliances :

Official-in-charge of offices, yards, sheds etc. where these appliances are provided will be responsible for the upkeep and safe custody of the fire appliances supplied to them. Following are to be ensured :

(i) To see and ensure that Fire prevention instructions issued from time to time are strictly observed.

(ii) That 'No-smoking' Notice Board are provided specially where smoking is considered dangerous.

(iii) That Notice Boards indicating current telephone numbers of the nearest Railway and City Fire Brigade are to be provided and displayed at stations, Goods Shed, Parcel Offices, yards and at other important places.

(iv) Where water tanks, barrels or buckets are provided, Station Master must see that they are always kept full of water and conveniently placed in suitable position. A little kerosene oil should also be dropped in the water to prevent breeding of mosquitoes. Water should be replaced one every Monday.

(v) The ratio of water and sand buckets is 1:1 These should be toppled or changed at least once every month. This sand should not be allowed to get wet.

(vi) That any defects, noticed in the fire appliances are attended to with least possible delay by writing to the authorities concerned. Ensure that timely inspections and checks are conducted by the authorized agent as per schedule.

(vii) The SSE/SE/JE(C&W) of the base depot of the rake is responsible for providing fire extinguishers in respective places like RMS Van, A.C. Coach, Inspection Carriage, Dining Car, etc., and to ensure its timely maintenance and filling of fire extinguishers as per schedule and their loading in brakevan of passenger carrying trains and other locations. A

record should be maintained for this purpose.

(viii) Guards of Passenger carrying trains LPs of all trains should ensure availability of fire extinguishers in Brakevans/locos. If not available, they shall report the matter in writing to the Station Master for necessary action.

(ix) Frequent checks should be conducted to ensure the efficacy and availability of adequate number of fire extinguishers as prescribed.

(x) Cases of loss or theft of the fire fighting appliances should promptly be reported to the RPF/ Inspector, Officer Incharge/RPF and GRP including the controlling authority of the respective department and the incharge will arrange to replace the same from his on hand stock or place indents to division for replacement.

(xi) Chief Civil Defence Instructor of the division should also be entrusted with the job of inspection and training of staff.

24.13: Responsibility of Maintenance of Fire Extinguishers :

The designated agent should maintain the fire extinguishers quarterly and all the extinguisher shall also be subjected to a thorough inspection at least once in a year. The annual inspection should be combined with the operational test and hydraulic pressure test. The extinguishers after inspection should be refilled immediately and the date of inspection and refilling should be indelibly marked on the extinguisher and recorded in the register of the fire extinguishers.

Sr.DME/Sr.DEE of the division who are entrusted with the job of selection of the private agency for inspection and maintenance of fire extinguishers should circulate details and address of the authorized agent for upkeep of fire extinguishers, validity of the contract, telephone numbers and frequency of inspections to be conducted by the agent as per the agreement to all places where fire extinguishers are provided to enable them to call the agent whenever necessary.

24.14: Training in Fire Fighting :

Staff attending Zonal Railway Training Institute / APDJ, should be imparted training on fire fighting through lectures and practical demonstrations.

Principal/ZRTI/APDJ shall co-ordinate with the Sr. DSO/DSO or Sr. DSC/DSC of division to requisition Civil Defence Instructors or qualified RPF staff, from the division to impart such training as per requirement.

Training centres also nominate their instructors to undergo training on fire fighting in nominated Training Centres. These trained instructors shall conduct fire-fighting training for trainees. In some cases, special classes may be held at training centres to give fire fighting training for which field supervisors should be spared positively who give training to their field staff.

For the staff, those who do not attend the Training Institute/Centres/Schools, necessary programme should be organized by concerned departments in co-ordination with Sr.DSO/DSO/ Sr.DSC/DSC from time to time.

In addition to the above training centres, all Divisional Training Centres should include ‘Fire Fighting’ as part of the curriculum to give lectures and practical demonstrations of fire fighting to all staff. Besides, necessary fire drills are to be conducted at stations, yards, sheds, offices, hospitals, etc., once in a month.

CHAPTER -XXV

AUTOMATIC AIR BRAKE SYSTEM

25.01: Principles: In Automatic air brake system, the medium is compressed air pressure. It obtains its power from the pressure differential between control reservoir pressure and brake pipe pressure. The Brake pipe is originally charged to 5 Kg/Cm2 of the compressed air.

25.02: Description:

(a) In a train composed of completely fitted or piped vehicles, the automatic air brake may be operated on every completely fitted vehicle, provided that the engine air hose pipe is coupled to the first vehicle of the train by means of air hose coupling, angle cocks opened, and that each vehicles is coupled to its neighbor in a similar manner, the rear angle cock of the last vehicle being closed and the air hose pipe placed on the air hose support.

(b) The gauges on the Engine and in the Guard's van when the train pipe is continuous indicate the air pressure available by reduction of which the train can be stopped. The gauges should show not less than the following:-

	Engine Gauge	Guard's Van Gauge
Passenger Train ...	5 Kg/cm2	4.9 g/Cm2
Goods Train....	5 Kg/Cm2	4.8 Kg/Cm2

(c) More than 5 Kg/Cm2 is not necessary and the air brake combination in the engine (e.g.Valve) should be so set that the pressure charged in the brake pipe is not more than 5 Kg/Cm2 as otherwise brake binding is likely to be experienced.

25.03: How Applied and Taken off:

(a) The Brake is applied by the engine Loco Pilot or guard by reducing the brake pipe.

(b) The first application when made by the Loco Pilots should be made sharply by reducing not less than 0.4 kg/Cm2 of air pressure initially and further reduction in steps of 0.2 Kg/cm2. The different sequence of Brake applications are minimum reduction 0.4 Kg/Cm2, service applications 0.8 to 1 Kg/Cm2 , full service application 1.5 Kg./Cm2 and emergency brake application, in which the maximum brake cylinder pressure attained in shortest period of time.

(c) In any emergency, the brake may be applied from the Guard's van or any other vehicle of the train, where an application valve is fitted (provided the brake pipe is continuous) by pressing down the valve lever, until the needle of the gauge falls to zero. The Brake is then fully applied on each fitted vehicle.

(d) Should be train on which the automatic air brake is in operation parts accidentally in the portion on which the brake is operated, the air hoses between the parted vehicles will get disconnected, and the brake will be applied, automatically on each of the fitted vehicles.

(e) The brake is released by the engine Loco Pilot by charging the air pressure by means of Loco Pilot's Brake Valve (Ag Valve) to the same conditions as existed before the application of the brake.

(f) The automatic air brake can be released on any vehicle by pulling the released lever of the distributor. The release rod need not be kept pulled till the Brake cylinder is exhausted.

(g) The Brake gear should be properly adjusted so that the brake blocks firmly grip the wheel treads in the brake applied condition, the test for which may be done by sounding the brake blocks with a hammer.

25.04: Specification:

(a) The air hose coupling between the Engine and the first vehicle and between each piped or fully braked vehicle and its neighbour must be properly connected. The rear air hose of the piped or fully Braked vehicle forming the last of the sequence from the engines must be engaged on air hose support and the angle cock closed carefully.

(b) When the air hose couplings have been connected, and the angle cocks are opened, the engine Loco Pilot must charge the required air pressure 5Kg./Cm2 and maintain it through out the journey.

(c) Examination of trains before starting should be done as per General rule 4.30,4.31,4.32,4.33 and subsidiary rules thereto.

(d) Guard and Loco Pilots shall ensure at the time of taking over charge of a train, that their trains have the prescribed minimum brake power as laid down below.

(A) For Goods Trains:

(i) For the purpose of working out of the percentage of operative pistons on trains, piped vehicle should be deemed to have in-operative cylinder/cylinders. The percentage has not been expressed in terms of vehicles or four wheeler units but only in terms of brake cylinders, since bogie wagons have two cylinders and four wheelers have one cylinder.

(ii) An active brake cylinder is one in which the air pressure can be admitted through the auxiliary reservoir when the pressure in the brake pipe is reduced by control from the engine and which, moreover, satisfies the stipulation that its piston would remain in pushed-out position for not less than 30 minutes after the air pressure in the brake pipe is reduced.

(iii) On steep gradient sections 90% of the brake cylinders must be operative.

(iv) Brake power of freight trains:-

Description -	**Originating station**
Freight trains	
a) C.C. Rakes -	100%
b) Premium End to End -	95%
c) Airbrake stock -	90%
d) Vac. Train	85%

Not less than 95% of total number of cylinders in case of C.C. rakes and 85% in case of other goods trains shall be in working condition in case of train originating/examination point. There may be however, certain amount of deterioration in the brake power while the train is on run due to wear and tear. Taking into account the practical conditions, the goods trains including C.C. rakes may be worked with 85% active cylinders enroute. For the purpose of this rules ‘piped vehicle” (i.e. fitted with trains pipes and having no vacuum cylinder or other brake fittings) should be deemed to have inoperative cylinder(s).In case, however, a Loco Pilot feels that the brake power is not upto even this level (i.e 85%), he shall suitably control the speed of the train and

work the train to the next station or next train examining station for necessary examination by train examination staff.

(v) No audible leak is permissible in the air brake system along the train.

(vi) There should be at least 4 fully air braked vehicles including brake van, with operative cylinders at the rear end of the train.

(vii) The position of Empty/Load Box handle on wagon should be placed on the appropriate position either Empty/Load, according to the loaded condition of the wagon.

(B) For Passenger Carrying Train :

(i) From an originating station the train must have all vehicles with active air brake cylinders.

(ii) At intermediate stations not more than 10% of in-operative cylinders. (Subject to maximum of 2 cylinders only) can be permitted.

(iii) When the engine is attached to the train, the Loco Pilot must see that the air hose coupling on the engine is properly connected to that on the train. Both angle cocks to be closed before detaching their hose couplings of the engine and front vehicles and air hoses are engaged on respective air hose supports.

(iv) The Loco Pilot must test the engine automatic air brake apparatus before leaving the shed. Should there by any difficulty in charging and maintaining the required air pressure, after coupling to the train, steps should be taken to locate and remedy the fault, failing which the defective vehicle should be detached without infringing safety. Loco Pilots should ensure that the specified main reservoir Pressure is maintained.

25.05: Recording and testing of air pressure indication by Guards :

(a) The Guard must record in the appropriate column in the Guard's rough journal book and Guard's train report what air pressure is indicated in the brakevan gauge every time the train starts after a halt. He will not give starting signal to the Loco Pilot unless the air pressure is registered in his gauge or unless he is authorized by a representative of Mechanical Department to start at lower air pressure than prescribed.

(b) At the first starting station and at all stations where the engine or any vehicle(s) are detached from the train or any vehicle(s) are attached to the train, before starting when the Loco Pilot has charged the air pressure, the Guard must reduce 0.5 Kg./Cm2 air pressure by operating his brake van valve observing the indication needle and then replace his valve to normal and allow the Loco Pilot to charge the remained air pressure. Without doing, the Guard must not give the starting signal to the Loco Pilot.

(c) If the indicator is not registering correct air pressure the fact must be brought to the notice of either the Train Examiner or the Loco Pilot.

25.06: Air pressure tightness test for locomotives and trains by Loco Pilots :

(a) Engine : Engine should be tested for leakage test as follows :-

(i) Open the Loco angle cocks in front and in rear to allow the dirt or water to blow out and apply master gauge on rear air hose couplings. Close the front angle cock of the engine.

(ii) Charge the brake pipe pressure to 5 Kg./Cm2 Ensure 5 Kg/Cm2 pressure is registered in the Engine brake power pressure gauge as well as in master gauge.

(iii) Drop pressure 1 Kg./Cm2 by keeping the Loco Pilot's brake valve handle in applicable position.

(iv) Keep the cut-out cock in 'OUT' position. Wait for 60 seconds.

(v) Note, there should not be any drop in the pressure gauge in the next 60 seconds.

(vi) Any drop in pressure indicates the leakage in the Engine.

(vii) Again charge the brake pipe pressure to 5 Kg./Cm2 and ensure pressure is restored instantaneously.

(b) On Trains :

(i) Couple up engine air hose to the train air hose.

(ii) Open rear angle cock of the brake van to allow the dirt or water to blow out and apply master gauge.

(iii) Charge the brake pipe pressure to 5 kg./Cm2 Ensure the same amount of pressure is registered in the brake van pressure gauge and master gauge.

(iv) Drop pressure by 1 Kg./Cm2 by Loco pilots, brake valve.

(v) Keep the cut-out cock in the loco brake valve in out position and wait for 60 seconds.

(vi) A drop of 0.2 Kg./Cm2 (0.3 Kg./Cm2 on longer trains) is permissible.

(vii) Any excess leakage noticed is to be attended to.

(viii) Again re-charge the brake pipe pressure to 5 Kg./Cm2 and ensure the pressure restores instantaneously in brake van.

(ix) Close the rear angle cock of brake van and engage the respective air hose on support.

25.07 :During Journey :

(a) Loco Pilots and Guards must unscrew their hand brakes fully off before starting.

(b) Loco pilots will be guided in the use of their air brakes and hand brakes by the orders in force.

(c) If during the journey the Guard of any train finds that the gauge in his Brakevan shows less than the required air pressure (unless he is satisfied that such is caused by an application of brakes) he must be prepared to apply his hand brake if required and advise the Loco Pilot of the defect at the next stopping station.

(d) The Loco Pilot and the guard must report to the Train Examining staff at the next train examining station any irregularity or defect in connection with the working of the automatic air brake which may have occurred, and the Guard must in addition, note the particulars in his journal.

(e) When fitted or piped vehicles on which the automatic air brakes are being operated have to be parted for any purpose, the angle cocks of the vehicles where they have to be uncoupled must be closed so that there may be no delay in coupling and the men put on the job are not injured.

(f) In case of failure of the automatic air brake on any train during the journey, if the defect cannot at once be remedied, the train must proceed cautiously to the next convenient station, where the defective vehicle 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 the hand brakes. In all such cases the Guards must be on the alert and assist in stopping the train with the hand brakes.

(g) (i) When two engines are employed to draw a train, the Loco pilot of the leading engine will be held responsible for the working of automatic air brake. The Loco Pilot of the second engine must, however in case of emergency, assist in stopping or reducing the speed of the train by applying the automatic air brake, or hand brake, as may be required, but he must not maintain or recharge the air pressure.

(ii) When an additional engine or engines are employed to push a train, the Loco Pilots thereon must not interfere with the working of air brake which shall be under the control of the leading engine Loco Pilot as laid down in para (g)(i) above.

(iii) Loco Pilot of all additional engines will at all times keep the handles of the Loco Pilots brake Valve in the release position.

(iv) In the event, Loco Pilots of the engine in rear requiring in any emergency to attract the attention of the leading engine Loco Pilot, he shall given whistle code as laid down in G.R.4.50 and S.R.4.50.01.

Note : - These rules are laid down to avoid the serious danger which would arise if the Guard or the Loco Pilots of additional engines were to put the brake on, while the leading Loco Pilot was trying to recharge air pressure.

25.08: Stopping :

(a) Before the train is brought to a stand, the Loco Pilot will release the brake slightly to prevent a rebound of the vehicles and an undue strain on the couplings.

(b) In case of a train becoming divided, the Guard in the rear van must put his hand brake hard on and secure it with the chain and skid, where provided. He must also take any other precaution that may be necessary to prevent the rear portion moving, before going back to protect his train.

(c) In controlling trains on descending long and heavy grades, Loco Pilots are cautioned against the exhaustibility of the air brake system. Loco Pilots should know what is called the sensitive brake application and should take extreme care in avoiding the fading of the brake power. After repeated brake applications care should be taken that auxiliary reservoirs where the brake cylinders are fed from, are recharged to the original capacity (5 Kg./ Cm2). Neglect of this rule may lead to the train going out of control.

(d) On long and heavily graded sections, when trains are braked only by compressed air pressure, it is essential that trains be stopped at suitable time intervals during the run for recoupling lost air pressure in auxiliary reservoir and to ensure that train be kept under control and hence, halts may be provided on such heavily graded sections either at station or in mid sections for recouping air pressure in the auxiliary reservoir and these halts wherever provided are shown in the working Time Tables. Loco Pilots while working air brake trains must ensure that they strictly observe these halts regardless of whether they are given through signals or not.

(e) The fact that after the brake has been applied the air pressure in the control reservoir gradually decreases due to leakage and that in less than half an hour the brakes may leak off altogether must not be forgotten when a train is brought to a stand on a gradient steeper than 1 in 150. In all such cases measures must be taken to Guard against the possibility of a run-away.

The Guard must always be vigilant and be prepared to assist the Loco Pilot by applying hand brakes, if called upon to do so by the Loco Pilot and if necessary in an emergency. If the Loco Pilot requires additional brake power, the Guard and Assistant Loco Pilot shall pin down hand brakes on as many vehicles as the Loco Pilot may consider necessary.

25.09: Passenger Train Stopping Apparatus :

(a) Passenger carriages are fitted with an apparatus enabling passengers, in case of emergency, to partially apply the automatic air brakes and so to attract the attention of the Loco Pilot and the Guard of the train except such particular carriages/trains as may be exempted vide GR.4.18.

(b) On noticing the drop of pressure in the brake pipe pressure gauge, the Guard, Loco Pilot, Motorman and Asst. Loco Pilot will take necessary action.

(c) To reset the apparatus to enable the train to proceed, it is only necessary for the Guard or Asstt. Loco Pilot to push one of the discs to its socket or to turn disc through 900 as the case may be, which will cause both disc to resume their normal position and the brake blocks to get released.

25.10: General :

(a) Air Hose couplings must not be left hanging loose but must be properly secured on the air hose support provided for the purpose.

(b) To couple the air hoses, they must be taken one in each hand and lifted sufficiently high to enable the palm ends of both air hoses to be coupled together and when lowered the coupling packing ring of one plam end will fall in the coupling case of the other end and hold in position with stop-pin.

(c) To uncouple the air hoses, they must be lifted straight up, when the coupling packing ring of one palm end will come out of the coupling case of the other palm end and air hose palm ends will separate.

(d) When connecting and disconnecting Air hoses, staff must be extremely careful. When the Air brake system is under charging, there will be a pressure of 5kg/cm2 in Air Hose and hence, before handling them respective angle cocks should be closed and after uncoupling /coupling angle cocks should be opened.

(e) Care must be taken in un-coupling air hose Palm ends that the MU washers are not displaced of lost.

(f) Shunting staff and other when passing between vehicles must not step on the air hose coupling interfering with or damaging them.

(g) When automatic air brake vehicles are placed in siding or stabled within the station limits, the brakes must be released, and vehicles kept from moving by the application of the hand brakes if fitted, or by wedges or chains on the required number of vehicles if necessary.

(h) Guards and other concerned staff must take care that articles are not placed in Guard's vans in such a position as to come in the way of the lever of the Guard emergency valve.

25.11: Instructions to Loco Pilot and Guard on the use of Air Brakes :

Loco Pilots and Guards are being instructed in the training centre during their initial and refresher training period regarding the air brake system and its use. They must be well acquainted

with all the instructions of this chapter and ensure strict observance.

25.12: Recording of Air Brake particulars by Guards :

(a) The Guards must be careful to show in their rough journals and on the T-34HFcopy handed to the Loco Pilot the particulars of air pressure and number of vehicles with active/in-active cylinders on train.

(b) In all cases where the active cylinder is made in-operative or vice-versa, during the journey, the change and stations where it took place must be noted by the Guard in his rough journal and on the T-34HF copy handed by him to the Loco Pilot.

25.13: Locomotive Loco Pilot to blow through :

In order to prevent the accumulation of moisture and dirt in the pipes of automatic air brake apparatus, Loco Pilots are instructed that before leaving shed with their engine to work a train, a good blow through should be given with the Loco Pilots brake valve by opening the front and rear angle cocks. A through blow should be given by opening the dummy plug of main reservoir also. The accumulated moisture and oil will be drained out. Likewise, before engine is attached to the train, the rear hose should be opened and blow through given. After the engine is attached to the train and the rear air hose of the engine and the air hose of the first wagon of the train air hose coupled, the blow-through should be given by opening the rear angle cock of the last vehicle.

25.14: Other Responsibility of Staff :

(a) The working of automatic air brake by the engine Loco Pilot will not relieve the Guard of any responsibility as to the braking of the train. Guards must therefore keep, a good look-out and be prepared to apply the automatic air brake or hand brake, should any necessity arise.

(b) Engine Loco Pilot must satisfy themselves that the automatic air brake is in proper working order before starting and at each station where any vehicle is attached or detached. They must also test the brakes before descending steep inclines and while approaching any danger signal or terminal station; the speed of the train must be reduced if necessary so as to stop the train at the proper place, Guards must watch the speed of the train and assist the engine Loco Pilot by the use of their Air Brake and Hand brake when necessary.

(c) Unless the automatic air brake is working properly while the train is on run, the engine Loco Pilot must whistle for the Guard's hand brakes, stop the train and inform the Guard that the automatic Air Brake is out of order and that the hand brakes must be relied upon for working the train to the next convenient station.

(d) In the case of failure of the automatic air brake on any vehicle during the journey, and if the defect cannot at once be remedied, the train must proceed cautiously to the next convenient station where the defective vehicle can be re-marshalled, detached or otherwise dealt with. The speed of the train should be so regulated as to enable the LP to have full control of the train. In all such cases the Guards must be alert, and assist in stopping the train.

25.15.:How to Locate Leakage in Air Pressure :

Normally, the leakages are at the joint of the Air Hoses couplings namely at the palm ends and at nipples, at angle cock spindles, at the grip seal joints on main brake pipe, branch pipe etc. The leakage is usually detected by hissing sound produced by the air blowing –off. For detection of minor leaks, soap solution can be applied at joints where bubbles will be formed if leakage exists.

25.16.: Trains with Air Brakes :

(a) Normally, trains must run fully air braked.

(b) In case of emergency when a passenger train, for any reason has to run non-air braked, the speed must not exceed 40 KMPH and for mixed and goods train must not exceed 30 kmph subject to any lower speed restriction which may have been imposed over a particular section for any reason. In any case, a passenger train must not run non-air braked over any portion of the line without the permission of the Pr. Chief Operations Manager. However, running of non-air braked goods train in emergency may be permitted by the DRM.

(c) In such case, the load of the trains must be reduced and the Loco Pilot and Guard of the train shall be responsible to see that the train is under control to stop wherever required.

25.17: Attaching of Vehicles not Fitted with Automatic Air Brakes to Coaching Trains :

(a) Mail, Express and passenger trains fitted with automatic air brakes, brake piped vehicles (vehicles fitted with only brake pipe and not with distributor valve, brake cylinder, brake rigging etc.) may be attached not more than one. Such vehicle attached on a passenger train should be protected by one or more vehicles fitted with automatic 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. Vehicles, both coaching & goods, fitted with brake pipe only, may be attached to troop trains and special trains conveying military stores etc., but the specification of brake power laid down in para 25.04 must be followed except if any relaxation is permitted by PCME/ Sr.DME/DME in case of emergency.

25.18: Disconnection of Means of Communication :

If disconnection of means of communication to prevent misuse is permitted vide GR.4.18, the procedure and precaution laid down in the said G.R & S.R thereto should be followed.

25.19: Testing of Communications and Alarm Chains on Running Train :

(a) The communication provided in passenger carriages for stopping trains in case of emergency, must be tested by Divisional Operations Manager, and Divisional Mechanical Engineers, their Assistants and also by the Divisional Traffic Inspectors and C & W and Loco inspectors in running train at least once a month. The test must be made by pulling the chains in one of the passenger carriages on the train, while the train is on the move but the test should be avoided while a train is ascending an incline or when a train is running late. Divisional Safety Officer shall also make similar checks.

(b) The result of the test must be recorded by the testing officials and reported to the Divisional Operations Manager or Divisional Safety Officer and the Divisional Mechanical Engineer at once. The following particulars are to be recorded:-

  (i) Date, time, train Number and the number and class of the Carriage in which the chain was pulled.

  (ii) Time that was taken to stop the train after the chain was pulled.

  (iii) Whether signals were properly exchanged between the Guard and the Loco Pilot.

  (iv) The time that elapsed before the Guard came to the carriage from which the chain was pulled.

(v) Total duration of the halt.

(vi) Approximate estimated speed of the train at the time of test.

25.20: Application of Automatic Air Brake from the Brake Van:

The Automatic air brake may be applied from the brakevan in an emergency only. The application of Automatic air brake must, in such cases, be gradual, as there is risk of the train parting owing to sudden application of the air brake from the rear.

25.21: Blanking "off' Automatic Air Brake Distributor Valve:

When an automatic 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 the individual wagon can be isolated by shutting off the isolating cock. This isolating cock is either fitted on the distributor valve itself, or on the branch pipe connecting the brake pipe to the distributor valve.

25.22: Empty/Load Handle on Special Type Bogie Fitted Wagons:-

(a) The special type bogie wagon with higher carrying capacity are provided with a mechanical device known as empty/load box, by the manipulation of which, the brake power of a wagon can be increased or decreased.

(b) This equipment has been provided to ensure that the train has adequate brake power in the empty as well as loaded condition of the wagon to enable it to be kept under proper control at all times.

(c) When the wagon is loaded, its brake power must be increased and this is done by operating a small Empty/load Box handle (Provided at the side of the wagon just below floor), from the 'Empty' position to the 'loaded position'. These two positions are clearly marked on the plate on which the handle is fixed, by legend also by colour.

(d) When, the wagon is empty and as such increased brake power is not necessary, the Empty/ Load box handle MUST BE set at the 'Empty' position.

(e) If the Empty/Load Box handle is not set in the correct position, a serious accident can happen, as in the loaded condition the train will have inadequate brake power, on the other hand, when it is empty, severe application of brake will skid the wheels and cause them irreparable damage.

(f) All station and yard staff both operating and commercial, also train examining and running staff should be fully acquainted with the operation of the Empty/Load Box device fitted on special type bogie fitted wagons. The following instructions should be strictly observed:-

(i) The handle of empty/load box should be at the "Empty" position when the wagon is empty or when it is loaded with light materials like bamboo etc. So that the gross weight of the wagon is not likely to exceed 50 tonnes. The handle should be set to "loaded" position when the wagon is fully loaded or if the gross weight is above 50 tonnes.

(ii) The Train Examiner will be responsible for the correct setting of the Empty/Load Box handle at all originating stations where the train is examined and certified fit by the Carriage & Wagon staff and at stations where the trains are passed by them. This should be recorded in the Air Pressure Brake certificate also.

(iii) The Guard will be responsible for the correct setting of Empty/Load Box handle at wayside stations where any shunting is done or when a stabled train is picked up. The guard must,

however, be vigilant to see that when his train is detained at a station for any length of time, no unauthorised person interferes with the handle. This caution is to be exercised particularly when the train is running empty.

(iv) The staff responsible for loading or unloading of the wagons should also ensure that the handle of Empty/Load Box is correctly set after loading/unloading. Just before unloading commences, the Empty/Load Box handle should be changed to “Empty” position.

CHAPTER-XXVI

INTERCHANGE OF ROLLING STOCK

26.01: Introductory : Some of the salient features governing the interchange of coaching and goods stock as between one railway and another and the maintenance of such stock for the purpose of interchange.

26.02. Definition : In the context of interchange of rolling stock some import terms which are frequently used in the rules are defined below:-

(1) 'Rolling stock' includes both coaching and goods stock.

(2) 'Vehicle' stands for coaching stock only.

(3) 'Wagon' applies only to goods stock.

(4) 'Junction of interchange' means the Junction at which the stock between two or more Railways is interchanged.

(5) 'Owing Railway' means the railway to which a vehicle or wagon belongs.

(6) 'Forwarding Railway' means and includes each railway receiving a vehicle or wagon from another railway whether on the outward or homeward journey.

(7) 'Receiving Railway' means and includes each railway receiving a vehicle or wagon from another railway whether on the outward or homeward journey.

(8) 'Booking Railway' means the railway on which traffic originates.

(9) 'Destination Railway' means any railway between the booking railway and the destination railway.

(10) 'Intermediate Railway' means any railway between the booking railway and the destination railway.

(11) 'Working Railway' means a railway working a junction.

(12) 'using railway' means a railway using a junction worked by another railway.

(13) (a)'Coaching stock' comprises all coaching vehicles including self –propelled vehicle such as rail cars, electrical multiple units, goods wagons intended for coaching traffic, etc. Goods wagons intended for coaching traffic should be marked as prescribed and used for coaching traffic only.

(b) Passenger vehicles comprises coaching stock used exclusively for carrying passengers and includes composite carriages of which the whole or part as allotted for carrying passengers.

(c) other coaching vehicles comprise saloons and inspection carriages and include tourist cars, restaurant cars , construction cars, parcel vans, composite luggage and brake van etc.

(14) 'Goods stock' means and includes all goods stock including wagons, Tanks, Flats, Vans i.e all rolling stock other than coaching stock, irrespective of contents and whether attached to passenger or goods train.

(15) 'Traffic Authority' means the head of the Traffic, Transportation or commercial Department as the case may be.

(16) A 'Day' is twenty four hours from midnight to midnight, standard time being adopted in all cases.

26.03:Rules for the interchange of coaching Stock.

(1) Nothing in these rules shall prevent individual railways entering into mutual arrangement for the interchange of coaching stock.

(2) All empty coaching vehicles shall be returned to the owing railway by the shortest route except where otherwise agreed to by the owing railway.

(3) Coaching vehicle may be returned loaded by the receiving railway to a station either:-

i) On the shortest route back to the owing Railway or

ii) On the route via which received or

iii) On the owing railway.

(4) A vehicle which has been dealt with in contravention of clause (3) shall be returned to the owing railway by the shortest route, unless reloaded to or via the owing railway when it shall be sent to the owing railway by the route booked at the reloading station.

(5) Special vans i.e luggage , parcel , Motor vans etc. when booked by owing railway to another railway, shall be returned to owing railway as quickly as possible but in any case not exceeding the total period calculated as specified below:-

A day for every 121 kilometers or part of 121kilometres from the interchange junction to the destination station plus two days at the destination.

For example : Distance between interchange junction and destination is 300 km total time allowed for the vehicle to be returned is 3 plus 2 = 5 days.

(6) In the event of interruption of through communication from any cause whatever the railway on which the interruption occurs shall, within 48 hours of occurrence despatch message of the fact to all railways whose vehicles are detained on account of the interruption.

(7) If a railway affixes any fittings on interchange stock in respect of which special instructions are considered necessary it must send copies of such instructions to the railways with which such stock. is interchanged.

26.04: Statement of damages to vehicle / vehicles caused by passengers or troops-

Prior to the departure of any troops or special train or before attaching to a train the individual carriages reserved or chartered for troops, tourists pilgrims or marriage parties, the special train or the reserved vehicle / vehicles wilt be jointly examined by the · Guard of the train. Train Examiner at station where Train Examiners are posted, the Station Master, and a representative of the occupants and a memo of damages to vehicle / vehicles will be prepared and jointly signed by the representative of the occupants, the Station Master, the Guard of the train and the Train Examiner if any. This memo wilt be prepared in triplicate, a copy of which will be retained by the Station Master, one copy handed over by him to the representative of the occupants and another copy to the Guard of the train, who wilt take it through to destination or hand it over to the relieving Guard enroute, as the case may be.

On arrival at destination, the vehicle / vehicles will again be jointly examined in the manner stated above and the cost of any damages found beyond any of these noted in the joint memo will be recovered from the representative of the occupants on the spot, if possible. When the cost

of extra damages that have occurred is not paid for by the representative of the occupants at the terminating station, his signature wilt be obtained on the joint memo which will be forwarded to the DRM concerned, for necessary action. At the destination station only those damages will be noted in the joint memo as are caused by willful or careless conduct on the part of the occupants of the carriage (s), such as window or shutters broken or damaged, straps cut off, cushion damaged or missing lamp broken, door handles wrenched off, or generally only such damage to the stock as has been evidently or d deliberately done by the occupants or through their carelessness.

26.05: Interchange Junctions for Coaching stock-

The following are the junctions of interchange for coaching stock between the N F. Railway and other Indian Railways-

Junction station	Working Railways	Using Railways.
Katihar (KIR)	NF	ECR
Purnea (PRNA)	NF	ECR
Maida Town (MLDT)	ER	NFR

26.06: Point of Interchange-

(a) All goods stock without exception shall be considered as interchanged on arrival at the junction from the using railway and on departure from the junction to the using railway.
(b) The following are the interchange points of goods stock between N. F. Railway and other railways-

Junction Station	Working Railway	using Railway
Maida Town (MLDT)	E. R.	N. F
Katihar (KIR)	N.F	E. C. R.
Purnea (PRNA)	N. F	E. C. R
Singhabad(SQB)	N.F	Bangladesh
Parbatipur (PBT)	Bangladesh	N. F

26.07: Number Taker's Record-

Each junction of interchange must maintain Number Taker's books, wherein full particulars of all vehicles/wagons interchanged must be recorded. A vehicle/wagon shall, unless in a fit condition to run, be considered as interchanged when entered in the Number Taker's book, and it shall be so entered immediately it is put into a line or siding in which such vehicles/wagons are usually placed for the purpose or at such time and in such ways as may be arranged between the railways forming the junction.

26.08: Alteration in equipment of wagons, etc.-

When railways make any alteration in the equipment of wagons or change the design of any gear or decide to treat as obsolete any wagon fitMgs affecting interchange transactions, they should intimate the · Director General-RDSO, who will advise all concerned.

26.09: Loading-

Rolling stock which is unevenly loaded or over loaded must be damage labelled by the Train Examiner and arrangement must be made for it to be attended to. After the defect has been rectified by the Commercial Department, a fit memo must be issued by the Train Examiner.

26.10: Interchange of Traffic between India and Bangladesh

Introductory-

Some of the salient features governing the interchange of rolling stock between India and Bangladesh Railways and the maintenance of such stock for the purpose of interchange are described in this chapter. Detailed Rules governing the interchange of rolling stock with Bangladesh are contained in the "Fundamental and Subsidiary Rules for interchange of traffic between India an Bangladesh" published by the IRCA

Definitions-

(1) All traffic, of whatever description, carried by rail from one country to or across the other shall be known as "India Bangladesh Traffic".

(2) "Standard" Wagons shall be those wagons of agreed type of construction including special type of stock which each country agrees to interchange. The total number of these wagons shall be communicated by each country to the other. Special types of stock such as tank wagons, bogie rail trucks, bogie timber trucks, well wagons end falling trucks etc. which are specially built for the transport of specific commodities shall be termed non-pooled and shall have 'NP' markings in a circle.

All other wagons shall be treated as non-standard and will not be interchanged.

(3) Interchange of India Bangladesh traffic shall be regulated by the following fundamental rules and rules subsidiary thereto which cannot be amended added to, or departed from, without the written consent of the two Governments.

Railway Administrations in the two countries will, by mutual agreement, frame from time to time such subsidiary rules as may be necessary to implement these fundamental rules .

(4) Subject to such laws as the respective Governments may, from time to time enact, or such orders as they may issue for regulating the movement of India Bangladesh traffic, all such traffic shall be booked through to destination and the booking railway w supply the necessary rolling stock. The actual route by which the consignment is booked shall be selected as laid down by each country in its own publications.

(5) Interchange of vehicles and wagons shall be governed by two sets of subsidiary rules, one set relating to Transportation and the other to Mechanical interchange.

(6) Indian and Bangladesh Railways will work to a target wagon balance to be fixed from time to time by mutual agreement between the two Railway Boards. Penalties will be prescribed and imposed when mutually agreed targets and not acted upon after issue of a specific reminder. For this purpose, wagon balances will be fixed separately between Bangladesh Railway and N. F. Railway.

The Railways mentioned above may work to a fixed balance either by sending loaded wagons or empties or both. provided their accounts shall be kept separately for covered and open wagons, and a creditor railway for covered or opens, may ask to be given the wagons open or covered for which it is a creditor. and provided further that either Railway Board may on giving due notice call for standard wagons of individual type required for its own work.

(7) Hire charges shall be payable by the debtor railway at such rates as may be agreed upon from time to time.

(8) Coaching stock and standard non pooled wagons shall be returned to the Railway to the Railway from which they are received.(Subsidiary rules will, inter alia, provide for penalties for breach of rules).

(9) A rolling stock census will be taken at agreed intervals and at this census each country will give to the other full details of-

(a) All stock within its territory which belongs to the other country.

(b) All standard interchangeable stock belonging to itself.

(10) There shall be no joint stations. If facility provided at a station in one country are used by the other, they shall be paid for in such manner as may be mutually agreed upon.

(11) All restrictions imposed by either country in regard to the booking of traffic to particular stations or by particular routes or in any other way, shall be scrupulously observed by the other country.

Note-Any India-Bangladesh restrictions should be notified and shall come into force four days after issue of the restriction message. Any consignment booked against restrictions by the contiguous railway after four days will not be accepted by the railways, which imposed the restrictions. For other than contiguous railway, an additional time limit of 24 hours for each railway shall be allowed. For the purpose of hire such wagons will be debited against the railway violating the restrictions, Any booking done in excess of the quotas in force will be dealt with like wise.

(12) No consignment shall be offered or accepted in interchange unless it is accompanied by its Invoice/Way bill .

(13) The classification of commodities as dangerous, offensive and excepted, shall be mutually agreed upon between the two countries for the purpose of India-. Bangladesh traffic.

(14) 'Director' means Director, Wagon Interchange, India or Director, Wagon Control, Bangladesh.

(15) A 'Day' is twenty four hours from midnight to midnight, standard time being adopted in all cases.

26.11: Rules for interchange

(A) Coaching Stock-

(1) All types of coaching stock shall be considered suitable for interchange, as qualified in Annexure Vll to Fundamental and Subsidiary Rules for interchange of traffic between India and Bangladesh.

(2) A vehicle shall be considered as handed over when entered in the Number Taker's books at the junction and it shall be so entered immediately it is put into line or siding in which such vehicles are usually placed for that purpose or at such time and in such ways as may be arranged between the railways forming the junction.

(3) If a railway introduces any fittings on interchanged stock regarding which special instructions for its own staff are considered necessary, it must send copies of such instructions to the railways with which it interchanges.

(4) All coaching vehicles, subject to the provisions of sub-rule (8) and (9) below shall be

returned to the owning railway as quickly as possible, but not exceeding the period specified hereunder-

One day for every 80 kilometres (50 miles) or part thereof from the interchange junction to the destination station plus seven days on each railway over which the vehicle is routed and three days for a transhipment points.

(5) All empty coaching vehicles shall be returned to the owning railway by the route by which they were received loaded except that-

(a) Tourist cars,

(b) stock forming tourists, excursions or marriage special trains and stock used for small excursion parties when released or replaced enroute, shall be returned to the owning Railway by the shortest route.

(6) Coaching vehicles may be loaded by the receiving Railway either-

(a) To a station on the route via which received.

(b) To the owning Railway,

(c) Beyond but via the owning Railway.

(7) If any country detains a vehicle beyond the period specified in rule (4) above, subject to the provisions of rules (8) and (9), it shall pay a penalty of Rs. 200. 00 per unit per day (Broad Gauge) to the owning railway.

(8) In the event of an interruption of through communication from any cause whatever, for 12 hours or over, hire and penalty shall not be charged under the provisions of Rule (7) above for the period during which the interruption lasts on vehicles delayed in consequence, either short of or a beyond the point of interchange.

(9) In order to obtain the benefit of Rule (8) the Railway on which the interruption occurs must, within 48 hours of the occurrence, despatch telegraphic advice of the fact to all Railways whose vehicles are thus detained failing which hire and penalty will be chargeable at the option of the owning Railway until the despatch of such advice. The telegraphic advice shall be acknowledged by the receiving Railway and, if an acknowledgement is not received within 48 hours of issue of the advice it shall be repeated,

(10) If the consignments loaded in vehicles are required to be rebooked or diverted to another destination, they may be sent in the original vehicles advising the forwarding Railway concerned. The period specified in Rule (4) shall be correspondingly increased at the rate of one day for 80 KMs (50 miles) for the additional. Haulage incurred.

(11) Arrangement as mutually upon may be made between adjoining Railways for provision of block rakes for the running of through passing of train services. such block rakes are to be excluded from the hire charges.

(12) The junction of interchange shall submit daily to the adjoining railway concerned individual numbers and types of the stock interchanged in both directions from midnight to midnight.

(B) Goods stock

wagons, suitable for interchange shall be described as “Standard” wagons. These will include IRS, IRCA type wagons and such others as are mutually acceptable for interchange.

The following shall not be treated as standard wagons for the purpose of interchange-

(I) Broad Gauge with carrying capacity of less than 16 tons respectively;

(ii) Wagons fitted with non-standard · wheels and axles;

(iii) Wagons marked “for Local Traffic only”

(iv) Brake Vans, as qualified in Rule 22 of Annexure-Vll to Fundamental and Subsidiary Rules for interchange of traffic between India and Bangladesh.

(v) Stock with experimental or trial fittings.

Note :-Wagons due or overdue POH shall be accepted freely by the parent line or in the direction of the parent line either loaded or empty.

26.12: Point of interchange-

(I) All goods stock shall be considered as interchanged on arrival at the junction from the using railway and departure from the junction to the using Railway.

(ii) It shall be optional for the receiving railway to transship at the junction the contents of any covered wagon containing a load for one station of less than half its carrying capacity and the cost shall be charged against the railway making over the wagon. Unless otherwise arranged, consignments for more than one station loaded in any one wagon shall be transshipped at the junction at the expenses of the railway which made over the wagon.

(iii) The following are the interchange points of goods stock between N. F. Railway and Bangladesh Railway.

Junction Station	Working Railway	Using Railway
Singhabad(SQB).	N.F.Railway	Bangladesh Railway.
Parbatipur (PBT)	Bangladesh Railway.	N.F.Railway
Radhikapur(RDP)	N.F.Railway	Bangladesh Railway
Birol(BLE)	Bangladesh Railway	N.F.Railway

CHAPTER-XXVII
LINE CAPACITY

27.01: Definition:

Section capacity is defined as the 'number of trains which can be run each way over a given section of the railway in 24hours. It is also known as **line capacity**.

For a single line section, this is calculated as the number of trains that can be run each way during 24hours, whereas on double line section, this capacity is worked out separately for both the directions. Section capacity could be expressed in three different ways viz:-

(a) Maximum line capacity: This is represented by the maximum number of trains that can be entered in the Master Chart so that it is impossible to introduce even a single more train on the section concerned.

(b) Practical line capacity: Practical line capacity is represented by the number of trains per day which is derived from the above mentioned maximum line capacity making allowance for such factors as time required for maintenance of permanent way, time margin for scheduling and other operational irregularities. In actual practice, the train scheduling is based on this capacity. When we speak of line capacity in general, we mean practical line capacity which is also known as effective line capacity.

(c) Economic line capacity: When line capacity is underutilized, increase in train services follow the pattern of law of increasing returns due to more intensive utilization of fixed assets. However, as the number of trains to be operated on a section grows larger and larger and the section starts getting saturated, it becomes more and more difficult to increase the train services without increasing the time loss in train operation. As a result, the utilization efficiency of the rolling stock and the train crew decreases and maintenance cost of the track increases. This leads to gradual increase of the transportation cost per train kilometer. The optimum number of trains which can be run on the section economically is the economic line capacity.

27.02: Factors involved in empirical formulae-

Certain factors which are taken into account in calculation of the line capacity are described below.

i) Critical Block Section-

A section consists of a number of block sections and the trains have to go through each of the block sections. Therefore, the effective capacity would be where the capacity is least; and this will be in the longest block section from the time point of view. This is known Critical Block Section and the running time on that section will have to be taken for the purpose of calculating line capacity.

ii) Running Time-

Since the running times are different for trains of different speeds, the running time of the slowest train in the critical block section is taken so as to include the worst condition.

iii) Block Operating Time-

After a train arrives at a station, it is not possible to allow another train in the same block

section unless certain operations are done, I.e. closing of block section, asking and giving for fresh Line Clear, setting of points. lowering of signals, etc. This is known as Block Operating Time.

iv) Efficiency Factor-

From the practical point of view it is not always correct to assume that every time the critical block section is cleared there will be a train ready at the station to be allowed in the same block section. Even if there is a train, it may not be possible to start it because of some work at the station or some other train having to take precedence over it. In other words, the occupation of the critical block section can not be cent percent. This is a most important factor which affects efficiency ratio. Generally sixty to seventy percent of the efficiency factor is taken in the calculation of line capacity through empirical formulae. The efficiency factor which is included in each of the formulae largely depends on the extent to which human element is involved in asking and giving line clear, setting of routes reception and despatch of trains by taking off signals etc. and also on the standard of controlling efficiency of the running and train working staff. With the introduction of advanced methods of working route relay/panel interlocking etc. other thing being the same the efficiency factor would be automatically increased to 80%or above. The standard of staff caliber their proper initial and refresher training discipline, etc. are also important factors in the improvement of efficiency factor. The efficiency factor on the other hand, depends on the peculiarities of each railway and is not possible to evaluate it mathematically. It is a measure of the actual performance from what is planned. The forest requirement to improve this efficiency factor is an intelligent forecast which gives 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 an small as possible.

27.03: Calculation of Line Capacity: (Theoretical Formula) Scott's formula

$$N = \frac{24 \times 60}{R+5} \times \frac{7}{10} \quad \text{for Double line section}$$

$$N = \frac{24 \times 60}{R+5} \times \frac{7}{10} \times \frac{1}{2} \quad \text{for Single line section}$$

Where à 'N' represents the number of trains each way in 24 hours, 24x60 represents the number of minutes in a day.

'R' represents the running time of a goods train in minutes over the critical section (i.e the section over which the running time is maximum).

'5' represents the time in minutes allowed for "block working".

$\frac{7}{10}$ 'represent the efficiency factor.

Example:

Assuming running time of the slowest goods train on the critical block section is 27minutes and block operating time is 5 minutes the capacity on single section would be:-

$$N = \frac{24 \times 60}{27+5} \times \frac{7}{10} \times \frac{1}{2} \quad \text{for Single line section}$$

$$= \frac{63}{4}$$

=15.75 i.e roughly 16 trains in each direction.

American formula

$$C = \frac{1400}{T+t+2t} X Y$$

Where C is the capacity in each direction T+t are the interval between two successive opposing trains clearing the critical block section.
2t is the block operating Line for two opposite trains.
Y is the efficiency factor which is taken to be

$$\frac{70}{100} \text{ or } \frac{7}{10}$$

Stain back's formula

Stain back's formula resembles American formula in that it takes the interval for clearance of two opposing slowest trains in the critical block section. The formula is on the other hand, very elaborate and complicated:

$$C = \frac{1440}{S} \times Y$$

Where:

C is the capacity of section.

S is the operation time of trains and its value is given by

S = ta + tb +o + w

While "ta+tb' are the running times for two slowest trains crossing at stations on either side of the critical block section.

'O' is the sum total of block operating time for two slowest trains. The operating time includes all actions that are necessary for second train to run through without either being stopped at the first stop signal or checked at the station and bring in whether simultaneous reception facilities exist or not at the station and the Loco Pilot's reaction in the matter of starting after the Last stop signal has been taken off and time lag that might take place in operating of the Block Instrument if the Station Master is occupied elsewhere.

'W' is the time the second train has to wait before it can start

'Y' is the efficiency factor.

Example: Assuming running time for two slowest trains on the critical block section is 25 and 27 minutes and block operating time for two trains is 5+5=10 minutes and stopping time of the second train is 5 minutes the capacity would be –

$$C = \frac{1400}{25 + 27 + 10 + 5} \times \frac{7}{10}$$

$$= \frac{1008}{67} = 15.05$$ i.e roughly 16 trains in each direction.

Modification adopted on the Ex-GIP Railway

Since the passenger trains are scheduled to run on the fixed paths what is actually required is to be find out the capacity of Goods Train . For this purpose the total time of occupation of the passenger trains on the critical block section is subtracted from 1440 minutes available in a day and capacity of Goods trains is then calculated for remaining time . Thus the formula becomes

$$CG = \frac{1440-(TP+t)}{TG+t} \times Y$$

Where ‘CG’ is the capacity of goods trains.
‘TP’ is the running time of each passenger train on the critical block section.
‘TG’ is the running time of slowest goods train on the critical block section.
‘t’ is the block operating time between successive trains and
‘Y’ is the efficiency factor which is taken to be.

27.04: Calculation of Line Capacity (Charting Method): The most reliable and practical way of assessing the line capacity of a section correctly, which is adopted by most of the railways, is the charting method- indicating train paths on time-distance graph for 24hours. It is therefore, best to determine the section capacity by actually plotting trains in a master chart. In this process the scheduled coaching train paths are first plotted and then as many goods train paths are inserted as possible so that, it becomes impossible to accommodate even one more train. This gives us maximum section capacity. While doing so, the facilities provided at different block sections, block stations, as well as the terminal facilities & limitations are taken into consideration.

27.05: Guidelines for Calculation of Line Capacity on Indian Railways:

(a) Charting method should be the basis for assessing line capacity for planning purposes.
(b) Capacity assessed by charting method should not be less than as calculated by Scott’s formula.
(c) A section will be considered saturated if the number of trains run daily is 90% or more than the charted capacity. Planning for additional line capacity on such sections should be done.

27.06: Various methods of Improving the Line Capacity:

(a) By incurring expenditure:

(i) To reduce the running time on critical block section
(ii) To improve the speed of trains
(iii) To provide automatic signals
(iv) On increased use of modern signaling system
(v) On provision of CTC on double line
(vi) On provision of train describer
(vii) To use EMU & DMU for stopping train.
(viii) On provision of AWS
(ix) On provision of PI/RRI/EI
(x) To increase CSL of running lines
(xi) On interlocking of LC gates/Elimination of LC gates.
(xii) On improving facilities at terminal yard commensurating with the work load.
(xiii) On provision of longer turnouts at stations to increase the speed of the train.
(xiv) On independent shunting facility at important stations to avoid constraints of reception & dispatch.
(xv) On easing of ruling gradient.

(b) Without incurring expenditure:

(i) Proper planning.
(ii) Proper controlling.
(iii) Proper efficiency by motivation & training.
(iv) Proper Time tabling.
(v) Proper maintenance of instruments
(vi) Minimizing block operation time
(vii) By reducing crossing & precedence

(viii) By implementing Management Information System (MIS).

(ix) Uniform traction

(x) By running heavy haul/longer goods trains.

(xi) Keeping a watch on engineering restrictions, which should be imposed for minimum possible period.

(xii) Simplification of rules.

27.07: Order of Priority for Increasing Line Capacity Works:

As line capacity works involve huge investments and long gestation periods, planning for such works has to be done with meticulous care to avoid traffic bottlenecks on one hand and uncalled for expenditure on the other hand. Therefore, it is necessary to follow the sequence below for considering increase in section capacity.

a) Organizational and operating measures to ensure optimum utilization of the existing operating assets as follows:-

(i) Improvement in Time table.

(ii) Reducing disparity in inter-sectional running times.

(iii) Review of sectional running times.

(iv) Improving efficiency of staff.

(v) Efficient operations of yards, stations and terminals.

(vi) Improved maintenance of equipment.

(vii) Monitoring of trains by officers and inspectors.

b) **Technical measures**:

(i) Improvement in Signalling & interlocking.

(ii) Motive power improvements

(iii) Civil engineering improvements will include the following:

- Opening additional crossing stations.
- Strengthening the permanent ways and bridges.
- Improvements in alignment, eliminating surface road crossing, removing speed restrictions, providing 1 in 16 turnouts to permit higher speeds on loop lines.
- Easing of gradients.
- Patch doubling (Doubling of section is not undertaken in one stage but in phased manner)
- Double/Triple/Quadruple line.

27.08: Throughput:

The throughput of a section is the total quantum of traffic which can be transported over a section in a period of 24 hours. The quantum of traffic moved includes passenger traffic &

freight traffic. The passenger throughput could be measured in terms of number of passengers or passenger kms which are carried over the section in 24hours.

Passenger Throughput = Number of passengers travelled x Distance they travelled in Kms.

The goods throughput may be expressed in terms of :

a) Number of wagon, or

b) Gross Tonne kms or

c) Net Tonne kms (carried over the section in 24hours)

Generally 'Throughput' in Railways refers to goods throughput for day to day operation and is expressed in terms of number of wagons. But for commercial transactions, it is expressed in terms of 'Net Tonne kilometres' because NTKM indicates the ultimate productive work done by railways. Keen observation and effort is required to improve NTKM.

27.09: Measures to Increase 'Throughput':

Throughput of a given section can be increased by increasing section capacity. However, independent of section capacity, throughput can be increased by increasing the trailing load as under:-

a) Inducting High capacity Diesel & Electrical locomotives & Multiple Operations of Locomotives.

b) Improved Rolling Stock with CBC coupling & draw bar capacity of 80 tonnes or more.

c) Improved roller bearing on Rolling stock.

d) Increasing carrying capacity of rolling stock without much increase in length or tare weight.

e) Improved Braking system (Air Brake & Disc Brake system) to maintain desirable "Braking Distance".

f) Increasing Permissible Axle load & permissible moving dimensions by Civil Engineering works.

g) Increasing loop capacity & strengthening the loop lines.

h) Improved system of communication between Engine crew, Train staff, Station Master & Controller.

i) Adequate Terminal capacity & facility to deal with Heavy Haul Operations.

j) Re-Scheduling & curtailing running of slow stopping passenger train on heavy haul routes or on dedicated tracks.

k) Integrated "Mega Blocks" to prevent frequent departmental maintenance block.

l) Upgradation & modernisation of techniques & methods of attending to trouble shooting & break down.

m) Upgradation in the skill & knowledge of "Train Running " & Train Passing" staff.

27.10: Advantage of Higher 'Through Put':

a) Wagon Utilisation Increases.

b) Increase in Railway Revenue.

c) Yard/Sectional Congestions Eased.

d) Reliability Increases.

e) Customer is satisfied & reposes confidence on Railways.

f) Cost of Transport of Freight Reduces.

g) Interchange commitments with adjoining railways fulfilled.

CHAPTER-XXVIII

MISCELLANEOUS

A. JOINT PROCEDURE ORDER FOR OPENING OF RELAY ROOMS AT STATIONS/CABIN

To streamline the system of opening of Relay Rooms at stations and cabins, following procedure shall be adopted.

1. **Locking of Relay Rooms** : The Relay Room/Cabin basement shall have double locking system of Operating and S&T Locks.

   1.1 **Operating Lock :** One Godrej shall be provided on the door of Relay Room / Cabin basement by the Station Master. This lock is named as Operating Lock. First key shall be kept in the safe custody in key box with the ASMon duty. Spare key/keys shall be kept under the custody of DOM/AOM/ARM of the Division/Area.

   1.2 **S&T Lock :** Likewise one Godrej lock shall be provided on the door of Relay Room/ Cabin Basement by the Signal Maintainer / Signal Supervisor. This lock is named as S&T Lock. First key shall be kept in the safe custody of the concerned Signal Maintainer/Signal Supervisor of the station/Section.

   Spare key/keys o fthe S&T lock shall be kept under the safe custody of Sr.DSTE/DSTE of the Division.

2. **Opening of Relay Rooms :**

   2.1 **Duties of S&T Staff -** Whenever relay room is to be opened either for maintenance schedule or during failure or for other maintenance activities/construction work, the concerned Maintainer/Signal Supervisor shall.

   2.1.1. First obtain the serail number of the day with time from Section Engineer, Signal HQ, of the respective divisional control office.

   2.1.2 Then record the same in the Relay Room key Register.

   2.2. **Duties of Operating Staff -** When ASM on duty is requested for the key by S&T Staff, he shall :

   2.2.1. First inform the Section Controller on duty, who will record this in Control chart.

   2.2.2 Then ASM shall give the key of Operating Lock to S&T staff, after the entry is made in the Relay Room Key Register.

   2.3 Relay Room / Cabin Basement key shall not be handed over by ASM on duty to any Group D Staff of S7 T department.

3. **Closing of Relay Rooms :**

   3.1 **Duties of S&T Staff -** On completion of work, the concerned Signal Maintainer/ Signal Supervisor shall :

   3.1.1 First properly close Relay Room/Cabin Basement door and lock it with both the locks.

3.1.2 Then return the key of Operating Lock to the ASM on duty and make the entry in the Relay Room Key Register.

3.1.3 Advise Section Engineer, SIgnal HQ at Divisional Control Office, of the time of closing the Relay Room.

3.2 **Duties of Operating Staff -** When the key of Operating Lock is returned by S&T staff to ASM on duty, he shall :

3.2.1 First keep the key in the safe custody and acknowledge it in the Relay Room Key Register.

3.2.2 Advise Section Controller of the time of closing the Relay Room who will record it in the Control Chart.

4. **The procedure, frequency and authority for opening of Relay Rooms in four categories is appended below :**

4.1 **<u>For attending failures of S&T Gears from within Relay Rooms :</u>**

Following steps shall be taken for opening of Relay Rooms for attending failure inside the Relay Room when necssary.

4.1.1 a) By ASM : Entry to be made in Signal Incidences Register by ASM on duty and failure memo be issued to S&T staff. The S&T staff shall not taken the Relay Room key for attending failures and open the relay room unless failure is recorded in SFR.

b) ASM on duty shall inform Section Control who will record in his control chart.

4.1.2 **By S&T staff :**

a) If disconnection is required, Disconnection Memo to be given by S&T staff to ASM on duty.

b) Failure memo should be acknowledged and entry in Relay Room key Register to be made by S&T staff before obtaining Station Master's Key.

4.2 **<u>For Periodical Maintenance of Relay Room</u>** :

Relay Room key for schedule maintenance shall be taken only once in a calendar month during monthly inspection by Sectional Supervisor.

4.3 **<u>Opening for Special Activities and Works</u> :**

The relay room can also be opened and closed by following the procedure as given in Para 2 & 3 respectively to carry out the activities as and when required for -

4.3.1 Special maintenance activities like cable meggering, block/disconnection memos, selection/locking table testing, maintenance work inside relay room by Electrical & Engineering staff, during failures, data logger resetting and inspection by Divisional and headquarter officials.

4.3.2 Track circuit adjustment & Voltage monitoring during monsoon and whenever required during rains.

4.3.3 Works required by S&T construction & Open line staff for preparatory works and during commissioning. In each such case, the construction staff shall follow the detailed

guidelines issued regarding working on signaling gears under the change of Open line.

4.4 **Emergency cases :**

4.4.1 In case of emergencies such as fire, flood, earthquake etc., the following actions to be taken:

a) Open Line Section Engineer (Signal) / Signal Maintainer & the ASM shall jointly decide the need for opening the Relay Room.

b) Section Engineer Signal HQ at Divisional Control Office and Section Controller shall be advised respectively.

c) In case of communication failure during such emergencies. Open Line Signal Maintainers/ Supervisors and ASM on duty shall jointly decide the need of opening the Relay Room and communicate later on to respective controls.

4.4.2 In case key is lost/misplaced -

a) It shall be reported to control for either lock.

b) In normal course the spare key with Divisional Officers shall be used. In emergency situation lock may be broken under advise to control.

c) New lock shall be procured and provided.

4.5 **Unauthorised Opening :** In case ASM on duty comes to know of Relay Room/Cabin Basement opening by unauthorized means or by unauthorized person or by any Group 'D' staff the signalling system shall be suspended by him and matter immediately reported to Section controller.

5. **Reporting and Recording of opening of Relay Rooms :**

5.1 **Control Officer -** A record of Relay Room opening will be kept on the control chart by the section Controller.

5.2 **Divisional HQ -** Section Engineer Signal HQ at Divisional Control Office will prepare daily statement and also compile a 30 days report for day to day and periodical perusal of Sr.DSTE/DSTE & Sr. DOM/DOM.

5.3 Sectional SSE & TI

5.3.1 Senior Section Engineer Signal & TI of the respective section will check the station records of Relay Room opening during their Inspections and cross check it with data longer/counter reading. Discrepancy, if any shall be immediately inquired into and advised to Sr. DSTE & Sr. DOM by the numbered control message from the station immediately.

5.3.2 Senior Section Engineer Signal & TI of the respective section will send a monthly report of opening of Relay Rooms of all stations in their beat to the DSTE & DOM respectively. Any discrepancy will be brought to the notice of Sr. DSTE & Sr. DOM by the numbered control message from the station immediately.

(M.Garhwal) 5.10.07
CSTE

(S.V.Arya)
COM

B. JOINT PROCEDURE ORDER FOR PROVISION OF STANDARD BRAKEVAN EQUIPMENT FOR COACHING TRAINS IN LOCKABLE CUPBOARD IN BOTH REAR AND FRONT SLRs OF PRIMARY BASED TRAINS

Ref: Railway Board's letter No.98/Safety (A&R)/19/21 dated 28/02/2000.

1 Standard Brake van equipment's for Coaching trains as indicated below should be kept inside a lockable cupboard provided with wire mesh (Jali) of both front and rear SLRs of primary based trains :

SN	Items	Maintained and supplied by Department	Quantity in Nos
1	Portable Control Telephone	S&T	1
2	Portable Emergency Lighting Equipments	Electrical	1
3	Fire Extinguisher	Mechanical	2
4	Wooden Wedges/Skids	Mechanical	2
5	Stretcher	Operating	1

In the power vans of LHB rakes, these equipments except the stretcher should be kept in the cupboard provided for the purpose. As the stretcher cannot be accommodated inside the cupboard it should be kept separately by the side.

2 These equipments should be loaded in both rear and front SLRs / Power Vans at the originating station platform by the respective departments. After completion of loading, the C&W Supervisor should lock the cupboards. The keys should be handed over to the Guard. Equipments duly checked and certified should only be kept m Cupboards.

3 List of equipments in the cupboard mentioning their quantities should be pasted both outside and inside of lockable cupboard duly signed by C&W Supervisor. The list should be water proof coating/ laminated and will be provided by C&W staff.

4 In order to ensure safe accountability of brake van equipments, they shall be handed over to Guard in locked condition of front & rear SLRs / Power Vans at originating station and acknowledgement should be taken from him by C&W Supervisor before issuing Brake Power Certificate All Guards while taking the charge at originating station should check and confirm that the cupboard is in locked & sealed condition. Guards while taking over the charge en-route. would observe the intactness of lock and endorse the observations in relieved Guard's tough journal. After the termination of the trains of the other end, the keys should be handed over by the Guard to the Station Master.

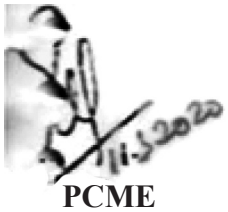
5 In case of consumption or any irregularities noticed during journey, it will be advised in writing to the relieving Guard by the relieved Guard in the Guard's journal as the seal have to be broken m this case. At the terminal station any irregularities / consumption of an tem shall be advised in writing to Station Master by the Guard. The key of the padlock, if used shall also be handed over to Station Master, who shall advise in writing to the representative of the concerned department to recoup the shortage. The equipments in the cupboard of both the SLRs / Power Vans should be unloaded by the respective departments after

the train terminates at the Primary Maintenance Station after completion of the return trip.

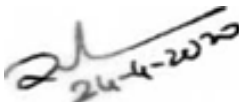
6. Brake van equipments shall be subjected to quarterly checks by concerned departments for ensuring their working condition. Supervisors of each department ensure that only tested equipments in good condition shall be loaded.

7. For those SLRs which Guard portion is given on lease, the handing over & taking over the safety equipments in sealed and locked condition would be the responsibility of Commercial Supervisor to/from the leasing party.

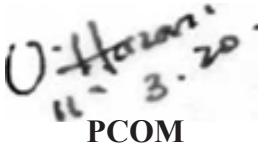
GT/369/O/R(JPO) DATE : 24/07/2020


PCME


PCEE


PCSTE


PCCM


PCOM

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C. JOINT PROCEDURE ORDER FOR LOCKING OF GUARD'S PORTION OF FRONT SLR OF PASSENGER CARRYING TRAINS.

Sub : Looking of Guard's Portion of Front SL.R of passenger carrying trains.

Ref : Railway Board's letter no. 2004/M(C)/7/10 dated 20/23.12.04

On the basis of the recommendation of CRS/Southern. Circle, Railway Board has issued instructions vide then letter quoted above regarding locking of Guard's portion of the F/SLR of all passenger carrying trams. Earlier Guard's portion of the F/SLR of passenger carrying trains was occupied by the Assistant Guards working the train. As the post of Asstt. Guard has now been abolished and therefore, there is a need to lock the same.

As per Board's instructions, Guard's portion of F/SL.R should be kept locked by 'Special Keys' by C&W staff However, since 'Universal Locks' of most of the SLRs are defunct & not in use, padlocking of the Guard's portion of the F/SLR has to be done.

The following procedure shall be followed for padlocking of Guard's portion of F/SLR :-

(1) Unties normal conditions no consignment / material shall be loaded in Guard's portion of front SL.R in passenger carrying train.

(2) The locking of Guard's portion of the F/SLR of all passenger carrying trains will be done by Driver/Assistant Driver of the train.

(3) All N.F. Railway Drivers working passenger carrying trains will be supplied with a personal

lode & key winch they will carry along with other equipments. This personal lock & key will form a part of their safety equipment. The Guard's compartment in the Front SLR should be kept Locked by Drivers at the originating station and should be opened, whenever reversals take place en-route.

(4) Padlocks & keys will be supplied to the Drivers by the concerned Sr . DME (P) / DME (P) or Sr. DEE (OP) of each division.

(5) Availability, Shortage & Supply of padlocks & keys will be monitored by the respective department While assessing the requirement of such locks, arrangement must be made for spare locks & keys at all crew changing points in sufficient number, based on experience as buffer stock, to meet the requirement of diverted trains etc.

(6) At all crew changing points on this Railway, the incoming Driver / Assistant Driver will remove his lock from the Guard's portion of F/SLR & outgoing Driver /Assistant Driver will put his lock in place. This arrangement will continue till the destination of the trains is reached or till the train is handed over to adjoining Railway.

(7) For trains entering into N.F. Zone, where the Guard's portion of the F /SLR may be in open condition & occupied by passengers / outsiders, the outgoing Driver /Assistant Driver, at crew changing point, will make a strong effort to get the Guard's portion of the F/SLR vacated & lock the Platform side door after closing side the off side door from inside using the door latch. in his effort to get Guard's portion of the F /SLR Guard's portion of the F / SLR vacated the Driver / Assistant Driver may seek the help of die train escort or RPF/ GRP posted at the station. However, there should not be any undue detention to the train on this account, Train escort as well as RPF / GRP staff posted at these stations should also ensure at their own that the F/SLR is vacated in time without any undue detention to train.

(8) A similar practice shall be followed for trains originating from NFR system. However, in all cases of originating trains RFF/ GRP staff posted at the station should on their own come to the F/SLR of the originating train and get the Guard's portion vacated, to enable the Driver to padlock the same without any loss of time.

(9) If it does not become possible to lock the Guard's portion of the F/SLR of the train within the scheduled stoppage of the train due to the inability of the Driver/Assistant Driver to get it vacated, the Driver/ Assistant Driver will report this to the Guard. On receipt of this information, the Guard will allow the train to start after reporting to the Control through SM/ ASM of that station so that arrangements can be made to get the Guard's portion of the F/ SLR vacated by RPF/GRP at the next stoppage.

(10) Some SLRs attached to trains are escorted by RPF/GRP staff for preventing theft of luggage of the F/SLR. Such RPF/GRP staff are required to seat in Guard's compartment of the F/SLR for the purpose of escorting. In such cases Driver/Assistant Driver will hand over the key of the lock provided in the Guard's portion of the F/SLR to RPF/GRP escort party at the station where RPF/GRP start escorting duty. Key will be given back to Driver/ Assistant Driver by RPF/GRP escort after locking the Guard's compartment on completion of SLR escorting duty. RPF/GRP staff will give a receipt on the following proforma to Driver / Assistant Driver at the station from where the escorting duty of SLR is started. Driver / Assitant Driver will also put his signature command paper of the escort party as a token

of keys of the Guard's portion of the F/SLR having received back by him.

Acknowledgement

I, BC/CT …… have been directed to escort F/SLR of train on ……Ex. Station…….. to …….. ……. Station. I have received key of lock of Guard's lobby of the From SLR at station.

……

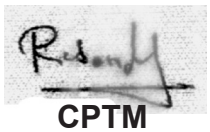
(Full signature of RPF staff)

With designation

(11) Crew/Driver/Assistant Driver) of the Railways working trains on the jurisdiction of N.F.Railway shall also follow the above system of padlocking the Guard's portion of F/SLR for this purpose, the adjoining Railways should issue suitable instructions to their Drivers/Assistant Drivers coming to this Railway, on the basis of this JPO.

Compliance of the above instructions must be rigidly observed by all concerned.

The above issues with the approved of competent authority and will come into force within mediate effect.



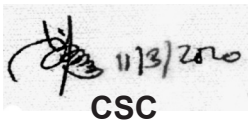
CPTM



CME(O&S)



CRSE



CSC

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D. JOINT PROCEDURE ORDER FOR TIMELY REMOVAL OF DEAD BODY FROM THE TRACK

No. T/61/RUN OVER/TRC Dated 23.05.2018

Sub:- Timely removal of dead body from the track.

1. It is observed that inordinate delay takes place in clearing the track in case of run over or dead body found on or near the track, resulting into long detention to Mail/Exp/Passenger and Goods trains.
2. The existence of dead body on or near the track should be immediately informed to RPF/ GRP/SM/Gateman over telephone /Cell phone/Walkie-talkie or in person by any railway staff
3. GRP/RP& staff should immediately attend the site by fastest possible means of transport tion as stipulated in JPO No.P/25/IX/Claims(UTI)/CB/2018 dated 09.11.2017.
4. To clear the track for movement of subsequent trains, the dead body may be removed from the line and kept at a minimum distance from the site with the minimum handling to avoid the destruction/removal or disturbance of the evidences.
5. The dead body is to be immediately removed from the track by any railway staff. .
6. The body may be left in charge of any responsible person of the society or the railway man and if no responsible person is available at the site where the body is found it shall be removed to the nearest gate lodge in the direction of the movement of the train. Where there

is no gate lodge it win be carried and made over to the SM of the next station.

7. In all cases a written memo should be made over to the person by the guard and in his absence by the driver indicating time and place, position of the body in relation to the track, blood stains on the ballast or engines, positioning of any clothing etc. found on or near the rails, name of the informant and his full postal address, position of any photography or videography may be taken and rough sketch of the body may be drawn.

8. if (he dead body obstructs the movement of trains in the station yard/jurisdiction, Station Master shall arrange to immediately remove the body from the track for early movement of the affected train as wen as the following trains.

9. Nothing contained in the aforesaid paras shall contravene or be contrary to the para 111(b) I.II.IIUV & para 112 of the N.F.Railway Accident Manual updated version 2013.

10. In case of any doubt or clarification the relevant provisions of Accident Manual shall prevails.

11. The activities/formalities involved after the removal of the body from track shall be completed as per relevant provisions of Accident Manual or Railway Act 1989.

CPTM **CME(O&F)** **CTE** **CSC**

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E. COST OF STOPPAGE OF A TROUGH MAIL/EXPRESS TRAIN FOR TWO MINUTES

S.No.	Details	Cost (Broad Gauge)					
		Diesel			Electric		
A	**Basic Data**						
1	Class of the train	Mail/Exp.	Mail/Exp.	Mail/Exp.	Mail/Exp.	Mail/Exp.	Mail/Exp.
2	Average composition of the rake (coaches)	18	20	24	18	20	24
3	Average bookde speed of the train (Kmph)	120	100	120	110	120	110
4	Duration of Stoppage (min.)	2	2	2	2	2	2
5	Actual loss of time with for deceleration, acceleration & half time.	8	8	8	8	8	8
B	**Cost Data**						
1	Cost of additional fuel/energy consumption						
	(a) Consumption in units (Ltr. for dsl & Kwh for elect)	106	108.49	118	129.94	162.91	181.81
	(b) Cost per unit 2013-14 (ASS P.321 cl.68&cl.74)	83.75	63.75	63.75	6.61	6.61	6.61
	(c) Escalated to 2015-16 @ 21.30%	77.33	77.33	77.33	8.01	8.01	8.01
	(d) Cost for additional fuel/energy consumption	8197	8390	9125	1041	1145	1457
2	Cost of train Km. lost						
	(a) Train Km. lost*	10	8.33	10	9.17	9.17	9.17
	(b) Average cost of hauling a coaching train one Km. 2013-14	1268	1268	1268	1050	1050	1050
	(c) Total loss for the train Km. lost.	12680	10567	12680	9625	9625	9625
	(d) Escalated loss for 2015-16 @ 21.30%	16381	12817	16381	11675	11675	11675
	Total Cost (1d-2d) (fig in Rs.)	28578	21207	24506	12717	12820	13132

(As per Railway Board's letter no. 2004/chg-II/13/Stoppage Policy dated 24.02.2016)

F. JOINT CIRCULAR NO.02 OF 2017 (S&T) FOR RECORDING OF FAILURES IN SIGNAL FAILURE REGISTER

1. Wide discrepancy has been noticed in the number of signal failures recorded on the Control Chart and the figures recorded in the Signal Failure Register.

2. It has been found that the reasons for the difference between the numbers of Signal failures recorded in Signal Failure Register (calculated by adding together the number of failures entered in the Signal Failure Register at each station) and the figures recorded in the Control Chart arise out of the following factors:
2.1. When there is a failure of a Block Instrument, entries are made in the Register at the station on either side of the Block Section instead of making it only at the end where the actual failure occurred.

2.2. When a station issues T/369(1) for passing a Signal of the station in advance, entries are made at both the stations.

2.3. When several trains are detained as a result of a particular failure, each detention is recorded as separate failure instead of only one failure.

2.4.When T/369(3b) is prepared after making corresponding entries in the Signal Failure Register, but T/369(3b) is subsequently cancelled without cancelling corresponding entry in the Signal Failure Register.

2.5.When a number of Signals fail as a result of a Track Circuit or Point failure, the Track Circuit/Point being common to all signals, it is recorded as multiple failures.

2.6.Failures of various telephones viz. ADM and Control Phone ring are also recorded in the Signal Failure Register.

2.7.Failures are recorded in Signal Failure Register even though it does not result in the detention to train.

2.8. Failures of VHF/Walkie-Talkies are recorded in Signal Failure Register.

2.9 Failures of Gate Phones are recorded in Signal Failure Register.

3. It has therefore been decided that the following procedure shall be observed while making entries in the Signal Failure Register in order that records in Control Chart and entries in Signal Failure Register rally.

3.1. Only one failure shall be recorded for each signal failure, irrespective of number of trains detained. Details of trains detained and T/369(3b) issued to them shall be given in appropriate column against the signal failure.

3.2. When more than one signal fail on account of a defect In a Point, one failure i.e. a point failure should be entered. A sample entry for this case is given below:

Our at fault	Time failure occurred	Time failure rectified	Trains detained	Sr. No. and date of T/369(3b)	Remarks
Point No.24 Indication not coming (signals A.B.C.D.E affected)			.....DN .....DN .....UP .....DN .....UP		

3.3. Similar entries as in item No.3.2 above should be made in respect of a Track Circuit failures affecting Signals or Points.

3.4. Signal & Telecommunication Failure Register should be renamed as Signal Failure Register only and Telecommunication Failure Register to be opened & maintained separately to record all sorts of telecom & passenger amenities failures related to S&T department.

3.5. Signal Failure Register normally having 80 pages, out of which Page No.1& Page No. 60 should be treated as Main Signal Failure Register and Page No. 61 to Page No. 80 should be treated as Separate Register for recording of failures as given in Para 3.6 to Para 3.10.

3.6. T/369(1) issued by any station far the signal at a station ahead shall not be entered on Page No 1 to 60 Signal Failure Register but shall be entered on Page No. 61 to 80 of Signal Failure Register to be kept for this purpose.

3.7. When Double line Block Instrument fails, entries should be made only at the station which first detects failure. Other station shall record T/369(3b) on the Page No. 61 to 80 of Signal Failure Register mentioned in Para 3.6.

3.8. For single line section defect of the Block Instrument (Token/Tokenless) shall be entered at the station which first faces difficulty of dispatch. Other station shall record T/369(3b) on Page No. 61 to 80 of Signal Failure Register mentioned in Para 3.6.

3.9. Motor Trollies are not ordinarily heavy enough to work treadles or track circuits used in connection with the Block Instruments. Whenever a motor trolley fails to operate treadle or track circuits the Station Master concerned shall operate the emergency release provided for the purpose. In such cases, no entry shall be made on Page No. 1 to 60 of Signal Failure Register; It may be recorded on Page No. 61 to 80 of Signal Failure Register.

3.10. There are some failures in which neither T/369(I) nor T/369(3b) is issued viz. indication lamp/LED of Signal aspect at SM's panel fused/defective but Signal is glowing at site such instances shall also be recorded on Page No.61 to 80 of Signal Failure Register as mentioned in Para 3.6.

3.11. Failure of Walkie - Talkie and various telephones viz ADM, Gate Phone, Control Phones ring and Control Telephone shall not be recorded in the Signal Register. It shall be recorded in Telecommunication Failure Register.

4.0 For any entry In Signal Failure Register if the actual failure is in adjacent station then signal staff shall mention the name of other station while giving remarks of the failure.

4.1 A month wise summary of total Signal Failure to be maintained in Signal Failure Register for last two financial years and current financial year as per format attached in Anexure.

Inspire of above instructions, some wrong entries may still take place. This should be sorted out by Sectional SSE/JE(SIG) jointly with Station Master during his visit and total number of failures recorded in red ink and prominently entered on top of the page at the time of such joint check, correcting the serial number also. These entries shall also be counter checked by the SSE (SIG)/IC and Traffic Inspector during their visit.

This Joint circular supersedes Joint circular No.4 of 1998 on the same subject issued vide No. N/245/1/5 dated 3.3.98.ns

(O.P. Nebhnani)	(Amlan Kumar Biswas)	(Sanjeev Kishore)
Principal Chief Signal & Telecom Engineer	Principal Chief Operations Manager	Chief Safety Officer

Annexure to Joint Circular No. 02 of 2017 (S&T) dated - 24.10.2017

Summury of Total Failure

Stations :

Month	For the Year 2020-21		For the Year 2021-22		For the Year 2022-23	
	During month	Cumulative	During month	Cumulative	During month	Cumulative
April						
May						
June						
July						
August						
September						
October						
November						
December						
January						
February						
March						

(O.P. Nebhnani)	(Amlan Kumar Biswas)	(Sanjeev Kishore)
Principal Chief Signal & Telecom Engineer	Principal Chief Operations Manager	Chief Safety Officer

G. JOINT PROCEDURE ORDER (JPO) TO DEAL WITH BOMB THREAT CALLS IN RAILWAYS

On being observed (he need to deal with Bomb Threat Calls in Railways the following Joint Procedure Order has been drafted:

1. Need for JPO:

Railway is a soft target for attack by terrorist/miscreants. Few cases of bomb blast in Trains/ Railway premises, have taken place in the past over N.F. Railway, A number of calls are also received in the Railway system informing about placing of bombs/noticing of suspicious items in Trains/Railway premises. In the absence of clear cut guide lines, often it leads to disruption of traffic for long hours, resulting loss of punctuality and harassment to travelling passengers. Therefore, there is a need to specify clearly:

1 (i) What to do on receiving a Threat Call.

1 (ii) Specify roles of different Agencies/department. to ensure co-ordination and effective response to each and every situation.

1 (iii) Follow up action to be4aken once the Bomb has been defused/exploded/call has been found to be a hoaxed.

2. Responsibilities of Railways :

It is the responsibility of the Railways to provide safe and Secure journey for its passengers. Therefore, each and every Bomb Threat Call, whether received telephonically on its own system, through police control room or otherwise, ought to be looked into seriously as it affects safety and security of travelling public as well as of Railway property. Prevention of injury or loss of life has to be given topmost priority. Co-ordinated efforts on the part of different branches of Railways and State Police/other security agencies is required to ensure safe evacuation, rescue operation, disposal of Explosives, crowd control, provision of Medical facilities, preserving evidence at site, making fast alternative arrangement for travelling passengers, prompt and correct dissemination of information etc.

3. Receipt of Information regarding Bomb Threats :

3.1 Information regarding Bomb threats may be received from the following sources

3.1 (i) On Telephone through Police/GRP control rooms.

3.1 (ii) Through Anonymous/ Pseudonymous letters.

3.1 (iii) On phones of SS/ASMs/Commercial Control/Railway Help lines - 139/182 etc.

3.2 Intention of the threat caller :-

It is important to understand the intention of the caller. The seriousness with which a call has to be taken and follow-up action Io be done will, to a great extent, depend on the details of information received from the caller.

The intention of the caller/informer may be:

3.2 (i) To actually inform about the Bomb.

3.2 (ii) To create panic in Railways/Police.

3.2 (iii) To cause stoppage of Train, if one is about to miss boarding a Train,etc.

3.3 How to deal with different Throat Calls :

3.3(i) If information is received through Police/GRP Control rooms, normally they will inform all the details collected by them. Accordingly decision can be taken by Railway authorities in consultation with Police Officials.

3.3(ii) If specific information is given by anonymous/Pseudonymous letters, proper checking through BD Team of RPF/Police should be ensured.

If there is no specific information, all Railway employees/Police personnel/Other stake holders (Coolies, Authorized Hawkers etc.) should be alerted to be extra- vigilant about un-identified baggage, suspicious looking persons etc. General alertness should be ensured without causing any panic.

3.3(iii) If information is received on Phone by SS/ASM/Commercial Control /Railway Help line etc., the information received should be thoroughly analyzed to come to a proper decision.

3.3(iv) To ensure that the recipient of the call can extract maximum relevant information, the following should be ensured:-

3.3(iv.i) All public interface Phones, viz. SS/ASM/Commercial Control etc. should have caller ID facility.

3.3(iv.ii) Officials manning these Phones should be sensillzed/trained ice licit as much relevant information, as possible, whenever such Bomb threat calls are received.

PCCM	PCOM	PCSC
N.F.Railway, Maligaon	N.F.Railway, Maligaon	N.F.Railway, Maligaon

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H. CLASSIFICATION OF OPERATING STAFF INTO 'A', 'B', 'C' & 'D' CATEGORIES

The important role of operating staff, especially those involved in train passing duties cannot be over-emphasized. Failures of train passing staff can result in serious accidents and bring down the reputation of Railways. In this context, it is absolutely essential that a proper system of monitoring and upgration of staff involved in train passing duties is instituted. Operating Staff may be categorized into 'A', 'B', 'C & 'D' categories for the purpose of better and more effective monitoring of comparatively inefficient staff as also to upgrade their knowledge and competence.

(A) METHOD OF CLASSIFICATION

1. All Operating staff involved in train passing duties shall be classified under one of the four heads - 'A', 'B', 'C' & 'D'. Categorization will be made after an analysis of performance of that employee for the last 6 months. The important parameters to be taken into account

while analyzing the performance of the employee along with the weightage of each is given below. The classification shall be done on the basis of 100 marks and marks for each parameter shall be as follows:-

(i)	Knowledge of Rules	25 marks
(ii)	Alertness and observanceof rules	25 marks
(iii)	Safety Record	15 marks
(iv)	Leadership and Management	15 marks
(v)	Discipline	10 marks
(vi)	Appearance & neatness	10 marks

2. For staff to be classified as A or B category, they must secure a minimum of 60% marks each in 'Knowledge of Rules' parameter as well as 'Alertness and observance of Rules' parameter.

3. Staff shall be graded based on the total marks received. The gradation shall be as under.

Category 'A'	80 and above
Category 'B'	50 to 79
Category 'C'	49 to 26
Category 'D'	25 and below

4. All known alcoholics shall, however, be classified only in 'D' category, irrespective of marks received by them in other aspects of working.

(B) SYSTEM OF GRADING

1. The gradation of staff shall be made by the following:

(i) The SS/SM in-charge of the station shall grade all Group-D staff working under his control.

(ii) Group-C staff including SMs/ASMs, Switchmen shall be graded by the TI of the Section or the Supervisory SS in Scale (9300-34800) Grade Pay of Rs.4600 and above.

(iii) SSs Scale (9300-34800) Grade Pay of Rs.4600 and above shall be graded by AOM.

(iv) All Traffic Inspectors (any grade) shall be graded by AOM.

2. To ensure that the system is fair and objective, all classifications made by the SM/SS/TI shall be counter-signed and accepted by the next higher authority within 6 months.

(C) SYSTEM OF MONITORING

1. A separate register shall be opened and the performance of the employee shall be recorded every 6 months. Record of performance shall be seen by the next higher authority once a year. This review shall decide the further course of action to upgrade staff, wherever necessary.

2. Staff classified as Category 'D' staff shall be monitored on a monthly basis by the SM/SS/TI/AOM.

3. Staff classified as Category ‘C staff shall be monitored on a quarterly basis by the SM/ SS/TI/AOM.

4. A copy of the record of classification of Category ‘C’ and ‘D’ shall be maintained by AOM/DOM/Sr. DOM. Their record of performance shall be upgraded by the TI on a 6 monthly basis and reviewed every 6 months by the AOM.

(D) SYSTEM OF UPGRADATION

1. All attempts should be made to upgrade staff in ‘D’ and ‘C’ categories. In this context, wherever staff have been classified as category ‘C or ‘D’, inputs of knowledge, counseling and monitoring shall be done by the next higher authority. SM/SS/TI must make special efforts for upgrading staff classified as Category ‘D’. The inputs given to the employee in a 6 month period shall be tabulated and a record maintained and reviewed by the DOM/Sr. DOM. every year.

2. During monthly Safety Meetings conducted at stations, areas of weakness of the staff on the basis of which they have been classified in a lower category must also be discussed, along with ways to upgrade the same.

3. In the case of ‘D’ category staff where inputs cannot be given at the Divisional level, they shall be sent for Refresher Courses at more frequent intervals to be decided by the DOM/Sr. DOM based on the competence and knowledge seen during the time of analysis.

(E) INSPECTIONS

The inspection reports of SS/TI/AOM should specifically deal with the categorization of staff and attempts to upgrade and reasons for downgrading of staff.

(F) ADVICE TO STAFF

Details of ‘A’, ‘B’, ‘C’ and ‘D’ classification must be notified to the concerned staff. However, the records should be maintained and handled by the Station Superintendent personally.

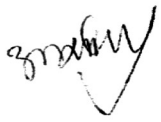
(G) AWARDS AND PUNISHMENTS

1. To ensure that this system not only results in a higher level of competence, but also becomes a self-motivating factor, any staff categorized as ‘D’ or ‘C’ who within a period of 6 months, upgrades himself to ‘A’ category, may be motivated suitably.

2. For being considered eligible for annual safety award, staff who have consistently maintained themselves in Category ‘A’ should generally be considered.

3. Categorisation of staff should be taken into consideration while filling up the columns pertaining to Safety Consciousness etc. in the Annual Performance Reports.

4. However, staff who do not upgrade themselves despite inputs of knowledge, training and monitoring, need to be taken up suitably. Review of their service should be done and wherever necessary, their retirement from service should be planned as per existing rules.



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Register of Amendment/Correction Slip

No. of Amendment/Correction Slip	Date of Issue	Para No.	Page No.