ZRTI Phase-1 Operation Project

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TOPICS FOR PRESENTATION

- Absolute block system of Signalling
- Automatic block system of Signalling
- Duties of Guard

ABSOLUTE BLOCK SIGNALLING SYSTEM

&

AUTOMATIC BLOCK SIGNALLING SYSTEM

FOR SAFE TAIN OPERATION,

there are two theories.

1. Time gap approach.
2. Geographical gap approach.

SYSTEM OF WORKING

means the system adopted for the time being for the working of trains on any portion of a railway ;

SYSTEMS OF WORKING.

(1) Trains shall be worked on one of the following system:-

- ✓ - **The Absolute Block System.**
- ✓ - **The Automatic Block System.**
- ✓ - **The Following Train System.**
- ✓ - **The Pilot Guard System.**
- ✓ - **The Train-staff and ticket System.**
- ✓ - **The One Train Only System.**

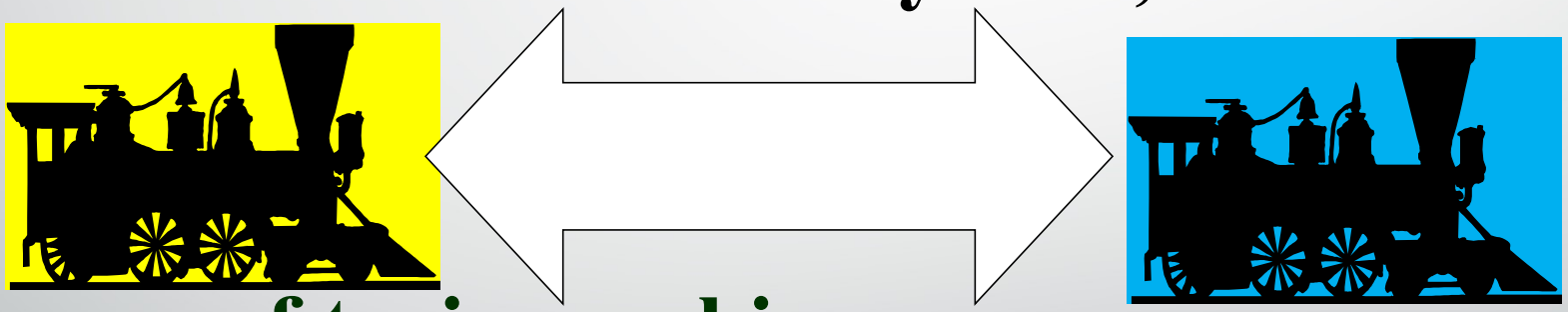
(2) The Absolute Block System and Automatic Block System alone shall be used on every Railway, except, any Railway or portion of a Railway on which the use of an other System of Working mentioned above, may be sanctioned under special instructions..

ABSOLUTE BLOCK SYSTEM

One of geographical

gap approach…

Absolute Block System,



of train working

MEANS OF COMMUNICATION FOR LINE CLEAR

- Block instruments
- Track circuits
- Axle counters
- TELEPHONES ATTACHED TO B/ints
- Station to station fixed telephones
- Fixed telephones (rly.Auto/bsnl)
- Control telephone
- VHF sets

ESSENTIALS

- No train shall be allowed to leave a Block Station unless, Line Clear has been received from the Block Station in advance, and

ON DOUBLE LINE

- such Line Clear shall not be given unless the line is clear, not only up to the First Stop Signal at the Block Station at which such Line Clear is given but also for an Adequate Distance beyond it;

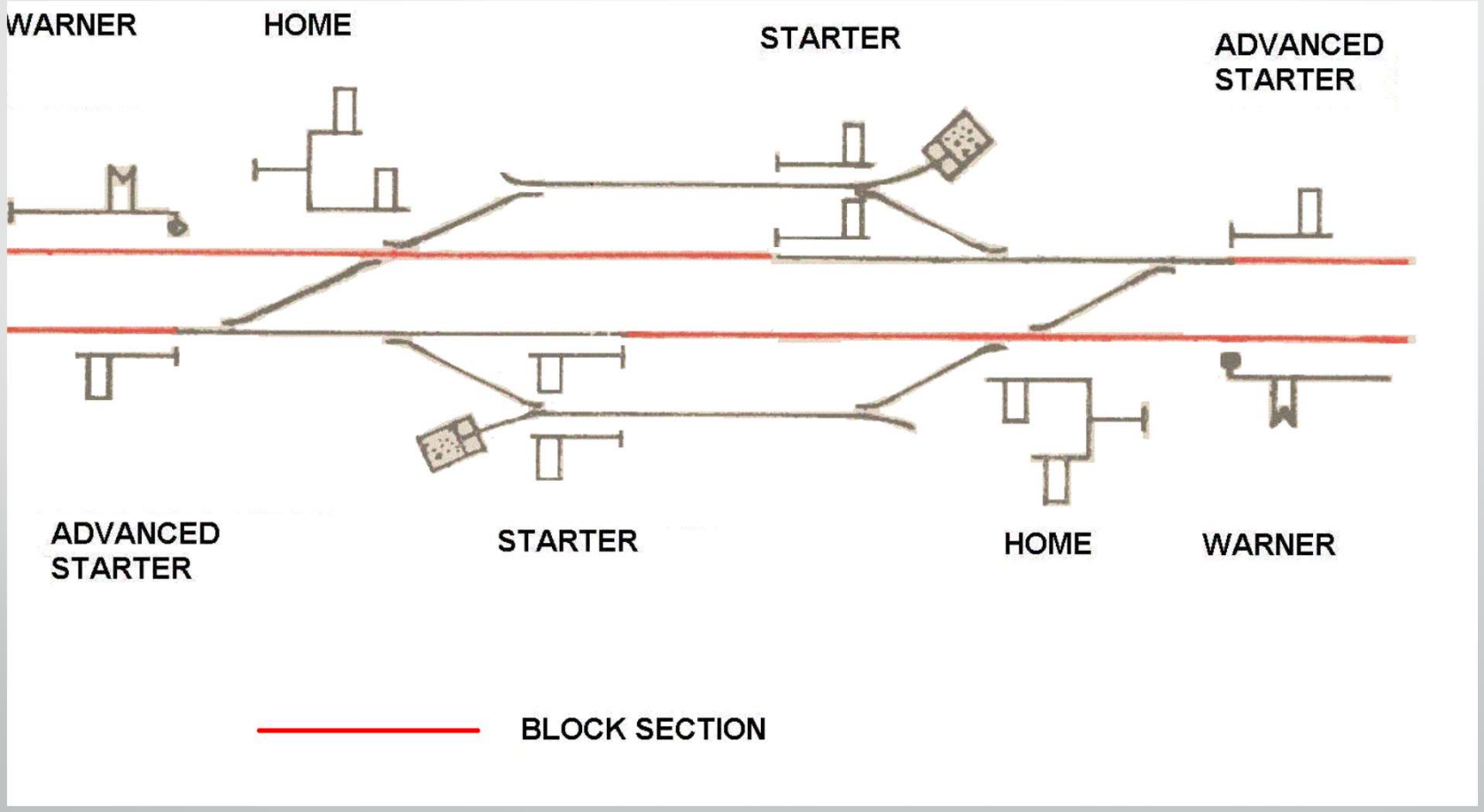
ON SINGLE LINE

- such Line Clear shall not be given **unless the line is clear** of trains running in the same direction, not only **up to the First Stop Signal** at the Block Station at which such line clear is given, but **also for an Adequate Distance** beyond it,

- And is clear of trains running in the direction towards the Block Section to which such Line Clear is given;

- Unless otherwise directed by approved special instructions,
  - **AD = 400 METRES IN TWO ASPECT L.Q. OR CLS &**
  - **AD = 180 METRES IN MAUQ – CLS AND MLQ**

CLASS A STATION

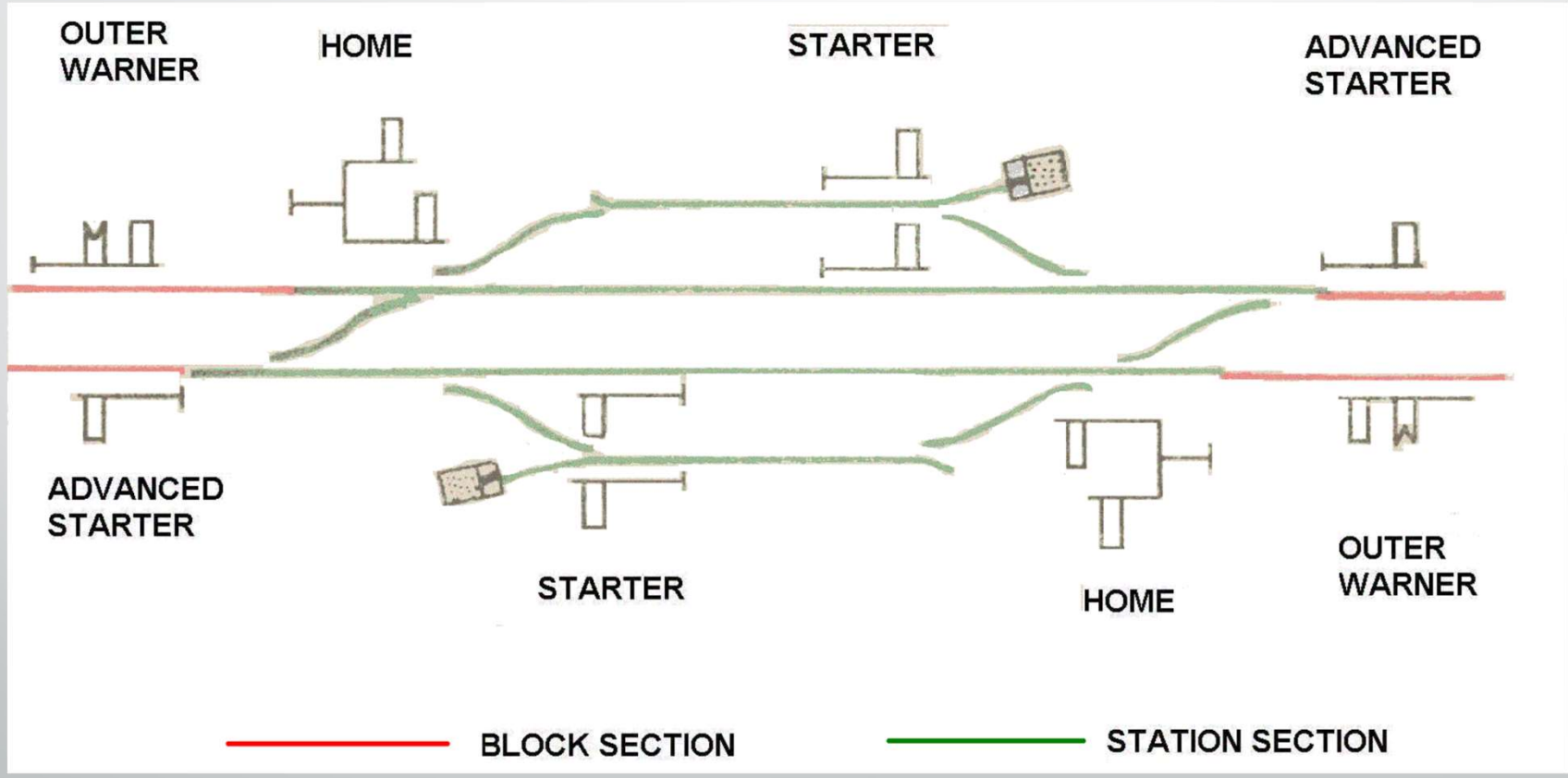


CONDITION FOR GRANTING LINE CLEAR
AT A CLASS 'A' STATION
ON SINGLE LINE OR DOUBLE LINE

the line shall not be considered clear and line clear shall not be given, unless: -

a) the whole of the last preceding train has arrived complete;
b) the signals have been put back to 'ON' behind the said train;
c) the line on which it is intended to receive the incoming train is clear up to the Starter; and
d) All points have been correctly set and all facing points have been locked for the admission of the train on the said line.

CLASS B STATION



CONDITION FOR GRANTING LINE CLEAR AT A CLASS 'B' STATION ON DOUBLE LINE.

The line shall not be considered clear and line clear shall not be given, unless : -

a) The whole of the last preceding train has arrived complete;

b) All necessary signals have been put back to 'on' behind the said train; and

c) The line is clear up: -

- **At stations equipped with two aspect signalling:-**
  - ❖ Up to home signal, or
- **At stations equipped with multiple aspect signalling or modified lower quadrant signalling**: -
  - ❖ Up to the outermost facing points or the block section limit board (if any)

CONDITION FOR GRANTING LINE CLEAR AT A CLASS 'B' STATION ON SINGLE LINE.

the line shall not be considered clear and Line Clear shall not be given, unless : –

a) the whole of the last preceding train has arrived complete;

b) all necessary signals have been put back to 'ON' behind the said train; and

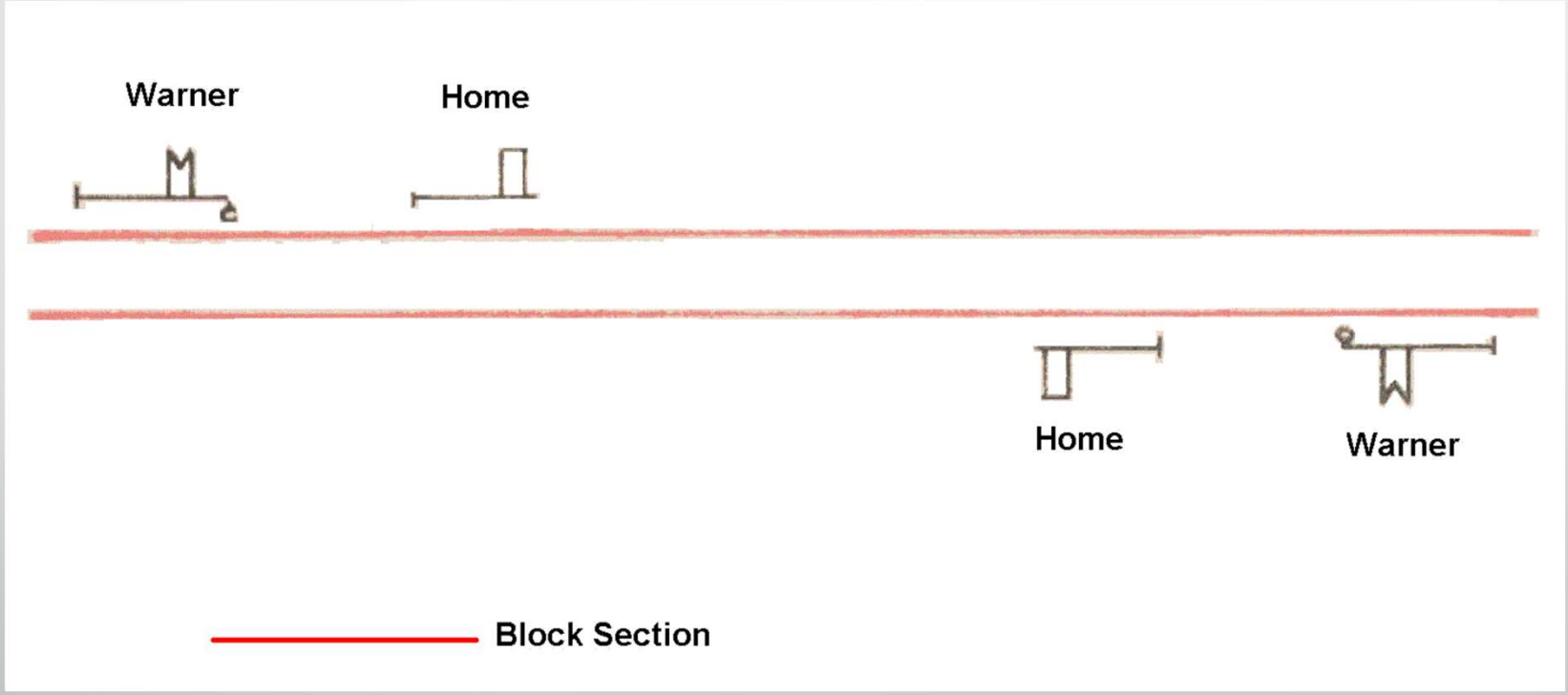
c) the Line is Clear : –

- **At STATIONS EQUIPPED WITH TWO ASPECT SIGNALLING** : –
  - ❖ Up to the Shunting Limit Board or Advanced Starter (if any) at that end of the station nearest to the expected train, or
  - ❖ Up to the Home signal if there is no Shunting Limit Board or Advanced Starter; or
  - ❖ Up to the Outermost Facing Points if there is no Shunting Limit Board or Advanced Starter or Home Signal ;

- **AT STATIONS EQUIPPED WITH MULTIPLE ASPECT SIGNALLING OR MODIFIED LOWER QUADRANT SIGNALLING: -**

  - Up to the shunting limit board or advanced starter (if any) at that end of the station nearest to the expected train, or
  - Up to the outermost facing points if there is no shunting limit board or advanced starter.

CLASS C STATION



CONDITION FOR GRANTING LINE CLEAR ON SINGLE LINE OR DOUBLE LINE IN TWO-ASPECT, MULTIPLE-ASPECT OR MODIFIED LOWER QUADRANT SIGNALLING.

the line shall not be considered clear and line clear shall not be given, unless : –

a) the whole of the last preceding train has passed complete at least 400 metres beyond the Home signal and is continuing its journey; and

b) all signals taken 'OFF' for the preceding train have been put back to 'ON' behind the said train

- Provided that on a single line, the line is also clear of trains running in the opposite direction towards the block hut from the block station at the other end.

AUTOMATIC BLOCK SIGNALLING SYSTEM

KINDS OF SIGNAL IN AUTOMATIC BLOCK TERRITORY

- Automatic stop signal: **‘A’ marker** in Black font with white back ground.
- Semi-Automatic stop signal: **Emulated A marker** in black background .Manually operated and automatic both working.
- Manually stop signal: Operated manually only.

A & AG marker gate stop signal

- Semi-automatic stop signal.
- Protects points also.
- A lit: Gate closed & locked, Points also set and locked.
- AG lit: Gate open/failed points correctly set.
- A & AG lit: Defective signals.
- NO lit: Points not set or routs failed.

Essentials of Double line

A. Line shall be continuous track circuiting or axle counter,

B. Line between two block stations may, be divided into a series of automatic block signaling sections,

Each portion of the running line between two consecutive stop signals,

The entry into each of which is governed by a stop signal

- **C.** The entry into each an automatic block signaling section governing by the track circuits or axle counters, such as:-

- The signal shall not assume off position unless the line is clear not only up to the next stop signal in advance but also for an **adequate distance** beyond it,
- The signal is automatically placed to ‘ON ’as soon as it is passed by the train.
- These adequate distance shall not to be less the **120 meters**

DUTIES OF LOCO PILOT

When a loco pilot , an automatic signal with an ‘A’ marker at ‘ON’, He shall:-

- Stop in the rear of the signal,
- Wait there for one minute by day and two minutes by night.
- If the signal continuous to remain ‘ON’
- He shall give the prescribed code of whistle and exchange signals with the Guard,

- then proceed ahead, towards the next stop signal with great caution ,speed not more than **15 kmph**.
- With great caution to stop at next stop signal or before short of any obstruction.
- The Guard shall show stop hand signal towards the rear the train,
- If visibility is not clear Loco pilot shall proceed with great caution and assist by assistant loco pilot/Guard.
- The Guard shall accompany to loco pilot on engine cab if assistant loco pilot not available.
- Even if the next stop signal is in ‘OFF’ position, loco pilot shall not assume normal speed before passing it.

- If visibility is clear the speed should not exceed **15 kmph**.
- He shall stop his train before any obstruction or train with maintaining sufficient distance ;

✓ In the case of EMU **75 meters** ,

✓ Other than EMU **150 meters**.

✓ In special circumstances, like floods etc. it may be reduced.

ESSENTIALS OF SINGLE LINE

- The line shall be provide with continuous track circuit or axle counter.
- Direction of traffic shall be established after line clear obtained from the block station in advance.
- Train shall be started from one block station only after the direction of traffic has been established.
- Line clear shall not be given unless the line is clear not only up to first stop signal but also for an adequate distance beyond it,
- Line between two block station may be divided in to two or more automatic block signaling section.

- Movements of train into ,each automatic block signaling section shall be controlled by the concerned Automatic Stop Signal,
- And Automatic stop signal shall not assume off position until the line is clear up to next Automatic Stop Signal:
- But where the next stop signal is a Manual Stop Signal the line is clear for an adequate distance beyond it,
- All Automatic stop signal for opposite direction shall be at ‘ON’.
- The **Adequate Distance** for line clear and tacking off signal shall not be less than **180 meters**.

RECEPTION AND DISPATCH OF TRAINS ON SINGLE LINE

- Controlled by the Automatic ,Semi-automatic, Manually stop signals.
- Direction of traffic established by the direction of Section Controller.
- The direction of traffic shall be established by using of Co-operative button. Private number shall be exchanged.
- Indication for direction of traffic will persist till such time the direction of traffic is changed by Cabin ASM on duty at the train sending end or train receiving end.
- The '**OFF 'aspect of LSS** constitutes ' **Authority to proceed**' for train enter the Block section.

MINIMUM EQUPMENTS IN SINGLE LINE

- Manual stop signal at a station
  - Home
  - Starter.
- An automatic stop signal in rear of the Home Signal of the station.
- (Under approved special instruction the automatic stop signal may be dispensed with.)

CONDITION OF TAKING OFF MANUAL STOP SIGNAL

HOME SIGNAL:

- Other than the terminal station ,the signal shall not be taken off unless line is not clear up to the the starter but also for an adequate distance of 120 meters beyond it.
- At terminal station line is clear up to stop board.

LAST STOP SIGNAL:

- Direction of traffic has been established.
- Line is clear up to next automatic stop signal.
- If next stop signal is a Manual Stop Signal line is clear up to an adequate distance beyond it.
- The adequate distance is not less than 180meters.

Issues of Automatic Block working

1. Speed variations.
2. Safety threats.
3. Cost factor.
4. Maintenance & Technological skills of staff.
5. Failure response time.

GUARD IN INDIAN RAILWAYS



DUTIES OF GUARD

- Timely reporting
- Proper uniform
- Setting up his watch before stating a train from a terminal or crew changing station.
- Copy of the working time table for the time being in force.
- Equipment with his train as per gr 4.19.
- A caution order and brake power certificate.
- Travel in his brake van.
- Ensure a continuous vacuum/air pressure from train engine to last vehicle of his train.

DUTIES OF GUARD

- Joint brake power continuity test to be conducted at the originating station.
- Test that his brake system is working then only sign the B.P.C
-
- Exchange of alright signals with station master.
- Exchange of alright signals with the Guard of train running in opposite direction.
- Watching trains on adjacent track.
- Guard to keep good look out during journey and during halts at station and while passing manned LC gates or gang working on line.

- look out on curves and if any during unusual is noticed take steps to stop the train.

- Showing hand signals during danger.

- Take steps to stop the train during unusual

Duties when train held up at First stop signal

- protection of train in rear by guard after fifteen minutes or such less time as may be prescribed by special instructions, irrespective of whether the cause is apparent or not.
- Protection of train by guard during unusual occurrences.
- Sending advice of accident or Break – Down.

Goods Trains:-

- Brake Van to Engine TO & FRO

The Guard should verify that:

- The entries in the vehicle guidance tally with the wagons on the train
- The wagon doors including side flaps and end doors are properly closed and well secured

ADDITIONAL DUTIES OF THE GUARD WHILE WORKING A TRAIN

- The wagons shown as empty in the vehicle guidance is **really empty**.
- The covered loaded wagons have the seal label on each side and the **seal is intact** and the wagons required to be **riveted** on each side are actually riveted.
- Ensure adequacy of effective brake power and amount of **air pressure/vacuum** as prescribed.
- The **heavy consignments** are **securely fastened** to ensure that they do not get shifted while on run.
- Any wagon does not appear to be overloaded or unevenly loaded on visual.
- marshalled as per **marshalling order**.
- The total number of vehicles and the trailing load (tonnage) of the train does not exceed **the limits prescribed in the WTT** for the section and for the class of engine working the train.

ADDITIONAL DUTIES OF THE GUARD WHILE WORKING A TRAIN

- Minimum prescribed Air pressure/Vacuum is indicated in the gauge available in the brake van.
- At every **long halt station**, crew changing station and after attaching or detaching of any locomotive / wagon enroute, **the continuity of brake pipe pressure** or continuity of vacuum should be checked before starting of train.
- Instructions for working of Air brake goods trains and special type of stock issued from time to time by the competent authority should be followed.
- Precautions for movement of ODC as per chapter 12

ADDITIONAL DUTIES OF THE GUARD WHILE WORKING A TRAIN (Para 310 of operating manual)

Passenger Trains

- The Brake-van equipments are complete.
- Proper charge is taken of luggage and parcels unless another staff is separately available for this duty.
- The passenger carriages are clean and filled with water.
- Train, Brake-van lights and fans are in working order
- Brake Power certificate is current and updated with correct entries.

During the course of journey Guard should:-

- Look after the safety of train, comfort and security of passengers particularly the female and children and assist them if necessary. Similar responsibilities rests with train superintendents (if provided) Ticket checking staff, RPF and GRP also.
- Attend to the complaints of the passenger and have them rectified.
- Perform the duties of train conductor when none is provided.

ADDITIONAL DUTIES OF THE GUARD WHILE WORKING A TRAIN (Para 310 of operating manual)

General Instructions

- Not permit anyone without a proper authority.
- No Fire arms
- No intoxicating substances, spirits or fermented liquor
- In case of outlying sidings where no commercial staff is posted, the responsibility regarding closing of doors, rising and falling of flap door, rests with the siding holder. The Guard of the train, however shall keep a watch on this on the run.