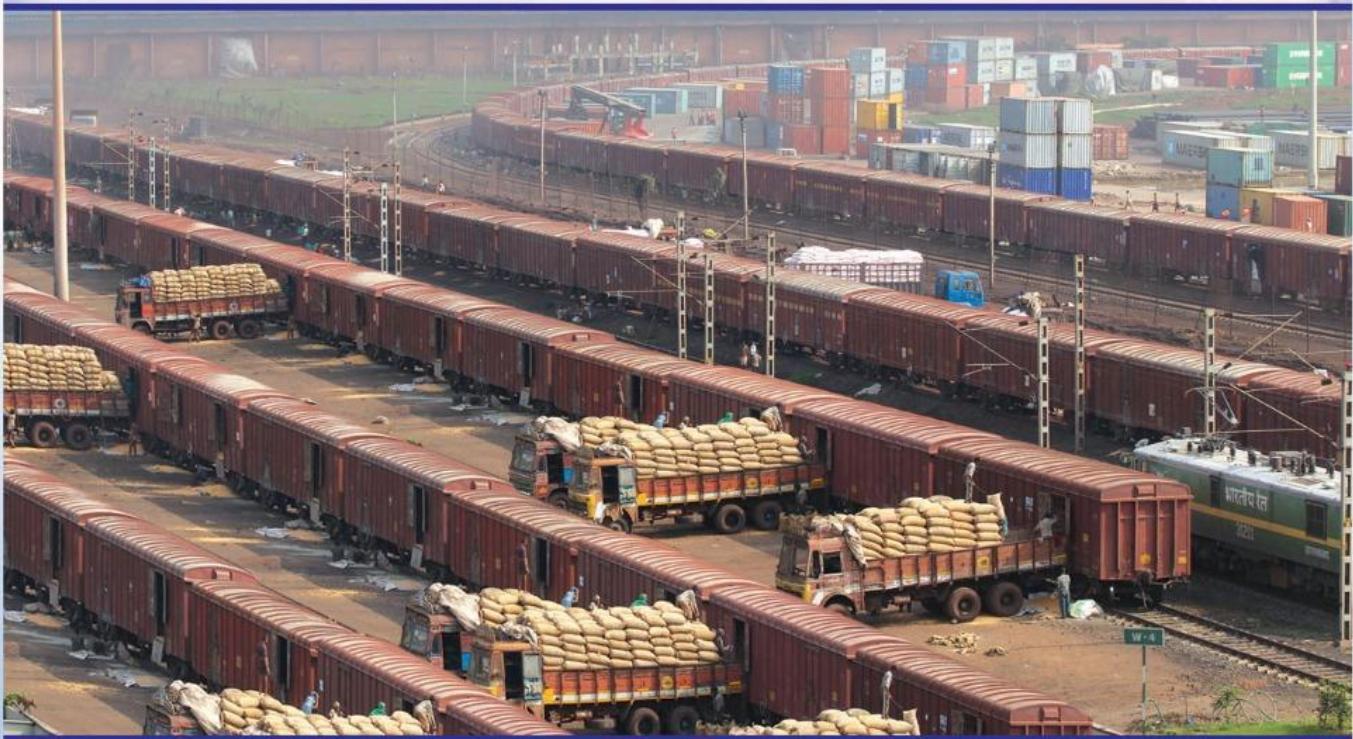




South Central Railway

# OPERATING MANUAL



2023



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2023

For official use only



**ARUN KUMAR JAIN**  
General Manager, South Central Railway

## Foreword

*It gives me immense pleasure to know that South Central Railway is coming out with its first “Operating Manual”. This comprehensive guide is designed to serve as a ready-reckoner for safe and efficient functioning of our train operations. Indian Railways has been rapidly transforming – in terms of both rapid infrastructure growth and technological advancement – to meet the travel aspirations of rail passengers. In such fast changing dynamic scenario, this manual will serve as an efficient and reliable guide for train operations, by giving utmost importance to safety and efficiency.*

*Train operations are not just a set of rules, procedures and protocols to be followed for operating trains. In fact, it is a commitment from us for ensuring that each passenger reaches their destination safely and securely. As such, each page of this manual represents a vital aspect of our collective responsibility to passengers, colleagues and the people we serve.*

*I am sure that this novel initiative will reinforce and take forward SCR’s work ethos towards safety, efficiency and precision to new standards in train operations. Let this manual serve as a bulwark in upholding our commitment towards excellence in train operations.*



(ARUN KUMAR JAIN)



## Preface

'Operating Manual for Indian Railways' was issued in the year 2008 with an objective to provide a ready handbook to officers and staff involved in train operations. Railway Board has advised Zonal Railways for preparing Operating Manuals for their Railway Zone.

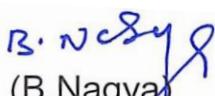
Preparation of 'Operating Manual for South Central Railway' started in the year 2015 by a team of Instructors of ZRTI, Moula ali. This effort was carried forward in Zonal Headquarters enriching the content with instructions and letters issued by Railway Board. The Manual has attained its present form by incorporating various inputs given by many Instructors of ZRTI, supervisors and officers of SCR. The contributions made by Shri H.Raghuram, Chief Instructor and team ZRTI, and Shri Allada Murali Krishna, TI/Rules deserve mention.

The Manual is an attempt to bring about an understanding of various facets of train operations currently in vogue. The focus has been kept on the basics rather than in detail, thus making it a concise book of knowledge for staff involved in train operations as well as other readers who seek such knowledge. The instructions and guidelines contained in this manual, do not in any way supersede or replace the G&SR or other instructions issued at Railway Board, Zonal and Divisional levels.

In the absence of such a Manual, many procedural instructions have got incorporated as Subsidiary Rules in G&SR. As and when the Manual gets established as an official document over a period of time, and finds its place, it is expected that detailed procedures of many aspects of train operations will be added to the manual in its future versions.

I congratulate and compliment COM/G and his Team for undertaking a major exercise in bringing out this book by referring many Railway Board letters and Manuals.

I hope that the Operating Manual prepared by South Central Railway will enrich the knowledge of Operating Staff in their day to day working and also will work as guide for future entrants into Operating department.

  
(B.Nagayya)  
Principal Chief Operations Manager

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# Chapter – I

## Introduction



Rail transportation gained significance in the 1800s with the invention of steam engine. Since then, Railways has been one of the prominent modes of transportation which is energy efficient. With the advent of high powered locomotives, better track structures and signaling systems, the railway operations have evolved with time. Modern concepts of transportation business like Supply chain and logistics require that the train operations are tailored to cater to the customer needs all over the world.

Of all the national railway networks in the world, Indian Railways is the fourth largest. It carries about 8 billion passengers and 1.4 billion tonnes of freight per year. About 15000 coaching trains and 8500 freight trains are run on a daily basis in the IR network which extends over 7300 stations. Such a large scale operation of trains is carried out every day by coordinated efforts of around 1.3 million employees working in 17 zones spread across the country.

Among the zones, South Central Railway is the 5th largest in terms of freight loading and 8th largest in terms of passenger trains run. In freight operations, the zone caters to the coal mines of Singareni and Western Coal fields which serve power houses spread across six states. Cement industries in Tadipatri, Manikgarh, Malkhaid, Tandur and Jaggiyapet clusters also fall under the zone. Krishnapatnam and Kakinada are the major ports served by SCR. The zone also has food grain loading by FCI and State civil supplies corporations of Andhra Pradesh and Telangana. In passenger operations, the zone has major terminals at Secunderabad, Hyderabad, Vijayawada, Tirupathy and Aurangabad. It is also strategically placed between zones like ECoR, CR, SWR and SR, thereby handling through freight and passenger traffic across these zones.

Train operations in the SCR network is spread across 600 stations. An understanding of Station, Train and their working is fundamental to the understanding of train operations. Hence, these aspects are dealt in the first two chapters of the manual. It is followed by a chapter on Control organization which is the nerve center for coordinating train operations across the stations, sections and between divisions, zones.

In Railways, operations and maintenance go hand in hand. However, maintenance that requires operational downtime affects train running as it consumes path. A chapter on traffic blocks deals with this subject matter. Daily train operations on such a large scale are prone to failures and unusual occurrences that when left undetected or not acted upon lead to unsafe situations. Some of the important unusals are dealt in brief in the fifth chapter.

In order to attain the best operational efficiency, all assets have to be utilized in the best possible way. The final output i.e. train running depends on how everything is coordinated. It is the measure of these outputs that indicate the health of the organization and the direction in which its performance is heading. The sixth chapter 'Operating Statistics' deals with all such indices that measure the various performance parameters of the train operations.

The activities carried out by staff at stations, on train, in control office and work spots have to be done in a safe and efficient manner to achieve smooth operations. For ensuring this, all these activities are closely monitored at supervisory and officer levels. Inspections, their types, quality and effectiveness which are very essential and critical to keep up safety in train operations are dealt in the seventh chapter.

For an organization to grow and respond to the changes in demand, business pattern, planning needs to be done on a continuous basis. Like any capacity building work, railway projects also have a long gestation period and hence traffic planning has to be carefully undertaken duly taking into account the possible future scenarios and trends. Well planned traffic facility works will ensure smooth train operations in future. Traffic planning is dealt in the final chapter as it is best appreciated after obtaining an overall understanding of all aspects of train operations.

\* \* \*

## Chapter – II

# Working of Stations



Station is a nodal point in dealing trains. As per GR 1.02 (51), ‘station means any place on a line of railway at which traffic is dealt with, or at which an authority to proceed is given under the system of working.’ A station comprises of a station yard on which trains are dealt by station staff through signals operated from panel room, cabins etc. Station is also the place where passengers board / alight; wagons are loaded / unloaded. Hence, the station is also provided with passenger and other user amenities like platform, waiting halls, circulating area and goods sheds.

### **Station Yard**

A station yard is basically a grid of lines where trains are dealt. The grid is made of tracks which are connected to each other through points and crossings. Some of the types of lines found in a station yard are...

**Running lines** – The lines in the station yard which have facility for direct reception and dispatch of trains on signals. They are usually track circuited.

**Non-running lines** – These lines do not have the provision for direct reception and dispatch of trains. They are utilized for stabling, maintenance, shunting, etc. They may or may not be track circuited / provided with shunt signals.

**Stabling Lines** are non-running lines that are earmarked for the purpose of stabling vehicles. Normally stabling lines are provided only at major stations where activities of examination/loading/unloading are frequent. The number of stabling lines depend upon the traffic handled in the yard/section.

**Sidings** are lines taking off from station yard for serving various activities like freight train loading/unloading, IOH/POH/ROH maintenance of rolling stocks, stabling of Track machine/Tower cars with their rest vans, saloon sidings for stabling of inspection/VIP carriages, etc. Some of the sidings are short and form part of the yard while some are of longer lead, serving places of loading/unloading owned by railways or by private customers. For such lengthy sidings taking off from the yard, the station is known as serving station.

**Pit Lines** are sidings normally provided at coaching terminal stations for the maintenance of rake by Mechanical and Electrical departments. These lines are provided with cat walks to check exterior and pits to check undergear.

**Sick Lines** are sidings where repair of coaches/wagons are done by Mechanical and Electrical departments. These lines are provided with facilities like welding, lifting etc.

**Shunting Neck** is provided at stations where regular and frequent shunting takes place. Provision of shunting neck ensures that main line train operations are not affected during shunting. Shunt signals / Shunting permitted indicators are usually provided to control the shunting movements to and from the shunting neck. Shunting necks have to be connected to all the lines/sidings of the station yard over which shunting takes place. The length of shunting neck needs to be adequate to avoid multiple shunting.

Most of the stations are provided with few running lines which enable crossing/precedence of trains. Depending on the functions served and the volume of traffic dealt, stations have additional facilities like non running lines, sidings for coaching operations like pit lines, stabling lines, IOH/POH lines, sick lines etc., sidings for freight operations like examination lines, sorting lines, loading / unloading lines etc., tower car sidings, track machine sidings etc.



*Running lines*



*Washing line*



*Pit line*

## Signals

The movement of trains in station yards is controlled through signals. Signals are of various types viz. fixed signals, hand signals, detonating signals and warning signals. Most of the station yards are provided with fixed signals but few of them are not. The movements in yards having no fixed signals are fully dependent on hand signals / authorities issued by station staff. The conditions for every movement have to be meticulously ensured by station staff before permitting the same. In stations provided with fixed signals, they are operated by Station Master through a panel or VDU (Visual display unit).

Some station yards have Level Crossing Gate, which is a gate provided at the intersection of road with railway track at the same level. Such gates within station yards are usually interlocked with signals. They are manned by operating staff who ensure that the gate is closed for road traffic during passage of trains.

## Station Yard Features

The following are some of the basic features of a station yard...

### Station Gradient

Station yards are generally provided on a level gradient. Whenever station is on a steeper gradient, protective sidings like slip & catch sidings are provided.

- a. *Slip siding* is intended to prevent vehicles escaping into block section. Slip siding is provided where falling gradient towards the block section is steeper than 1 in 100.
- b. *Catch Siding* is intended to catch vehicles coming out of control from the adjacent block section. Such vehicles could have escaped from the adjacent station or caused by train parting in block section. Catch siding is provided where falling gradient towards the station section is steeper than 1 in 80.

### Isolation

As per GR 1.02 (32), “isolation” means an arrangement, secured by the setting of points or other approved means, to protect the line so isolated from the danger of obstruction from other connected line or lines.’ On lines where isolation is provided, if vehicles start rolling it should not result in infringement to the movements over the lines from which it has been isolated.

Isolation can be achieved by any of the following methods...

- a. Connection to another line or long siding;
- b. Provision of short dead end siding; or
- c. Provision of trap.

Mechanisms like Scotch block, Hayes derail which ensures derailing of vehicles have also been used to achieve isolation, but they are not in vogue nowadays.

### Adequate distance

As per GR 1.02 (2), “adequate distance” means the distance sufficient to ensure safety. Adequate distance is mandated by GR in various occasions like distance between signals, distance required for granting line clear (commonly referred as Block overlap), distance required for taking off home signals on to a line (commonly referred as Signal overlap) etc. These distances are to be made available in the station yard unless exemptions are allowed in the concerned rule duly approved by competent authority.

## Interlocking

Signals are usually interlocked with track/routes through track circuiting & relays. Such an arrangement of signals, points and track circuits/axle counters, operated from a panel, interconnected by mechanical / electrical / electronic locking so that their operation must take place in a proper sequence which ensures safety is called Interlocking.

The objectives of interlocking are...

- i) Setting of route,
- ii) Locking of route,
- iii) Holding of route,
- iv) Preventing conflicting movements.

As per the method / technology used to achieve interlocking, it is classified as...

*Mechanical Interlocking:* In yards where points and signals are operated by levers, sequence of pulling levers is ensured by mechanical arrangements in lever frames. Lock bars are provided for locking points. Mechanical slots are provided for ensuring coordination between staff to enable a single operation. However, such interlocking is restricted by the size of the lever frames and hence not feasible for bigger yards. It is also maintenance intensive as alignments need to be consistently checked and maintained so that levers operate smoothly and interlocking is not compromised.

*Relay Interlocking:* Electromagnetic relays connected to track circuits, point machines and signals are used in relay interlocking. When operations of points and signals in the station are enabled through panels, such interlocking is named as Panel Interlocking (PI). In bigger yards, where interlocking is done between one route and another route such that simultaneous operation for various routes does not lead to conflicting movements, it is named as Route Relay Interlocking (RRI). Another feature in RRI is that the Station Master need not operate individual points in a route and can take off signals by pressing the concerned signal button and route button.

*Electronic/Solid State Interlocking (EI/SSI):* In this system, the interlocking is achieved through computerized microprocessor based software, which gets its input through relays connected to track circuits, point machines and signals. The complex sets of relays required for achieving route wise interlocking in RRI is replaced by a small computer hardware hosting the designed software. Thus, this system is most advanced, easy to maintain, safest as it is subjected to rigorous testing in factory as well as site and less prone to interference.

### Standards of Interlocking

Depending upon the provisions of isolation, type of signals, mode of operation of points, type of locking, mechanism of point detection, type of interlocking, level of track circuiting, type of block instrument etc., four standards of interlocking have been made, namely Std I (R), Std II (R), Std III (R) and Std IV (R). Based on the standard of interlocking, speeds allowed over the station yards have been permitted as up to 50kmph, up to 110 kmph, up to 140 kmph and up to 160 kmph respectively.

## Station Equipment

**Panel** – In relay interlocked stations, the operation of points and signals are done by Station Masters through a panel of buttons and knobs. This panel can be locked by a SM's key so that no person other than authorized can use it. This key should always be under the custody of the on duty Station Master.

**Visual Display Unit (VDU)** – After the introduction of EI, which is based on software, conventional panel has been replaced by VDU (Visual Display Unit), a monitor connected to a CPU for operation of points and signals by the Station Master. It depicts the station diagram duly indicating track circuits, points, signals etc., as shown in conventional panels. Functions are listed through pop-up menus for operation of points, signals, as stipulated in Station Working Rules. Station Master uses mouse and keyboard for selecting the required function needed for train operation.



Relay racks



RRI panel



VDU

**Block Instrument** is provided for granting/obtaining line clear for trains. It is normally interlocked with the Block overlap or the Last Stop Signal of the station depending on the block section for which it is meant for.

**Section isolators** are provided in electrified yards for isolating the power supply of OHE in case of emergency. They shall be operated only by staff who have been trained and issued with competency certificate.

**Data logger** also known as event logger, is a microprocessor based digital storing equipment which logs all the events occurring in the relay room at micro second levels. Such data stored is useful for accident investigation, failure analysis as well

as preventive maintenance. Exceptional Reports can be obtained by designing suitable logics for extracting specified information, which is useful in bringing out unsafe procedures/working needing corrective action.

At important/originating/terminating/junction stations, a provision has been made for Station Master to enter the train details and log it against the berthing track occupation by the train. This enables the timings of trains at that station to be automatically updated in control office application.

## Station Buildings

The station equipment are housed in buildings like Panel room, Relay room, Cabins etc. These along with other rooms critical to train running like Running rooms, Crew lobby are kept away from public. Relay rooms are double key locked so as to ensure only authorized S&T personnel can have access and only with the knowledge of the on duty SM. Service buildings like power supply room, ARME, Train lighting staff room are also located nearer so that they are readily accessible when required. Passenger and other user amenities are made with easy access for passengers / users as per the service they provide and foot fall expected.

Some of the passenger / user amenities found in a station are...

**Platforms:** Passenger platforms are provided at the station to facilitate the boarding/alighting of passengers. Goods shed platforms are provided to facilitate loading/unloading freight/parcel trains. Number of platforms varies from station to station based on the quantum of traffic dealt at that particular station. The length of the platform has to accommodate the longest train dealt on it. Platform meant for suburban trains are of higher level while goods shed platforms are generally of ground level so that unloading can be directly done into the trucks.

**Enquiry/Booking office:** These counters are available for issue of tickets and answering the enquiries of passengers. Reservation tickets are also issued at booking office dealing with less number of passengers.

**Reservation office:** Counters are provided at major stations for passengers to book their advance journey tickets.

**Parcel Office:** Separate office/sheds are provided for booking of Parcels/luggage by the passengers transported through coaching trains. At stations with high volume of parcel traffic separate inward and outward parcel offices are made along with required storage area and access to road vehicles.

**Goods shed:** Goods shed shall be provided only at such stations which are notified by railway administration based upon the quantum of freight traffic dealt with and requirement of storage space sought by the customers. Nowadays, rail side warehousing is encouraged rather than having goods sheds.

**Waiting halls:** Separate halls are provided at station for Upper class, 2<sup>nd</sup> class and ladies passengers to sit during their wait for the trains. These are provided with wash room facilities.

**Retiring rooms/Dormitories:** At major stations facilities are available for boarding and lodging for the passengers. The facility to book these rooms online has now been universalised. Some of the retiring rooms are managed by IRCTC.

**Cloak Rooms:** Facility is provided for the passengers to deposit their luggage in case they do not want to carry with them during their stay at that place.

**Sign Boards/Displays:** Display boards and PA system are provided for the passengers to know about the arrival/departure/platform of various trains and also directions for the various passenger amenities.

**Public utilities:** For the convenience of passengers, toilets and bathing facilities are provided on platforms. These are maintained by railways at way side stations and run under pay and use system at major stations.

**Food stalls:** Catering stalls are provided on the platforms for meeting the requirement of food to the passengers.

**Utility stalls:** Multi-purpose stalls are provided on the platforms for meeting the requirement of general items of the passengers. 'One Station One Product' is a recent initiative by the government to encourage local products.



Booking counter



Platform display boards



Container loading platform

## Train operations at station

The station is operated by station staff duly following the rules for operating trains in the station as provided in SWR – Station working rules, which are framed in compliance to G&SR, taking into consideration the station's layout, signalling plan and table of control. In case of yard modifications and new station commissioning, a temporary set of working instructions (TWI) are issued, which needs to be followed during the period of work. Apart from the SWR, instructions through Divisional Circulars and Joint Procedure Orders are also issued regarding certain specific operations.

## Station Staff

The staff involved in train operations like Station Master, Shunting Jamedar, Pointsman and Train clerks are referred to as station staff. They are bound to carry out their duties and responsibilities prescribed under G&SR, Block Working Manual, Accident Manual and Station Working Rules.

### Station Master

As per GR 1.02 (53), "Station Master" means the person on duty who is for the time being responsible for the working of the traffic within station limits, and includes any person who is for the time being in independent charge of the working of any signals and responsible for the working of trains under the system of working in force". Thus, the Station Master is responsible for safe & efficient working of the station in his/her shift. SM shall update and maintain all train passing documents/registers during their shifts correctly. They have to properly appraise the position of various equipment, lines, block sections, speed restrictions, shunting operations, etc. to their reliever. SMs should have updated their knowledge regarding various rule books, manuals with latest amendments and safety literature issued to them. In case of abnormal situations & circumstances, they are required to ensure safe, efficient operations keeping detentions to a minimum and enable quick restoration. They need to bring out any deficiency in safety equipment or procedures deviated/abnormality in the working of trains immediately to Station Manager and concerned officials as required.

### Shunting Master/Shunting Jamedar

At major stations having continuous shunting operations, a separate supervisor for carrying out shunting is provided as Shunting Master/Jamedar. He/she is responsible for safe and timely shunting by duly ensuring all the proper procedures are followed by the shunting staff working under him/her rigorously.

### Pointsman/Assistant Pointsman

Pointsman are deputed at stations for duties like performing shunting, exchange of all right signals, manning traffic LC gates, observing any abnormality in train, points, signals, track, OHE in station premises, clamping & padlocking of points in case signal/point failure, cleanliness of SM office/cabins and other miscellaneous works. While working as gateman, he/she need to follow the GWI and is responsible for closing/opening of the LC gates duly observing safe running of trains. They have to ensure cleanliness of the gate lodge and rails on the road. They have to initiate action and report to Station Master/official immediately whenever any abnormalities in the working of trains are noticed.

### Trains Clerks (TNC)

They assist the SM on duty in obtaining the rolling stock position, availability & location at the station yard, preparation of vehicle guidance to be handed over to the guard of the train and entering the required data in the FOIS & ICMS at a station. They also assist in maintenance of statistics and concerned registers.

## Medical fitness of staff

All station staff needs to be medically fit to carry out their duties. The rules regarding the medical fitness of a railway employee is provided in the para 514 of IRMM (Indian Railway Medical Manual) as below...

### Periodical Re-examination of serving Railway employees

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

### Classification of staff

For the purpose of visual acuity and physical ability of candidates/serving railway employees, medical standards for the Non-Gazetted Railway services are divided into the following categories.

(A) Category: A-1, A-2, A-3

A-1	Foot plate staff, Rail car drivers and Navigating staff.
A-2	Station Masters, Guards, Shunting staff, Pointsman.
A-3	Loco, signal and Transportation Inspectors, staff authorized to work trolleys, Yard supervisory staff, Road motor drivers and gate keepers on level crossings.

Age (as on the date PME)	Next PME due
Up to 45 years	Every 4 years
Above 45 & up to 55 Years	Every 2 years
Above 55 Years	Every 1 year

- (B) Any Railway employee in service may be required to undergo tests for vision and general physical examination in the event of his failure to comply with signals.
- (C) Special Medical Examination: The staff in the categories A-1, A-2, A-3 should be sent for special medical examination in the interest of safety under the following circumstances unless they have been under the treatment of a Railway Medical Officer:
  - (a) Having undergone any treatment or operation for eye irrespective of the duration of sickness.
  - (b) Absence from duty for a period in excess of 90 days. In case of A-1, A-2 and A-3 the employee may be asked to give an undertaking to his supervisor when reporting back to duty after leave or absence, irrespective of the period, that he/she has not suffered from any eye disease or undergone an eye operation.

## Roster & Attendance

Station staff working hours are as per approved roster assigned to them, which is made based on the workload and in accordance with HOER. The rosters are issued by division office duly vetted by personnel branch. The staff shall handover charge at the end of the hours of duty as prescribed at the station/yard to their proper reliever. The assigned duty hours should not be changed without the permission of Station in charge.

All the staff shall sign in the appearance register and mention the duty timings performed. The Station in-charge or the person authorized should endorse the attendance of staff at his station by closing the muster every day. He/she has to send the muster copy for the nominated period to SrDPO office of the division through the courier along with statements of NDA, NHA, OT etc.

## Station Working Rules (SWR)

As every station has its unique features of station yard like running lines, isolation, gradients, facilities like shunting neck, sidings, different standards of interlocking, etc., the rules on how trains are to be dealt in the station is provided as Station Working Rules. GR 5.06 mandates that in addition to the 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. The procedure for preparation of SWR has been provided in SR 5.06 & a standard format has been provided in Appendix XIV of G&SR. The objective of issuing SWR is to inform all staff about the procedure to be followed in train operations in the station as well as the special features of the station to ensure safety. These rules also cover details and procedures with respect to block sections, adjacent block stations, level crossings etc.

The following are some important documents that are part of SWR...

**Station working Rule Diagram:** It contains the complete layout of the yard, points, signals, gradients and interlocking arrangement of the station, holding capacity of all individual lines in meters, details of adjacent station and IBH signals where ever provided along with their respective distance.

**OHE Diagram:** In Electrified section, OHE diagram of the station is provided showing the elementary sections within the station as well as the adjacent block sections juxtaposed with the yard layout. This helps in understanding the impact of power blocks and OHE failures on train movements. OHE diagram also provides location of isolators. It shall be given in Appendix 'G' of SWR.

**Siding Diagram:** While the station working rule diagram gives the details of the station yard, the details of sidings and their layout is furnished in siding diagrams.

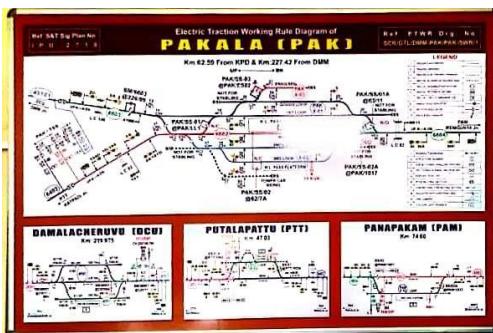
**List of Essential Safety Equipment:** List of essential equipment of stations along with descriptions and numbers is to be given in the chapter '11' and Appendix 'E' of SWR. The quantity and quality of the essential safety equipment of stations depends on the size of the station, nature and volume of traffic dealt. It shall be the duty of station in-charge to ensure that all the essential equipment is in good fettle so that as and when it is required it is available for use.

**Duties of Staff:** The duties assigned to each of the station staff like Station Master, Shunting Jamedar and Pointsman/Gateman is to be mentioned in the SWR. Where more than one Station Master is available in a shift, the duties of each Station Master are to be specifically given.

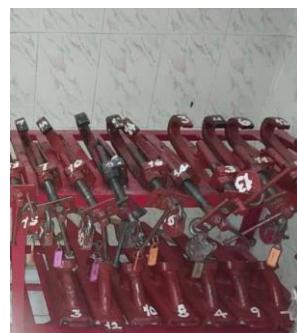
**Gate Working Instructions (GWI):** Instructions for Working of LC gates are to be given in Appendix 'A' of SWR. Copy of the GWI should be kept at the Gate lodge in English, Hindi & local language. GWI is prepared based on the guidelines issued in Appendix II of G&SR.



Disaster management board



OHE diagram



Safety clamps

## SM's Responsibility for assurance

Before an employee takes independent charge for the first time at any station, he/she must undergo learning at the end of which he/she must give a written assurance that he/she has understood the working rules of the station and is fully conversant with the duties he/she has to perform. Similar assurance is also to be obtained when there is a change of system/means of working of trains in the station. This learning has to cover all the shifts. The staff has to read the entire Station Working Rules, note down the salient features of working at that station like physical yard layout, Signalling and Telecommunication arrangements and system of working. During learning, the staff has to observe all the train/shunt movements carefully and the working pattern. At stations connected with sidings, the staff under learning has to accompany the pilots at least once, to and fro, as far as possible. During the visit to the siding, the staff has to observe salient features of siding yard, and placement, removals and other shunting procedures. Adequate number of days for learning has to be provided for covering all these aspects, an indicative table for which is given below...

Junction stations with Marshalling yard and lobby	10 days
Terminal stations with Marshalling yard and lobby	8 days
Large stations or Junction stations	5 days
Medium stations	4 days
Road side stations(Continuous roster)	3 days
Road side stations (EI roster)	2 days

Apart from the assurance, it must also be ensured that the employee possess the necessary competency certificates before allowing to take up duty. Necessary hand holding is also to be provided for new employees before allowing fully independent duties.

However, in emergencies and in cases where the duties are of a simple character and similar to those already performed by an employee at stations where he/she has worked before, the pickup period may be reduced by the SrDOM.

The Assurance shall be obtained in the Assurance Register which is maintained in three parts...

- Part A: Whenever new member joins or any amendment is issued to SWR or SWR is renewed, acknowledgement of all the Station staff should be taken in this part;
- Part B: Out-station staff before resuming duties at the station to acknowledge in this part and
- Part C: Station staff acknowledgement is obtained whenever he/she resumes duty after an absence of 15 consecutive days or more.

## Station registers, books & forms

In order to streamline day to day working in stations and to ensure due procedure, proper documentation of events, a set of books & forms and registers are warranted to be maintained in stations. Station Master should see to that all registers, forms and charts are properly and neatly maintained and that they are not used for purpose other than those for which they are printed and supplied. These registers form a record of performance of the station for the assessment and improvement of the working of train operations and facilities available at the station. Registers must be placed on shelves and almairah in dry and secure places where they shall be safe from irregular handling or removal by unauthorized person. The completed registers must be archived and maintained till their designated period of preservation. On completion of that period, they can be destroyed duly recording their details in a register.

The following is the list of registers to be maintained at station:

### Train Passing Registers

**Train Signals Register:** In this register, the on duty SM records the timings of various train passing operations and events in the station for every train. Timings of various events from the time of granting line clear to rear station up to section clearance at the advance station are mentioned in this register. Other important information like failure of block instruments, Maintenance blocks in force, PN obtained from guard regarding complete arrival etc. are also entered in TSR. Each block instrument mandates a separate TSR. With the enhancement of technology, some of the stations are provided with C-TSR/E-TSR where, SM is required to input the required entries of TSR in a computerized system.

**Train Intact arrival Register:** At stations where BPAC is not available/not working and trains are worked without guard/BV or walkie talkie of Guard is not functioning, the PN issued by Guard/Pointsman indicating the complete arrival of the trains is mentioned in this register.

**Gate PN exchange Register:** Entries pertaining to exchange of PN with the gatekeeper as per GWIs are mentioned here. It is maintained both at station and at the gate lodge. With the development of technology, Auto PN Generating system has been provided at some of the gates. This system provides for automatic generation and transmission of the PN by the SM to the Gatekeeper through an ANDROID TAB asking him/her to close the gate and Gatekeeper provided with a similar TAB has to acknowledge. The system is so designed that generation and exchange of PN by the gatekeeper to SM is initiated only when the gate has been closed.

**Route Cancellation, Emergency Calling-on Cancellation registers:** These registers are maintained by the on duty SM where he/she is required to furnish the reasons for such operation. When the respective buttons are operated, it gets logged on the panel/block instruments in the form of veeder counters. These counter numbers form a part of handing over/taking over and should be mentioned in the station diary.

**Control Order Register:** Instructions/orders issued by the control office are recorded and same are informed while handing/taking over of duties by the SMs.

**Stable Load and Clearance Register:** Whenever trains are stabled at the station, the SM is required to mention the stock and particulars of the train stabled in this register. After securing the required number of vehicles, the shunting staff/guard/LP to mention the particulars of vehicles secured and put their signature and record & issues a PN to the SCOR.

**Caution Order message registers:** Caution order messages received directly from the concerned department inspectors or from SMs, are entered or pasted in this register along with PNs exchanged.

**Caution Order Registers (Up and Down):** Every Monday at 00.00 hrs., SM on duty has to bring forward all the existing caution orders in geographical order. Whenever a new caution order is issued in that week, SM has to enter in this register duly assigning a serial number. All the caution orders entered in caution order message register should be reflected in this register and the same should be tallied / cross checked during inspection.

**Station Diary:** A shift wise record maintained at all the stations, where outgoing on duty SM appraises the incoming reliever SM while handing/taking over of the duties, the position of safety aspects, failures/unusuals occurred and orders/instructions/messages received during his shift is called Station Diary. Visit of various officersinspectors, cleanliness and safety aspects inspected by the in-charge SM are mentioned in this diary. The motor trolley permit given, surrendered at the next station after clearing the block section to be pasted in the station diary. The track fit certificate or fit certificate of the vehicle/loco issued by the concerned officials after the accident taken place to be pasted in the diary.

**Private Number sheets issue register:** The details of PN sheets issued by the Traffic Inspector are entered along with the order in which they are to be used is entered in the register duly signed by the TI.

**Power Block Register:** In electrified stations, whenever power blocks are availed, the procedure and details are logged in this register in order to ensure safety and planning of train operations.

**Pilot Movement Register:** In station with pilot operations in sidings, this register is mandated as per the system of working in force in the siding.

**Sick Wagon Register:** In case, a rolling stock is marked sick and detached at the station, SM has to mention the particulars of the stock and date and time of detachment/dispatch in this register.

## Staff Registers

**Staff attendance register:** Staff performing the duty has to sign this register duly mentioning the timing of their shifts.

**SWR Declaration/Assurance Register:** As per SR 5.06.12 & 13, staff are required to declare that they have understood the station working and append their signatures with date and time in this register. Without assurance, staff is not allowed to carry out duties.

**Assurance Register for Amendments to Rule Books:** As per SR 2.03.3, staff are required to acknowledge the knowledge of the amendments issued to various manuals in this register.

**Fog Signal Register:** In this register, the following are recorded - the receipt of detonators, names of fog signal men and their assurance of knowledge regarding protection and whether the station is in continuous fog prevailing area is available at the station. The format for the register is provided in the Appendix VII of G&SR.

**Staff Bio-Data Register:** It has particulars of the staff at the station including name, designation, date of appointment, date of joining the station, date of attending refresher/PME with due dates and gradation.

**Acknowledgement Register:** This is for Fortnight Gazettes, Circulars, Safety Bulletins, Vigils, Fly leafs. Contents of these literature received from the safety department are explained to all the staff by the in-charge of the station and their acknowledgement obtained.

**General Standing Order Book:** Any common instructions required to be given by the in-charge of the station to the staff is advised through this register and acknowledgement obtained.

## S&T Registers

**S&T Failure Message Book:** In case an S&T gear becomes defective, the Station Master shall issue a message and obtain the acknowledgement by the S&T staff in

this register. On completion of attention, a joint restoration message is also issued and recorded.

**S&T Failure Register:** In this register, SM has to enter the particulars of S&T failure along with rectification time, gear at fault and detentions caused to the trains. The S&T staff shall mention the cause and how the failure was rectified duly affixing their signature.

**Disconnection and Reconnection Register:** Whenever S&T staff undertakes Group "C" works or failure restoration; they need to do the works only after disconnecting the gear. For this purpose they issue disconnection notice to the SM duly mentioning the gear to be disconnected along with the signals that will not be available for operations. On rectification or attention followed by correspondence test, S&T staff shall convey the completion of the work to the SM on duty by issue of Reconnection notice. SM shall resume normal working after receiving the reconnection notice and test the reconnected gear for proper functioning. SM has to paste these notices and write particulars of date and time of issue and details of trains detained in this register.

**Crank Handle Register:** In case of Point failure or for testing, when crank handle is removed from HKT, an entry is made in this register along with the date and time and reason for extracting.

**Relay Room key Register:** Relay room housing the relays of interlocking between the panel and signals are available at the station with the provision of double locking. One key shall be available with S&T staff and another with SM on duty. When the authorized S&T staff requires the Relay room key provided with SM, they have to furnish details along with signature in this register. SM on duty handing over the key should also affix his/her signature in the register.

**Block Instrument keys Register:** Whenever the S&T staff requires the Block instrument key, they mention the date, and reason for the same duly affixing their signatures. After giving the key available with on duty SM, he/she also affix signature.

The following registers are to be maintained where Guards are Headquartered/Terminating/Originating stations:

- 1) Guards equipment register,
- 2) Guards Call Book,
- 3) Guards signing On / Signing Off Register,
- 4) Guards (Standing Order Book),
- 5) Breathalyser test register,
- 6) LTM register.

The following books and notices are maintained at level crossing gate provided with gate lodge.

- 1) A book showing the list of equipment.
- 2) Duty Rosters.
- 3) A copy of duty list with translation in regional language.
- 4) Level crossing working instructions in regional language, which should appear as separate appendix to SWR.
- 5) Public Complaint Book;
- 6) Vision Test and Competency Certificate of the Gatekeeper.
- 7) Results of last Traffic Census.
- 8) Inspection Books.

## Operating Forms

As a part of executing train operations in the station, SM in his duties is required to issue written authorities and instructions to the loco pilot, guards and other staff. A standard format of such common instructions / authorities is provided in printed books with numbered folios. These operating forms are usually prefixed with letter "T" and issued to staff after filling the specific details duly signed by the on duty SM. Some forms are issued in the normal working of trains like caution orders and shunting instructions. Some forms are issued during the abnormal working like failure of block instruments - PLCT, failure of signals-T.369(3b), temporary single line working on double line sections - T/D.602, etc.

## Non-interlocked working

Any modification of station yard resulting in alteration to working of signalling and interlocking, has to be executed through a process of non-interlocked working as per Appendix III of G&SR. Before NI working is commenced, the in-charge for the NI working has to ensure that all the staff involved in NI working have read the Temporary working instructions and acknowledged in the assurance register.

## Temporary Working Instructions (TWI)

When NI is undertaken, interlocking provisions stipulated in SWR are no longer available. So the SWR in its existing form cannot be used and a set of Temporary Working Instructions has to be issued. TWI is prepared in conjunction with G&SR and Block Working Manual covering all aspects of train operations during the period in which it will be in force. TWI should list out number of Goomties and portions of yard that each would control. It should also specify the duties of each staff involved for reception/departure of a train on/from different lines. TWI should list out different conditions required to be fulfilled for reception/dispatch of train, duly assigning specific responsibility to individual staff covering the following...

- 1) Procedure for granting/obtaining Line Clear;
- 2) Procedure for ensuring clearance of nominated line;
- 3) Procedure for closure of level crossing gates, if any;
- 4) Procedure for setting of route;
- 5) Description of series of points involved, from trailing end;
- 6) Description of the position of each point (Normal/Reverse) to be set;
- 7) Conditions to be fulfilled before taking off signals;
- 8) Procedure for taking off signals.

## **Station Management**

Depending on the importance and workload of the station, the station management is headed by Station Director/Station Manager/Station Master in-charge. At bigger stations, Station Masters in shifts are exclusively assigned for train passing duties. In wayside stations with less traffic, Station Masters are also entrusted with duties like ticketing, announcement and other station management duties. All station staff work under the supervision of SD/SMR/SM in-charge. Apart from the station staff, other departmental staff of Commercial, Security, Mechanical, Electrical, S&T, Loco (running) and Engineering are also deputed at stations for carrying out the duties pertaining to their respective department.

### **Station Director/Manager/SM in-charge**

The in-charge of station is responsible for smooth functioning of the station in all areas - safety, train operations, passenger amenities etc. Safety & train operation duties include proper maintenance of registers; ensuring that station staff follow and carryout all the responsibilities and duties mentioned in Appendix 'D' of SWR of the station; award grades to the staff working under them. He/she is personally responsible to see that the Rule books are kept up to date and are available to station staff for reference (G&SR 2.01, 5.02 & 5.03).

In case of abnormal working, they need to attend and render all possible assistance for passenger needs and traffic restoration. In case of major stations, where maintenance of coaching and goods stock are carried out, they are required to coordinate with division/control and other department for achieving efficient utilization and timely operations.

Apart from duties related to train running, he/she is also to ensure updating of various commercial registers, exhibit and maintain various statistics, charts and other information pertaining to the station. He/she is also to ensure proper working of passenger amenities, general cleanliness of the station through proper coordination with other departments.

Some of the registers maintained for the purpose of managing the various facets of the station are...

**Address Register:** It should contain the name, address, telephone/mobile phone number, email address of all the station staff. At major stations, a separate register containing list of all shop keepers, licensed vendors, licensed coolies, licensed contractors coolies or any other persons working at station other than railway employees must also be maintained along with the up to date address and telephone numbers, blood group if available and office copy of their Photo Identity Cards. Entry of such persons into station area should be permitted only after checking the identify card.

**Staff Gradation Register:** The supervisory Station Manager in case of big stations and Traffic inspector in case of way side stations are required to assess the staff of the station and give grading in this register.

#### Gradation of operating staff

(Ref: Rly. Bd's letter no. 2002/Safety-I/18/2 dated 16.02.2012)

All operating staff involved in train passing duties shall be assigned grades under one of the four heads – ‘A’ ‘B’ ‘C’ & ‘D’. The categorization shall be done after careful analysis of performance of that employee for the last 6 months. The important parameters to be taken into account while analysing the performance of an employee along with marks of each parameter is given below...

Knowledge of rules	:	25 marks
Alertness and observance of rules	:	25 marks
Safety record	:	15marks
Leadership & Management	:	15 marks
Discipline	:	10 marks
Appearance & neatness	:	10 marks

For staff to be qualified 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.

Staff shall be graded on the basis of total marks obtained as under –

Category ‘A’	-	80 and above
Category ‘B’	-	50 to 79
Category ‘C’	-	49 to 26
Category ‘D’	-	25 & below

Alcoholic staff must be categorized under ‘D’ category irrespective of marks obtained by them in other aspect of working.

**Staff Grievance Register:** Any grievance registered by the staff in this register, the in-charge of the station is required to dispatch to the concerned officials and obtain their acknowledgement. Separate grievance register has to be maintained for general and SC/ST staff. The rectification of the grievance also has to be mentioned in this register.

**Overtime Register:** The details of staff performing over hours of duty have to be entered in this register in order to monitor OT and ensure compensatory rest (CR) whenever possible and verify claims of allowance.

**Safety Meeting Register:** Monthly and when required, a meeting on one safety aspect/rule is conducted among the station staff and their acknowledgement obtained in this register.

**Weather Warning Register:** Whenever weather warning is issued by the control office, the SM has to send and obtain acknowledgement of engineering staff and paste the same in the register duly writing the particulars of message received from the control. In case the concerned staff is not residing near to the station, the message can be relayed through CUG mobile and recorded in the register.

**Public Complaints Register:** This has to be available with the on duty SM, and should be produced to any bonafide passenger who wants to lodge a complaint. Efforts have to be taken to redress the complaint and put the passenger at ease. The complaint along with remarks of the station in-charge should be sent to divisional office.

**Statistical Register:** The in-charge of the station to fill in the particulars of tickets & freight with the earnings in this register. It is maintained monthly and cumulative for the financial year April to March every year.

**Establishment Register:** All circulars pertaining to personnel department are to be recorded here or pasted.

**Tools and Plant (Dead Stock) Register:** Particulars of all the furniture, equipment and other non-perishable items issued by the administration are to be maintained in this register. Whenever any new stock item is received, it has to be entered in this register and when condemned to be mentioned. Stock verification is done by the accounts department periodically on the basis of this register.

**Accident Register:** Particulars of accidents occurred at the station is mentioned in this register including the action taken against the staff involved.

**Untoward Incidents Register:** Any untoward incidents like, run over, murder, suicide, death, bomb blast, agitations occurring in the station premises have to be entered in this book. The proper reporting of run over cases helps in dealing with spurious claims for compensation against Railways.

**Station imprest register:** The details of station imprest utilization must be logged in this register with proper bills. This will be useful in recouping the station imprest in a timely manner.

**Rake Detention Register and Loco Detention Register:** At stations where loading and shunting take place, these registers are maintained with particulars regarding the time of arrival/departure of rakes and locomotive along with reasons. This helps in analysing and reducing detentions in the station.

## Inspection Registers

**Officer's Inspection Register:** This register is for recording the details of inspections done by officers at the station. The deficiencies pointed out and the rectifying action should be recorded in the register.

**Inspector's Inspection Register (Traffic):** Traffic Inspectors, after conducting regular, casual or surprise inspection, mention the detailed notes in this register and append their signature. Action taken by the station in-charge should be mentioned against the relevant points noted in the register.

**Inspector's Inspection Register (other than Traffic):** Inspectors of commercial, accounts and other departments, after conducting their inspection, mention notes in this register and append their signature. Action taken by the station in-charge should be mentioned against the relevant points noted in the register.

**SMR/SS Night Surprise Inspection Register:** Wherever exclusive supervisory SMR/SM in-charge is there for a station, they are required to conduct night surprise inspection and write notes regarding the alertness of the staff in this register duly intimating the control office.

**Cabin Inspection Register:** This register is maintained at cabins which are generally away from the station master room. The deficiencies noticed have to be mentioned by the inspecting official against which the action taken has to be entered by the station in-charge.

**Level Crossing Gate Inspection Register:** This register has to be maintained at the Level Crossing gates.

**Joint Inspection of Points and Crossings Register:** The details of the joint inspection of points and crossings conducted by P-Way inspector & Signal inspector, like the readings, abnormalities found and attended are recorded in this register and signed by the supervisors.

**Joint Inspection of Track Circuits Register:** The details of the joint inspection of track circuits are conducted by P-Way inspector, Signal inspector & JE/TRD(OHE area), like the readings, abnormalities found and attended are recorded in this register and signed by the supervisors.

**Joint Inspection of OHE Bond register:** The details of the joint inspection of OHE bonds are conducted by P-Way inspector, Signal inspector & JE/TRD(OHE area), like the readings, abnormalities found and attended are recorded in this register and signed by the supervisors.

Apart from the above registers, various commercial registers like Wagon demand/priority register, indent/loading register, etc. are to be maintained at the station dealing in freight.

The period for which Station Operating Registers and Records are required to be preserved is advised by division office. An indicative period of preservation from the date of completion of various registers / records is as follows...

Description of Book/Form	Period
Train passing Registers/Books /Forms	1 year
Stabled stock/ Damaged Stock Register/Sick Wagon Register	3 years
Caution order/message books	1 year
Registers pertaining to S&T other than S&T failure	3 years
S&T failure register	Permanent Record
Fog signal register	3 years
Weather warning register	3 years
SWR assurance and other assurance register	Permanent Record
Attendance register/Muster Roll	Permanent Record
Control Order book/Conference book	3 years
Station Diary and charge Book	1 year
Guard's Duty Register	3 years
Guard's Rough Journal	3 years
Register of Train Advices	6 months
Form of Train Examination Advices	1 year
Officers / Inspectors / Surprise night / Cabin / LC gates Inspection register	Permanent Record

<b>Description of Book/Form</b>	<b>Period</b>
Joint inspection of Points& crossing / Track circuits / OHE bond	3 years
Accident register	Permanent record
Staff Bio-data/Gradation Home Addresses of staff register	Permanent Record
Staff grievance register	Permanent Record
Public complaints register	Permanent Record
General standing order book	Permanent Record
Establishment register	Permanent Record
Wagon Demand/Priority Register	3 years
Indent and Loading Register	3 years
Tool & Plant (Dead stock) register	Permanent Record
Safety meeting register	3 years
Record of Station Equipment sent for repairs	Permanent Record
Register of outward and inward letters	3 years
Register of important Circulars	Permanent Record
Station Order Book	Permanent Record
Spectacles Register	1 year
Unconnected Wagon Register	3 years
Register showing Analysis of late starts to Goods Trains at important yards	3 years
Summary of Daily receipt and dispatch of wagons and work done	Local orders to be issued by DRM
Register showing load of Goods trains and Goods trains run under load.	3 years
Unusual Register, other registers and Records maintained in control offices and at specified stations.	Local Orders to be issued by DRM.
Unusual Incident register	Permanent

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.
- iv) Each book/register when completed must be stocked in a bundle with a cover showing dates of commencement and completion.

## Items to be displayed

The following boards have to be made and displayed in station...

- a. Bio data of the staff mentioning the Grade, PF No, DOA, DOJ, PME/Refresher Course last attended/next due, medically fit with or without spectacles, mobile number.
- b. Duty rosters and classification list of staff employed at station.
- c. A list of nearest Doctors and Hospitals with telephone numbers.
- d. Notice boards for each of the trade organization.
- e. List of nearest Fire stations, Bus depots, Airports, Oil companies, etc. with telephone numbers.
- f. List of telephone number, Civil, Police, Military and Railway Officials.
- g. Disaster Management board depicting the contact numbers & address of high officials of the district to be contacted in case of disaster.
- h. The list of staff qualified in First Aid.
- i. Pit line occupation charts: Station Manager of the station shall prepare the occupation chart of each pit line available at that station, which guides the staff on the occupancy/availability of slots for maintenance in pit lines.
- j. Platform occupation charts: Station Manager of the station shall prepare the occupation chart of each platform line of the station; it helps to know the nominated line for reception of trains and also helps in planning for the introduction of new trains.
- k. Accident charts: Chart depicting the station yard and location of accidents in the yard with date & year is mentioned.
- l. OHE charts: Chart depicting the layout of OHE and their connections at the station including isolators are mentioned.
- m. Charts depicting coaching and goods statistics significant to the station.

## Correspondence

All official correspondence must be attended to by the Station Master, who shall open all covers and see that all letters are replied without delay. Every outward letter must be numbered, dated and must also bear reference number of the subject. This must be adhered to in all subsequent correspondences when replying to correspondence, reference must be made to the letter number under reply. Letters from the public asking for information must be replied promptly. If there is any difficulty in supplying the required information, the receipt of the letter must be acknowledged and matter referred to the DRM. When forwarding letters or complaints from staff working under them, Station Masters must furnish their own remarks along.

## **Station Imprest Cash**

(14/P/Vol.XV/G.III dated 01.05.2010, JPOs No S.200Mode of Distribution.97 (1/97) & MD.52/P dated 2004 of CCM/PS & FA&CAO)

Station Manager/Station Master/Clerk In charge of the respective stations are authorized to spend from the cash imprest to meet the miscellaneous & urgent requirement of station like cleaning, minor repairs, stationary etc. Individual items of expenditure should not exceed Rs.500/- per case. Recoupment of cash should be initiated by SM when the expenditure level reaches 50% of the sanctioned imprest cash. Existing imprest cash available with SM/SSs can be enhanced by obtaining associate finance concurrence and sanction of competent authority as per SOP on a case to case basis, duly furnishing the justification for such enhancement. A register is to be maintained regarding the purchase and its use. The procedure for recoupment and maintain record of the bills shall be followed as given the in the JPO mentioned above

## **Public notices for Exhibition**

The following notices and publications, besides those, which may be ordered from time to time, have to be exhibited at each station in conspicuous places.

- 1) Time table of arrival departure of all the trains stopping at the station.
- 2) Board showing current running of trains in the Waiting hall or at the Entrance.
- 3) Indication signage boards for various facilities and offices.
- 4) Notices regarding hours of business of Booking windows, Reservation Windows, goods, luggage and parcels – outside the respective offices.
- 5) Notices regarding restrictions in Goods Booking
- 6) Notices regarding Allotment of Wagons.
- 7) Rules regarding occupation/use of Waiting rooms – Inside the Waiting rooms.
- 8) Rules for the occupation/tariff of Rest houses and Rest rooms.

The Station Manager must be careful to see that out-dated time tables and notices are removed and replaced with current ones.

## **Exhibition of Public Advertisements**

In station premises, public advertisements in the form of Boards, Posters, Show cases, Models, Neon signs or in any other form should be allowed to be exhibited at any place only with the written permission of the competent officer of divisional commercial office. The Station Master will maintain a register showing full particulars of each advertisement exhibited at the station in the prescribed form.

The 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 competent officer of divisional commercial office has been obtained.

## **Prohibition against Photography / Film shooting on Railway premises**

Photography/Film shooting is strictly prohibited within station limits and on the Railway lines, except with the permission of the Chief Public Relations Officer (CPRO) who is the nodal officer in SCR.

## **Encroachments within the Railway limits**

No structures permanent or temporary are permitted on Railway land without the sanction of the General Manager. If such encroachments arise, the Station Master has to promptly report to the division office.

Every station based on its lay out, infrastructure, geographical location, facilities offered and type of traffic handled has different areas of concerns and requires different facets of management. Major passenger terminals have now become centre of the cities due to rapid urbanization. Providing additional train services and world class facilities to passengers in these terminals with existing space constraints is a challenge that requires detailed integrated planning. Freight terminals are now preferred to be outside city limits so that they are accessible to trucks throughout 24 hours so that loading / unloading activities carry on without any restrictions. With all train running and user activities happening, stations will continue to be a vital unit in operations.

\* \* \*

## Chapter – III

# Working of Trains



A train consists of a locomotive (driving unit) usually attached to haul a trailing load / formation of coaches or wagons. Based on the type of vehicles in the formation, trains are classified as coaching trains (made for carrying passengers), goods trains (made for carrying goods and animals) and mixed trains which consist of both coaches & wagons. In some trains like Vandebharat, the driving unit is integrated in the formation itself. As per GR 1.02 (58) "train" means an engine with or without vehicles attached, or any self-propelled vehicle with or without a trailer, which cannot be readily lifted off the track. Trains are worked between stations by competent crew according to a laid down system of working.

### **Components of a train**

#### **Locomotive**

A locomotive or engine provides the motive power for hauling a train. It is normally attached in front of the train for hauling for the formation behind. In few cases, it is attached in the rear of the train for pushing the formation like in ghat section working or for banking. Railway transport system in initial days was conceived with steam engines. With improvements in technology, locomotives have become better in terms of horse power, reliability and energy efficiency. Steam locomotives were gradually replaced by diesel locomotives. With electrification, diesel locomotives have largely been replaced by electric locomotives.

#### **Formation**

Coaches and wagons form the basic unit of passenger and goods trains respectively. These units are attached to each other through coupling and usually piped through for enabling the braking system. The sequence in which the units are coupled in a formation is called Marshaling order, which is designed duly keeping in mind safety and convenience. Normally a formation is complete with a brake van or SLR at the rear most. However in exceptional cases, two more additional vehicles can be attached behind the brake van or SLR. An LV board or tail lamp is attached to the last vehicle that signifies the intactness of the formation as complete. Each formation is certified its fitness through a Brake Power Certificate. The particulars of the formation and the destination to which it is booked to are provided in a document called Vehicle Guidance which is prepared by the station staff and handed over to the crew.

### Train sets

Train sets are the latest technology where the engines are integrated in the formation. Such train sets like Vandebharat / DEMU / MEMU / EMU are provided with driving cabs at both ends for the loco pilot to work. As the tractive power is distributed in such trains, they accelerate / decelerate faster. Similarly self-propelled vehicles like Track machines, Tower cars also have inbuilt driving units.

### Crew

Train Crew are competent railway staff who are authorized to operate, or support the operation of a locomotive / train. Loco pilots, Assistant Loco Pilots, Guards, Motorman and operators of tower wagons, track machines etc. form train crew. They run trains duly observing signals, speed restrictions in force. In order to ensure they're working train in a safe and proper manner at all times, train crew are selected based on eyesight, psycho test and are rigorously trained for handling locomotives; learning routes and to respond in emergency situations. There are designated crews for working Mail/express, passenger trains and goods trains based on their service and experience. Some crews posted at major stations for performing shunting only are designated as shunters.

### Path

Path is the time and space consumed by a train while running between two stations. As trains are run through many stations which form a section, paths are visualized and charted out in such sections. The number of paths that can be charted out in a section represents the line capacity of the section. In saturated sections, giving the train a clear path is very essential for achieving the best utilization of all the assets - locomotive, formation and crew. It also improves the average speed of the train.



*Freight train*



*Vande Bharat Train set*



*Crew*

### Train ordering

A train is ordered to run when all the requirements for running it - locomotive, formation, crew and path are ready or expected to be ready. Coaching trains are run to a schedule on the basis of time table / notification and do not require ordering separately. Goods trains and other trains are usually ordered individually by Section controllers through train advice/notice. In some major yards, SMs may also order goods trains duly receiving inputs from control. On receipt of the train advice/notice, the crew booking point in charge will serve call book to the Loco Pilot, Assistant Loco Pilot and Guard as per turn. An efficient train order will result in low pre departure detention and less transit time in the section.

## System of working

A Train is run between stations through a system of working. There are different systems of working viz. Absolute Block, Automatic Block, One train only, Following train, Pilot guard and Train staff & ticket system. In Absolute Block System, at any point of time, only one train can run in the block section. While in Automatic Block System the block section is divided into small auto signaling sections controlled by automatic signals which assume off aspects automatically depending on the movement of trains. In some metro systems, intelligent trains work on concept of moving block sections. When very less number of train/trains is/are required to be run in a section, One Train Only System is adopted. In all systems of working, a train requires an authority to proceed to leave a block station and enter the block section. As per GR 1.02 (10) "block section" means that portion of the running line between two block stations on to which no running train may enter until Line Clear has been received from the block station at the other end of the block section. Apart from the authority to proceed, the station also issues a Caution Order which lists out the various temporary speed restrictions to be followed by the crew in the section till the next Caution order notice station.

## Coaching Train Operations

Coaching train operations are planned, run and maintained to cater to the travel needs of the public so as to provide maximum level of satisfaction. Different passengers have different needs and consequently different criteria for satisfaction. While freight services are mainly end to end oriented services, the coaching services cater to enroute passengers also. Therefore, coaching train operations are planned to a reasonably predictable, systematic and regular pattern. Time tabling and punctual running are the two corner stones of coaching train operations.

### Types of coaching services

Indian Railways have evolved various types of services keeping in view of the public demand, such as...

**Vande Bharat:** These are the latest train services using train sets that can run up to 160kmph. Named as Train-18 in the design stage, these semi high speed train sets currently manufactured by Integral Coach Factory Chennai are provided with latest passenger friendly features. At present they have only seating facility, while sleeper berth facilities are under development.

**Rajdhani:** These are super-fast semi high speed trains connecting New Delhi and state capitals. These are elite trains provided with all AC sleeper coaches and given highest priority in timetabling and running.

**Shatabdi:** These are intercity super-fast trains conceptualized in 1989, on 100th birth anniversary of Pt. Jawaharlal Nehru. They run between state capitals, usually having a travel time of 6-8 hours. Only AC chair cars and executive chair cars are provided in these trains.

**Duronto:** These are non-stop superfast trains that run between source and destination stations. They don't stop enroute except for operational reasons like crew change. Duronto means "restless" in Bengali and the rakes are painted with unique yellow green livery.

**Sampark Kranti:** The word Sampark means contact and Kranti means Revolution. The combined name denotes revolution in public contact i.e., the steps taken by Indian Railways to provide high speed train connections from cities around our country with the National Capital through the provision of few stops and running at high speeds.

**Superfast:** These are express trains with limited halts at the important stations in order to achieve an average speed of 55kmph or more. Rajdhani, Shatabdi, Duronto and many long distance trains are all super-fast trains connecting major cities with additional premium features associated with their brand.

**Mail and Express Trains:** These are high speed services carrying passenger and postal mails and stopping only at important stations. These are run between distant places as inter-regional or between the important cities as intercity trains.

**Garib Rath:** In order to provide a superfast AC train affordable to common man, the concept of Garib Rath (means chariot of the poor) was evolved. The coaches used in this service are slightly larger than normal coaches with middle berth in the side portion also.

**Intercity:** In order to provide quick movement day journey travel between nearest cities, the Intercity Express services are provided. The trains are less expensive than other express trains, and usually reach their destinations within 5–6 hours. As they complete a round trip in a day, returning to the origin station at night, they are usually run with single rake. They connect various major cities that are adjacent to each other, all over the country. They contain a large number of general class coaches with a few reserved coaches.

**Jan Shatabdi:** As the Shatabdi trains are expensive; non-AC trains with Shatabdi features at affordable prices were planned as Jan Shatabdi. These trains have both AC and non-AC accommodations.

**Premium Trains:** In order to cater to the need of public that need to travel at short notice, Premium trains services are evolved. These trains are generally superfast trains. The Advance Reservation Period (ARP) is 15 days only and no wait-listed tickets will be issued. There is no cancellation facility and no refund is allowed. Unique feature of these trains is its dynamic pricing system. The prices vary according to the demand. As the seats are being filled the fare will increase, as in case of pricing of flight tickets in vogue.

**Passenger trains / MEMU / DEMU:** These trains contain only general coaches and stops at all the stations including the stations in villages. They take highest running time because of the number of stops, and hence average speeds are lowest. These services cater to the needs of short distance travelling public, of both rural & urban areas. Their fares are also low.

**Suburban trains / EMU:** These services cater to the need of mass transportation in densely populated cities. The fare is very minimal. The priority is to transport maximum people in least possible time.

## Numbering of trains

Every coaching train in Indian Railways is provided with unique number, following a five digit numbering system in vogue since December 20, 2010. In this scheme, the first digit indicates the type of the passenger train, as follows:

1 <sup>st</sup> digit	Type of trains
0	Special trains (e.g., summer specials, holiday specials, etc.)
1	long-distance trains, including the Rajdhani, Shatabdi, Jan Sadharan, Sampark Kranti, Garib Rath, Duronto, and other classes.
2	Long-distance trains; it is to be used when train numbers starting with 1 are exhausted in any series.
3	Kolkata suburban trains.
4	Suburban trains in Chennai, New Delhi, Secunderabad, and other metropolitan areas
5	passenger trains with conventional coaches
6	MEMU trains
7	DMU (DEMU) and railcar services.
9	Mumbai area suburban trains

The second digit usually denotes the owning zonal railway except for number 2, the details are furnished below:

2 <sup>nd</sup> digit	Zonal codes
0	Konkan Railway
1	CR, WCR and NCR
2	Superfast, Shatabdi, Jan Shatabdi, and some other classes of trains regardless of zones. For these, the next digit is usually the zone code.
3	ER and ECR
4	NR, NCR and NWR
5	NER and NFR
6	SR and SWR
7	SCR and SWR
8	SER and ECoR
9	WR, NWR and WCR

## Coaching locomotives

Locomotives are categorized as coaching, freight and mixed based on their design specifications especially hauling power and gear ratio. It finds mention in the locomotive syntax which generally has three digits followed by a number and subsequent digit if any.

The locomotive syntaxes normally used are:-

Digit	Meaning	Types with description
First	Gauge	W–Broad gauge; Y–Meter gauge; Z–Narrow gauge (2ft6in); N–Narrow gauge (2ft)
Second	Motive Power	D–Diesel; C–DC electric; A–AC; CA–both DC & AC; B–Battery
Third	Job type	G–Goods; P–Passenger; M–Mixed (Pass. & Goods); S–Shunting; U–Multiple units; R–Rail cars
WDM3A – Broad gauge; Diesel; can work both passenger & goods; 3A denotes 3100 hp		

## Loco Maintenance

Locos are maintained in the loco sheds. Depending upon the type of locomotives, kms worked and time spent on line, different schedules for maintenance are mandated. An illustration is given below.

Schedule	Duration	Periodicity
Trip inspection (TI)	2 hrs	After 4500 kms or one trip whichever is later
IA	4 hrs	60 days

IC	8 hrs	120 days
AOH	6 working days	18 months + 15 days (WAP-4 & WAG-5) 12 months + 15 days (WAP-1)
IOH	9 working days	36 months + 1 month or 6 lakh km, whichever is earlier (WAP-1 & WAG-5) 54 months (4 ½ years) + 1 month or 9 lakh km, whichever is earlier (WAP-4)
POH	24 working days	6 years + 3 months or 15 lakh km, whichever is earlier (WAP-1 & WAG-5) 108 months (9 years) + 3 months or 18 lakh km, whichever is earlier (WAP-4)

### Loco Links

Locomotives nominated to work coaching trains are programmed to match the time table. These schedules are called loco links. While preparing loco links, factors like adequate powering for the train service, permitted speed of locos, time slots for maintenance schedules, fueling slots in case of diesel, time for shed in / out movements have to be kept in mind. Lie over periods have to be kept bare minimum duly taking into account the time needed for the terminal operations required to pick up the next train. Power interception for a train should not be planned unless it is unavoidable.

The efficiency of loco links is assessed by train kms per engine day in use. Care has to be taken to ensure optimum utilization of loco shed capacity by avoiding bunching of locos. Diesel loco working under wire to be kept minimum. Where ARMs and ARTs are stationed and no powers are designated, links have to be made strategically so as to make available at least one diesel loco at any point of time.

### Coaching stock

For providing the various types of services mentioned above, different types of coaches have been designed, manufactured and put into service. They form the coaching stock. There are two types of Coaching Stock.

- i) Passenger coaching vehicle (PCV): A vehicle in which whole or some portion is being utilized for carrying passengers.
- ii) Other coaching vehicle (OCV): These vehicles do not have a passenger carrying portion but are planned to be attached to coaching trains for providing other facilities. Saloons, inspection cars, medical cars, tourist cars, parcels & horse van, composite luggage Power Cars, Pantry Cars & brake van are some of the OCVs.

### Types of coaches and their codes

All coaching vehicles are provided with an alphabetical code indicating the facilities provided in them. The meanings of the letters in the code are as follows.

<b>Code</b>	<b>Details</b>
W	Vestibuled
G	Self-Generating
S	Second Class
F	First Class
L	Luggage Van
R	Guard Brake Van
Y	Ladies Compartment
J	Ice Compartment
Q	Attendant
D	Vendors Compartment
P	Postal Van
U	Kitchen
CB	Pantry Car
CD	Dining Car
CN	Sleeper Class Three Tier
CW	Sleeper Class Two Tier
CZ	Chair Car
CT	Tourist Car
AC	Air Conditioned
FC	First Class with Coupe
GS	Second Class with Self Generating Equipment
JJ	Refrigerator Compartment
M	Military Car Ordinary
MA	Military Car Ambulance
ML	Military Car Kitchen
MF	Military First Class
CTS	Tourist Car for 2nd Class Passengers
CZACEN	Air Conditioned Chair Car with End on Generation
EN	End-on-Generation
FCS	First Class Coupe and Second Class
FSCN	First cum 2 <sup>nd</sup> Class 3-tier Sleeper
LR	Luggage with Brake Van

The above codes are generally given to coaches of IRS make having screw coupling. For the LHB coaches an additional alphabet L is prefixed.

### Coaching Stock numbering syntax

All coaches are also provided with a unique five digit number with each digit signifying the following

- The first two digits of the number indicate the year of manufacture of the stock.
- The third digit indicates the type of stock. i.e.
  - 0- FAC & ACCW (First AC or 2-tier AC class)
  - 1- ACCN & ACCZ (3-tier AC or AC Chair Car class )
  - 2&3 – GSCN (II<sup>nd</sup> Sleeper Class)
  - 4 & 5 – GS (II<sup>nd</sup> General)
  - 6 – GSCZ (II<sup>nd</sup> Chair Car)
  - 7 – SLR (II<sup>nd</sup> class cum luggage cum brake van)
  - 8 – WCB (Pantry car)
  - 9 – FC and VHP &VPU(First class or Parcel van)
- The fourth and fifth digit indicates the serial number of the coach
  - 11025 - Year of manufacture is 2011, FAC or ACCW, serial no. 25
  - 00534 - Year of manufacture is 2000, GS, serial no. 34
  - 98115 - Year of manufacture is 1998, ACCN or ACCZ, serial no. 15
  - 12765 - Year of manufacture is 2012, SLR, serial no. 65

### Coach composition

Detailed analysis of passenger traffic are done to decide the number and type of coaches (1<sup>st</sup> AC, 2<sup>nd</sup> AC, 3<sup>rd</sup> AC, First, Sleeper class and General) to be provided in a particular train service. Periodic survey of occupation percentage for various classes is conducted and the train composition is reviewed accordingly.

### Rake Links

For ensuring better utilization of coaches, coaching trains formation is fixed as rakes. Rake links are made so that formations are available for running train services without further shunting as far as possible. While linking rakes among different services, sufficient time slots shall be given for Primary/Secondary maintenance including time for shunting for pit line placement and platform berthing etc. In case of long distance trains, some cushion time for accommodating late running may also be given. While linking rakes it has to be ensured that pit line capacity of various depots is used efficiently.

### Coach Maintenance

The following schedules of maintenance are followed for coaching trains...

- i) **Primary Maintenance:** Passenger carrying trains are required to be checked for rakes with ICF coaches after every 3500 kms and LHB Rakes after 4000kms in pit line for 6 hours thoroughly by mechanical & electrical departments for fitness of undergear equipment, passenger facilities and cleanliness.

- ii) **Secondary Maintenance and OEM (Other end maintenance)**: The rakes that have undergone primary maintenance in the originating station are subjected to secondary / other end maintenance in the destination station depending upon the distance traveled.
- iii) **IOH (Intermediate over hauling)** is a scheduled maintenance of coaches, checked thoroughly in IOH sheds separately for each coach.
- iv) **POH (Periodic over hauling)** is a scheduled maintenance of coaches checked thoroughly in workshops separately for each coach.

Policy Guidelines regarding Revised Maintenance pattern of coaching trains  
(Railway Board letter no. 95/M(C)/141/I Pt. Dated 14.6.17):

S.No	Trains description	Primary Maintenance
1	Rajdhani / Duronto	At both originating and destination stations
	Shatabdi	At primary end only
2	M/Express round trip more than 3500km for ICF / 4000km for LHB stock	At both originating and destination stations
3	M/Express round trip up to 3500km for ICF / 4000km for LHB stock and touch primary depot within validity (excluding sl no 1 above)	At Primary end only once within the limit of 3500 Kms (ICF) or 4000 Kms (LHB) / 96 Hrs. whichever is earlier.
4	Interconnected Mail/Express Trains Round trip run up to 3500 Kms (ICF) or 4000 Kms (LHB)	To be done within 3500 Kms (ICF) or 4000 Kms (LHB) or 96 hours after the issue of original BPC whichever is earlier, only at Primary end.
5	Passenger trains with toilets including interconnected passenger trains/ shuttles	Done within 3500 Kms or 96 hours after the issue of original BPC whichever is earlier, only at Primary end.
6	Passenger trains without toilets	To be done after 3500 Kms or 7 days whichever is earlier, only at Primary end
7	Dedicated Parcel Trains	To be done after 4500 Kms or 10 days whichever is earlier.
8	Military/Election Special trains	To be done within 3500 KMs (ICF) or 4000 KMs (LHB) or 96 hours whichever is earlier. Other end under gear examination may be permitted only once.
9	DEMU/MEMU/EMU*	At the maintenance shed during every trip Inspection. 7 days periodicity for 700 HP units; 10 days periodicity - other units.

\*At present BPC for EMU is being given for 14 days instead of 10 days.

### Spare Coaches

These are general guidelines for spare coaching to be kept at station where Primary maintenance takes place:

Type of stock	Traffic	Mechanical	Total
AC coaches	5 %	6%	11%
Non AC coaches	4 %	5%	9%
Rajdhani/Shatabdi	5 %	6 %	11%

However, with advent of ICMS, it is possible to position spare coaches against IOH/POH on days of expected due and also replace coaches with trouble. Traffic spares have to be fully utilized for catering to demand by attaching to train.

### Crew links

Coaching crew is scheduled to work coaching trains as per time table. These schedules are called crew links. These links are prepared for optimum utilization of crew duly ensuring compliance to HOER. Separate links are prepared for Mail/Express, passenger and suburban trains.

### Time Tabling

The coaching train services are time tabled to serve the passengers. The arrival and departure times of the trains for all the stations through which it runs is published once in a year in the form of a time table.

#### Factors to be kept in view for scheduling of passenger carrying trains

##### Passenger's needs

- (i) Convenient departure and arrivals at station based on types of service offered.
- (ii) Speed and reasonable transit time
- (iii) Appropriate halt for meals/breakfast
- (iv) Sufficient time for entraining and detraining of passengers
- (v) Requirements of short/medium/long distance passengers need to be balanced.

##### Service Requirements

- i) Maintenance slot for primary, secondary and OEM.
- ii) Platform availability
- iii) Coach Watering facility
- iv) Catering for long distance trains
- v) Fueling if diesel loco planned.

## Types of Time-tables

**Public Time Table (PTT):** It provides the arrival and departure timings of train services at stations having passenger stoppages. The passenger time table timings are kept ahead of working time table timings in enroute stations to conserve gains made in running. In addition to the time schedules, PTT contain a variety of useful information for passengers, including fare-tables, reservation rules, accommodations available etc. These are published Zonal Railway wise. The 'Trains at a glance' is published giving scheduled timings of important trains all over Indian Railways. The timings of the PTT are also updated in **NTES** - National train enquiry system, which is an online platform for the travelling public to view the time table for journey they require.

**Suburban Time Tables:** These pocket sized time tables contain in detail the timings of all suburban services as well as of other passenger services running over the suburban sections and also the abstract timings of the passenger trains going beyond the suburban section.

**Sheet Time Tables:** These time tables contain the tabulated schedules of passenger carrying trains running over an area on large sheets of papers and are displayed at platforms and waiting halls.

**Working Time Tables (WTT):** These are issued separately for each division for the information and guidance of the Railway staff, especially the running staff, station staff, control staff and maintenance staff. The WTT includes arrival/departure/run-through timings for a train at all stations. It incorporates and furnishes information on maintenance and traffic allowance. The WTT also has sectional information, load charts, permitted speeds for loco/rolling stock, important JPOs, circulars, etc.

**Military Time Table:** The military timetable is given for movement of troops and military specials. These are framed at a meeting held annually by Railway authorities with Joint Director, Military (MILRAIL). The Military time table is issued as and when necessary and is meant for official use only and shall be strictly confidential.

Time Tables are usually published once in a year. Hence any major review of timings is usually carried out once in a year in order to reap the benefits of improvements in track / signaling / traction / rolling stock; to suit the changed scenario of operations; to provide better timings based on passenger feedback. However, in the interim period also timings can be revised by issuing relevant notifications and ensuring the information regarding the changed timings reach the travelling public / users.

## Revision of Time Table

Based on the data of tickets sold, representations from DRUCC, local leaders, passenger association, etc., divisions formulate proposals like new trains, additional services, extension of trains, augmentation of coaches, provision & elimination of halts, revision of timings and cancellation / diversion of trains. Such proposals are made duly indicating requirement of rakes, loco, path and crew. These proposals are then reviewed and consolidated in zonal headquarters. Once finalized, these zonal proposals are discussed in Inter Railway Time Table Co-ordination Committee Meeting held every year by Railway Board's Directorate, which is attended by CPTMs of all the Railways and the Executive Director (Coaching) Railway Board. The decisions taken in this meeting are proposed in budget. The changes/proposals approved in the budget are implemented in new time table.

### Time line for revision

S.No.	Activity	Date
1.	Division proposals are finalized based on various demands with probable timings and requirements of stock / loco / crew.	September
2.	Minutes of Divisional Time Table meeting to be sent to CPTM	October
3.	CPTM's Meeting with Mechanical, Electrical, Engineering & S&T officials	November
4.	CPTM's Meeting with RMS authorities.	November
5.	CPTM's Meeting with Sr. DOMs. The suggestions of DRUCCs and ZRUCC are duly considered in this meeting.	December
6.	Inter Railway Time Table committee meeting. This meeting is presided by the ED [Coaching] with Director [Coaching] as Secretary and CPTMs of all Railways as members.	February/ March
7.	Orders shall be given to print Time Table to press	15 <sup>th</sup> May
8.	Publishing time table to public	1 <sup>st</sup> June

### Temporary changes in time table

During unusual incidents or for carrying out mega blocks / new works, temporary changes are done to coaching train services duly giving advance information to the public when possible.

Diversion: A passenger carrying train may be diverted to another route due to serious accidents or floods or any obstruction causing dislocation of traffic and blockade of line, under advice to all concerned..

Cancellation: A passenger carrying train may be cancelled fully or partially due to serious accident/dislocation or abnormal delay in running. This should be done as a last resort only as it causes inconvenience to many passengers as well as results in loss of earnings.

### 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. The duplicate train starts at an intermediate station and follows the path of the original train so that passengers in those stations can board the duplicate train.

In order to take care of very high demands for a train reflected by long waitlists, clone trains having similar origin and destination and stoppages are also run during peak seasons.

### Punctuality

Punctuality in running of the passenger carrying trains is one of the significant indices of the Railway efficiency. It is monitored at various levels of Railway operations and management. Any serious dislocation of passenger trains also affects goods train running and corridor blocks. Thus punctuality is not only important for passenger satisfaction, but also have significant bearing on the freight operations maintenance & safety.

Punctuality statistics on Division / Railway is monitored on daily basis for improvement through Punctuality Analysis Module (PAM) of Integrated Coaching Management System (ICMS). Based on ICMS data, inputs of which are made at different levels detailed analysis of bad runners, bad sections are done and action plan are drawn in order to improve punctuality. Integration of ICMS to COA ensures real time status of the train services.

To monitor the Passenger carrying trains effectively according to their importance, relevance and stock they are grouped into following categories.

- i. *M/Express trains*: Vandebharat, Rajdhani, Duronto, Shatabdi, Garib Rath, Jan-Shatabdi, Superfast, Mail/Express & Suvidha trains
- ii. *Passenger trains*: DEMU, MEMU, Holiday Specials, Conventional rakes
- iii. *Sub-urban trains*

### Norms for Punctuality

Train arriving late is considered to be 'Lost Train' based on the following norms.

- Intra zonal & Terminating trains: arriving more than 15 minutes late at destination.
- Originating & Passing through trains: handing over by more than 3 minutes at interchange point.
- In case of Sub-urban trains, punctuality of the train is lost when it arrives more than 5 minutes late at destination.

$$\% \text{ Punctuality} = \frac{(\text{Total No. of trains} - \text{No. of trains lost Punctuality})}{\text{Total No. of trains}} \times 100$$

## Real Time reporting

To improve factual reporting of punctuality and asset failures in ICMS by the divisions, Railway Board declared 2018-19 as 'Zero base year'. Further to improve factual reporting, Control Office Application (COA) has been integrated with RTIS/REMMLOT devices provided in locos; Data loggers; E-TSR & C-TSR at stations. Through these, timings of trains are automatically captured in the Control Office Application and further transmitted in NTES, thereby ensuring that, real time information is available to the public and division office.

**REMMLOT / RTIS:** (Remote Monitoring and management of Locomotives and Trains) / (Real time train information system). These devices are based on GPS system provided in Diesel / Electric locos which automatically update location of trains in COA.

**Data logger:** At originating/terminating/interchange stations, data loggers have been integrated with COA. The SM has to input the train number against the occupation of berthing track circuits by the train at the station.

**E-TSR & C-TSR** are provided at stations where SM makes entries of train arrival/departure in a computerized system which is connected online to COA.

Sequence of picking up timings in COA is

- i. REMMLOT/RTIS
- ii. Data Logger
- iii. E-TSR & C-TSR
- iv. Manually by the SCOR.

## Lost Train Analysis

1. Trains that lost punctuality for the day are analyzed to identify the reasons in order to initiate measures for correcting them. Information is obtained through LTM of Guard & entries by SCOR in COA. Every coaching train Guard after completion of his journey is required to submit a report called LTM report (Late Train Movement report). It is a summary of the timing lost and gained on account of various departments and causes. The Guard at the end of the trip has to total up all the losses occurred under various department heads and summarize for each of the department separately.
2. Trains lost punctuality are categorized into different causes based on the maximum time of loss on the concerned department in PAM module of ICMS viz. Engineering, Planned Blocks, Traffic, Signal & Telecommunications, Carriage & Wagons, Diesel Loco, Electric Loco, ACP, Accidents, Incident, LC

gate, On other railways, Out of path, Construction works, NI working, miscreant act, commercial, weather, etc.

3. The trains which lost punctuality are analysed by the concerned departments in detail daily and necessary action is taken.
4. Daily, weekly and monthly Punctuality meetings are held at HQ of Divisional, Zonal & Railway Board to analyse the reasons and improve punctuality.

## Measures for Improving Punctuality

Punctuality requires constant analysis and monitoring. Long term measures like improved design and maintenance of Locos, Track, S&T Gears, Security, Commercial and Terminal arrangements have a significant effect on punctuality. Some of the day to day activities which are very important to achieve punctual running of passenger trains are as follows...

### Originating Stations:

Timely placement of empty rakes for train examination, sick detaching, marshaling, berthing on the platform, booking of staff, right time start and running to PTT, etc. are very critical to achieve 100% punctuality.

### Control Organization:

- (a) Crossings and precedence have to be arranged judiciously and efficiently.
- (b) Wrong / improper crossings / precedence contrary to normal priority like through goods trains over passenger trains should be rarely done.
- (c) The Controller should develop knowledge of the various passenger trains, dependability of the Loco Pilot and Guards, behavior of the passengers, particularly the daily commuters and the nature of the section.
- (d) Perennial issues if any should be flagged to time table controller to factor in during time tabling.

### Stations enroute:

- (a) Timely advice to gateman for closure of gates, timely planning of shunting or other conflicting movements.
- (b) In case of single line section, smart calculation of block section running time for reception & dispatch of trains or utilizing provision of simultaneous reception.
- (c) If there are perishables loading, the material is to be stacked at suitable place for prompt loading.
- (d) At crew change points, ensure readiness of the crew and box loading if any.
- (e) Clearing signals as per PTT timings.
- (f) Proper information should be conveyed to public regarding platform nominations etc., well in advance.

**Crew of the train:**

- (a) Shall attend to their assigned trains well in time with complete equipment; conduct brake continuity test and verify that the train is in proper state of function and with complete equipments to travel safely.
- (b) Make up time in case the train is running late by conserving gains on run and smartly exchanging all right signals.
- (c) Take prompt remedial actions in case of unusual occurrences and equipment defects.
- (d) Before scheduled departure, Guard to ensure parcel/luggage loading is completed, SLR doors are closed and locked, and relevant papers taken.
- (e) Start the train as per PTT.

## Coaching terminal operational procedures

- i. On arrival of a rake at a station, mechanical staff to close all doors and windows of coaches.
- ii. Before backing on to stabled/pit line, SM to ensure parcels and bedrolls are unloaded.
- iii. In case of major repairs/ due for IOH/POH, mechanical and electrical staff has to advise SM for detaching with its replacement duly advising the control.
- iv. If any coach is to be detached / attached on account of electrical maintenance, the SSE/TL shall inform the SSE/C&W and the mechanical staff shall issue sick/fit certificate to the Station Master.
- v. SM will form rake with fit coaches as per it's consist and place it on the pit line as per its schedule.
- vi. The TNC/SM has to advise Mechanical department in form No T.431 duly mentioning the painted numbers of the coaches and timing.
- vii. Once the rake is offered for examination, SM shall neither disturb the rake nor perform any shunting onto the rake.
- viii. SSE/C&W shall obtain line block from the SM before deputing men on to the formation. The mechanical staff shall place danger board at the entry into the pit line, place scotch block and lock before commencing the work on the formation, to prevent inadvertent entry of outside vehicles, which may harm the staff attending the rake.
- ix. After the rake is checked the mechanical staff advise SM by returning one foil of T.431 mentioning the time of completion and release the Line Block. The mechanical staff shall also remove the danger board and the scotch block.
- x. SM to back the rake on stabled/platform line as necessary.
- xi. The VG of the train will be prepared by SM/TNC and handed over to the Guard of the train.
- xii. The TNC/Station staff has to ensure that the BV equipment is available in front/middle/rear SLR and is sealed.

## Coaching Vehicle Census

Coaching Vehicle census is conducted to know the location of coaching vehicles and cross check the information with regard to its due dates. It is done under the directives of Railway Board. The month, date time of census is notified to all the staff involving in census. Prior to conducting a coaching vehicle census, CPTM holds a meeting and instructs the census officials. The data obtained through coaching census is updated in the master table of ICMS.

## Passenger Marketing

The demand for travel is always increasing in our country. However, it is also seasonally fluctuating. All trains are not fully occupied throughout the year. Hence there is an opportunity to plan & achieve the best method of coach usage to achieve maximum demand fulfillment.

The following actions are taken in this regard...

**Temporary Augmentation:** Based on the availability of room in the formation, coaches available are attached for clearing the wait list passengers. This is subject to

- i) Restricted trains: Additional carriage is attached to trains only with permission of the Railway Board/ PCOM/CPTM.
- ii) Prohibited Trains: Additional coach cannot be attached by these trains. This prohibition may be for a portion of journey or throughout to ensure punctuality.

**Permanent Augmentation:** Based on the demand and temporary augmentation done continuously for some of the trains, coaches can be permanently augmented for that service. This will be included in the coach composition and fired in the PRS.

**Coach composition review:** Based on occupancy, changing nature of demand, passenger profile, coach composition may be reviewed and optimized.

**Rake Link review:** As rake link based train services have come up, some of the limitations of one train service are passed on to the linked train. Hence it is better to link similar train services having similar demand. Even within the limitations, the following action shall be taken for improving coach utilization and better passenger satisfaction.

- i) Standardization of rakes with similar demand/loads reducing lie over period at originating/destination stations.
- ii) Extension/ running of train service in case of lie over period is more at secondary maintenance stations.

**Stoppage analysis by elimination/provision:** Based on the sale of tickets, some halts may be eliminated. Based on the demand and requirement, stoppages may be provided.

**Train on demand:** During festival seasons and other occasions during which demand for travel shoots up, special trains are planned and run to cater to the particular time period.

Apart from the above operational marketing efforts, other efforts like increase in the capacity of the coaches, better berth utilization and providing better passenger terminals with world class facilities also help in improving passenger satisfaction.

## Freight Train Operations

Freight Transportation involves movement of raw material from production centers to industries and semi-finished/finished goods to consuming areas. It plays an important role in economic and industrial development of a country. The freight business is the major source of revenue for the Indian Railways. Main activity centers of freight operation include sidings, goods sheds and examination yards.

### Type of Freight trains

**Pilot Trains** are those moving between serving station and siding for loading or unloading.

**Through goods trains** are freight trains transporting goods from one goods yard to the next without stoppage at intermediate points. Most of the freight trains run in the Indian Railways fall in this category.

**Merry Go Round (MGR) Trains:** Certain circuits are planned to make continuous trips between loading and unloading points with captive loco / formation. In SCR, such a system is functioning for supplying coal from Singareni Collieries at Mancherial station to NTPC power plant at Ramagundam station. The track is arranged in a bulb like formation so that there is no requirement for Engine reversal since the movement is circular. Since these trains make continuous round trips between dedicated loading and unloading points virtually without detention, they are named as Merry Go Round trains.

**Block rake:** Depending upon the type of wagon, a full train length is determined as a block rake. Most of the freight trains in Indian Railway fall in this category. Usually this train is booked for a single destination and gets a fare benefit of Train Load.

**Mini Rake:** It is a short rake composed of half the number of wagons specified for a Block Rake. These rakes are generally formed during slack seasons to promote loading with lesser quantity than Block Rake.

**Long Haul Trains:** With the increase in freight traffic disproportionate to increase in line capacity, Indian Railways has been innovating on increasing throughput per train. Improving design of wagon for a better pay to tare weight ratio, improved axle load etc. are long term solutions requiring expenditure. However, Long Haul Trains which are formed by joining two or three block rakes and run in a single path, doubles/triples the section capacity and through put. With the success of running such trains, Longer Loop lines are being developed in one station for every stretch of 50-60 km. In SCR long haul trains with two rake composition are called python rakes and trains' name are suffixed with 'P'.

**Two Point Rake** is a freight train carrying two sets of wagons destined for two terminals. This is generally permitted for authorized pair of destinations.

**Multi Point Rake** is a train carrying sets of wagons destined to more than two destinations. This type of loading is permitted only during slack season.

**Crack Trains:** These trains are planned to run through bypassing an intermediate crew changing point without changing of crew. They are given a good path so as to reach the destination/interchange point/another crew change point within crew hours. By running crack specials average speed of goods trains are increased thereby improving wagon turn-round, sectional through put and reducing crew detentions.

**Private Trains:** Though most of the freight trains are owned by Indian Railways, there are fleets owned by private companies too. Most container trains fall under this category. Some special type of wagon trains and automobile carriers are also owned by private companies.

## Freight Locomotives

Locomotives for freight operations are usually of higher hauling power in order to work loaded trains. Except in some captive circuits, freight locomotives do not work in specific links.

### Load chart

In order to ensure adequate powering for a freight train, including the factors like ruling gradient, trailing load, a section wise tabulation is provided in WTT for various combinations of freight locomotives and formation loads. This table known as Load chart also provides special conditions like running through at a station, providing banker, etc.

## Power Plan

The requirement of freight locomotives worked out for running freight and other trains is known as power plan. It is prepared once in a year on the basis of the number of trains run section wise in the previous year. A prescribed additional % engine kms are added for anticipated traffic growth.

## Types of wagons

Based on the different goods to be transported in freight trains, the following types of wagon have been designed and put in use.

**Open wagons** – They carry coal, ores, limestone etc. which are not drastically affected by atmosphere during transit. These wagons can be tipped or be unloaded through flap doors provided. They are also used for loading bagged commodities duly covering them with tarpaulins to avail benefits of back loading or empty flow.

**Covered wagons** – Normally used for goods which are prone to damage during transit by the atmosphere conditions such as good grains, cement, fertilizers, etc.

**Flat wagons** – Normally used for transportation of steel coils, rail sleepers, etc. are wagons without any side walls.

**Container wagons** – These are special flat wagons designed for handling containers. These wagons are provided with semi-permanent coupling.

**Hopper wagons**: Special wagons designed for rapid discharge from bottom used for transporting coal and ballast.

**Well wagons** – wagons having a well-shaped under frame normally used for transportation of larger consignments like military tanks, heavy equipment etc.

**Tank wagons** – These are wagons designed to carry liquid consignment like petroleum products, milk, edible oils, etc.

**Automobile carriers** – These are specially designed to carry automobiles. Passenger coaches modified to suit loading of automobiles are called NMGs.



BOXN



BCN



NMG

## **Wagon syntax**

All wagons are provided with alphabetical code which indicates the type or purpose of the wagon.

Code	Details
B	Bogie Wagon
O	Open Wagon
C	Covered Wagon
T	Tank Wagon
P	Petrol
LPG	Liquid Petroleum Gas
BR	Bottom Rapid Discharge
BY	Bottom Mech. Discharge
R	Rails
C	Container
L	Low Plat form
ST	Steel Load
N	Air Brake Stock
X	All welded construction
HS	High speed
HL	High Load
HA	Higher axle load
LW	Light weight

## **Wagon Pooling**

Every zonal railway of IR has been allotted with a fleet of freight wagons by the Directorate of Wagon Interchange (DWI) under the IRCA for coordinating wagon interchanges. Of these, most wagons are contributed to the general pool. Zones are restricted to maintain their wagon balances proportionate to their contribution to the general pool of wagons. Wagons not contributed to the general pool of wagons are marked as Non-Pooled Wagons ('NP'). These are usually some special-purpose high-capacity wagons earmarked for specific operations on particular routes.

## **Train examination**

Freight trains are examined in nominated yards having the facilities for examination and wagon attention. The examination normally gets done when the wagons are in empty condition with a few exceptions of loaded examinations permitted by extant instructions / JPO. There are three kinds of freight examination - Closed circuit examination, Premium examination & End to end examination. As CC rakes are valid for a higher number of days, they can be loaded multiple times before subsequent examination and hence have a positive effect on Wagon Turn Round.

## Crew

In case of freight trains, crew is booked through Crew Management System (CMS) on the basis of first in and first out for the first week and in subsequent week based on the number of duty hours they performed.

## Complexity in Freight Operation

Unlike Passenger Train operations which are time tabled & scheduled, freight operations are dynamic and require constant intervention in all stages viz., examination, empty run to loading point, loading, loaded run to unloading point, unloading. At each of the above stages, the operations are prone to variations like number of sick arising in examination; change in demand by customers; factors affecting loading operations and so on.

Some wagons have competing commodities and demands. For example, BOXN wagons are loaded with coal, clinker etc. When coal demand goes up and there is a power shortage in the country, supply for coal is prioritized and clinker loading gets affected. Similar is the case for BCN, which can carry food grains, bagged cement and variety of other commodities. As loaded freight trains require higher hauling power than empty trains, there arises a continuous need for power balancing. Hence, sometimes freight trains are over powered and sometimes under powered requiring banking.

## Loading

A customer wanting to dispatch goods by railway has to register an indent furnishing particulars of commodity; type of wagon required and destination terminal by paying the required Wagon demand registration fee (WDRF). Empties are supplied duly checking for restrictions / quota allotment on the day of supply. Allotment / loading orders are issued in accordance with the priority of registration as per preferential traffic order. Loading order given by the SrDOM is called as Specific Loading Order (SLO).

Freight charges as prescribed in IRCA Goods Tariff Part-1 & 2 of Vol.II are collected duly issuing an RR. All commodities transported by freight trains are grouped in four classes 'A', 'B' 'C' & 'D' for assigning priority in allotment of wagons. Apart from the priority SrDOM may give preference for traffic offered in block rakes, traffic covered by contractual obligations and/or guaranteed under specific Schemes, traffic in rakes loaded from a Siding/Goods shed of the station having round the clock working and having mechanized system of loading.

**Quotas:** In order to regulate the inflow of wagons into areas where facilities are not available to handle the sufficient incoming traffic, 'quotas' are fixed for loading of wagons to such areas.

**Restrictions:** In order to avoid detentions to wagons, whenever unusual occurrence like accident, labour strike, mechanical failures etc. occur, restriction messages are issued by operating department restricting the movement of goods traffic to a particular terminal or station or via a junction or route.

## Loaded Train Running

After loading, the loaded trains are run towards its destination, through the 'booked route'. The booked route is usually the shortest route except in few cases, where the freight is paid for a longer route by the customer for various reasons. In order to keep the fare for customer not get affected due to operational constraints in the railway network, in few routes authorized by Railway Board, trains are run via a longer other than booked route. Such routes are called rationalized routes.

## Unloading

On reaching the destination, the customer is required to unload the goods from the wagons within a stipulated time, beyond which demurrage charges for detention of stock will be levied. The unloaded material in the railway premises is required to be cleared within a stipulated time, beyond which wharfage charges for material available are levied.

**Rebooking:** Booking of a consignment after reaching the original destination, without taking delivery, to any other station, is known as rebooking.

**Diversion:** Diversion means diverting a loaded wagon or rake from a common junction to a new destination. PCOM of the zone in which wagons are physically available is empowered to grant permission for diversion of the wagons / rake.

**Delivery of goods short of destination:** Delivery of goods short of destination is also treated as Diversion. In case of delivery short of destination, the party should give an undertaking in writing that he will not claim any refund of freight charges for the portion of the journey not covered by the wagon. In this case, diversion fees need not be collected.

The party should affect book delivery, by surrendering the railway receipt and paying all the charges due at the original destination and effect physical delivery of the consignment at short of destination by surrendering a "No-due" certificate issued by the original destination.

**Diversion/Rebooking/delivery short of destination on Railway's account:**

The railway administration with the consent of the consignee/consignor may permit rebooking/diversion/delivery short of destination of consignments to nearby alternative station for delivery.

## Empty Running

In an ideal condition, all freight train runs can be in loaded conditions. But practically empty running happens as there is not always a demand in return direction. Certain special type of wagons for POL, Steel, Coal, Natural Gas, Ammonia, LPG etc. have to be generally run empty back to the loading points. Avoiding or reducing the extent of empty haulage and cross movements of similar type of empty stock requires operating acumen strengthened by advance information, close liaison with customers and some freight incentive schemes. Empty wagons are run to loading points with demand or examination points as per their condition.

## Daily Monitoring of Goods Operation

Following are the important goal posts of daily freight operation

- i) **Loading** – All the on hand empty wagons to be loaded are supplied for loading in time to achieve the maximum loading for the day. Empty wagons taken over early in the day shall also be strived to be loaded. Efforts are also taken to ensure a demand pipeline for the next day loading.
- ii) **Unloading** – All on hand inward wagons are placed for unloading in time to achieve the maximum unloading for the day. Inwards taken over early in the day shall also be strived to be unloaded. Wherever possible back loading shall be planned and achieved.
- iii) Maximizing handing over of outward & surplus empties to other divisions.
- iv) Planning appropriate locomotives to clear wagons from terminals after loading/unloading with minimum terminal detentions.

In order to achieve all this control office in the divisions are required to do the following on a continuous basis

### Planning/Forecasting:

Forecasting is done based on odd hours wagon holding duly targeting the above objectives. This brings the requirements for achieving the targets as well as the list of trains that can be run with existing resources. As divisions exchange such information with each other, the forecast can be updated based on expected trains.

DyCHC night shift should chalk out a rough plan in consultation with the adjoining DyCHC. Rough plan must be ready in all respects. Chief controller has to finalize the day's forecast/planning after checking the information, draft plan, and consultation with CHC of adjoining divisions. Copies of the forecast should be sent to SrDOM/DOM. After scrutinizing the same, the SrDOM/DOM gives instructions to CHC for final amendments. All HQ/RB instructions need to be complied. Once finalized, it must be repeated to Central Control.

**Execution:** Finalized plan should be communicated to all concerned supervisors viz Deputy Chief Controller, Controller, Yard Master, SSE/Loco Shed, Terminal SMs, crew lobbies, customers. All out efforts are to be taken to achieve forecasted loading & interchange.

**Review:** As many aspects of the freight operations are dynamic, there can be changes to the expected operations. Any failure or deviation would lead to consequent failure in interchange. Hence initial commitments to interchange have to be achieved by planning for alternatives and making appropriate changes to original plan.

## Zonal Head Quarter Role

The Zonal HQ plays a vital role in day-to-day operations of Divisions in two important ways, by giving suitable guidance and assistance.

Similar actions to the ones taken by divisions are taken by the zonal headquarters for inter divisional co-ordinations and forecasting zonal interchange & loading.

Latest Freight operations position of various divisions in the zone is obtained by the HQ central control from divisions through FOIS and other modes of communications. The information includes, stock position, loading and particulars of old outstanding and fresh registration of indents, freight trains running on each section, category wise position of unloading, Yard balances, 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) CEE/Plng. & Operations and CELE. The important position pertaining to various departments is conveyed to the concerned departments as well as the General Manager.

## Railway Board Role

Inter zonal co-ordination is done by Railway Board on a daily basis. Such close monitoring helps in ensuring that overall best operations for Indian Railways are achieved. Inter zonal interchange commitments and inter divisional interchange commitments are flagged and compliance is sacrosanct. This operational discipline is the driving force for freight operations.

## Freight Marketing

In order to attract traffic to rail as well as address the issues of empty flow and lean season loading, initiatives of freight marketing are taken up. Also, investments in wagons which are the basic assets of freight movement are also attracted with various schemes

## Various schemes for improving wagon population

Wagons are long term assets with life up to 20 years. Hence their production needs to be strategically planned. Some of the methods for bringing up wagon production with market needs are as follows:

### Wagon investment scheme

In order to encourage public-private partnership in procurement of wagons to meet with the anticipated incremental freight traffic Wagon Investment Scheme (WIS) was introduced. Customer's investing in Railway wagons will be assured of the supply of a guaranteed number of rakes every month based on the number of rakes procured and turn round of the type of wagons with 10% concession in freight. Investors opting for Engine on load (EOL) Scheme will get additional bonus. This guaranteed supply will be in addition to the normal supply of rakes to such customers.

### Wagon leasing scheme

The objective of this scheme is to develop a strong wagon leasing market by encouraging third party leasing of wagons, particularly with a view to bring in wagons of better designs.

Following types of wagons may be procured for leasing:-

- (i) High Capacity Wagons (HCW)
- (ii) Special Purpose Wagons (SPW) like BCBFG, BCACM
- (iii) Wagons for Container movement.

## Dynamic Pricing Policy

Introduced with the objective to optimize utilization of transport capacities and reduce idling of assets by imposing busy season surcharge and granting attractive concessions in freight and fare, during off season.

## Freight incentive schemes

Main objective of the Freight Incentive Scheme is to generate additional traffic volumes and additional revenues. Grant of freight concessions should, therefore, serve this very objective. A close watch needs to be kept to ensure that this objective is being served.

Following Schemes are included in this category:

**Liberalized Automatic Freight Rebate Scheme for traffic loaded in Traditional Empty Flow Direction:** This scheme is introduced with a objective to reduce the empty running of freight trains on IR and garner additional revenue by a suitable pricing mechanism based on discount offered to customers for booking their goods in trains, which are normally run empty from unloading points.

**Incentive Scheme for Freight Forwarders:** This scheme is introduced to facilitate cargo aggregation & expand commodity basket on railways. Since customers are required to book a minimum of half rake, which they may not have the goods required, a single customer aggregates the different customer's cargo and book by the railways.

## Features common to both coaching and freight operations

### Crew management

#### Posting of crews

LP / ALP / Guards / Shunters are posted at their headquarter stations under Chief Crew Controller (CCC). Crew are required to work from their headquarters to various stations as per their crew beats. Running rooms with catering facilities are provided for outstation crew. The hours of rest for a crew are different for headquarter and outstation. CCC has to ensure the staff working under are not due for refresher courses or periodical medical examination before being booked for working of trains.

#### Road Learning

Crew of the trains has to undergo road learning of the section, in order to familiarize with the signals, stations, gradients and other aspects required for safe running of the trains before they are booked for independent working of trains as per SR 3.78.2 of G&SR 2020.

#### Crew Lobby

The place where crews are booked for train operations is called a lobby. Combined crew lobby is where all three - Guard, Loco pilot and ALP are booked together. The lobby supervisors/staff takes forecast of requirement of crew from the control. They book the crew based on the train order in case of freight trains and non-time tabled coaching trains. A two call system is followed in order to minimize pre departure detentions. The booking of the crew is done through Crew Management System. Care is taken to ensure that the crew booked for a train is designated for working such trains; have a proper LR for the section. Once the crew arrives at the lobby, a breathalyser test is conducted along with signing on, to ensure that there is no alcohol intake or influence. This test is also conducted at the completion of duty while signing off. On completion of the duty, the crew submits a Combined Train Report (CTR) jointly signed by LP and Guard duly mentioning the detailed timings and en route detentions to CCC/SM. Apart from booking the crew for train orders, lobbies also ensure crew balancing for the day as per forecast.

#### Crew equipment & Documents

Crews working the trains are required to possess with them certain equipment as mentioned in SR 4.19.

### 9-Hour Rule

As crew are the most critical for safe running of trains, in order to have maximum alertness, a 10 hour rule was envisaged for at a stretch working, which has subsequently, revised to 9 hours. The following instructions have been issued in regard:

- (1) Running duty at a stretch should not ordinarily exceed 9 hours from the departure of the train.
- (2) Overall duty of running staff from 'sign-on' to 'sign-off' should not generally exceed 11 hours.
- (3) In operational exigencies, running duty may be extended beyond 9 hours within overall limit of 11 hours provided due notice has been given to the staff by SCOR, before the completion of 7 hours duty
- (4) If a train doesn't reach its normal crew changing point / destination within a overall limit of 11 hours, and the crew changing point is approximately 1 hours journey, the staff should be required to work the train up to the crew changing point.
- (5) In exceptional, extreme emergencies like accident, flood, agitation, lightening, equipment failures etc, the staff may be required to work beyond the prescribed limits of working hours and SCOR should advise the staff accordingly.
- (6) In order that running staff are aware of their beat, at every crew HQ stations and normal crew changing point, the beat of staff of Mail Express, passenger, goods trains etc should be prominently displayed on the notice board. Such type of notices also be put on lobby, loco shed, where the running staff is required to sign on and sign off.

### Crew requirement of a division

Crew requirement is reviewed once in six months by the division based on the crew required for working coaching links and average working hours of goods crew. 30% leave reserve and 10% trainee reserve are usually added to the bare requirement.

## Speed of trains

The speed of a train is restricted by the lowest of the permitted speeds among track, locomotive, and formation. It is also impacted by speed restrictions imposed permanently or temporarily. Sectional speed is the maximum speed for which a track is fit. It is given section wise and no train should exceed this speed while running on the section. The speeds of various locomotives, wagons and coaches permitted over a particular section is fixed and issued as a Joint Safety Certificate at zonal headquarters. This is communicated to the crew through Lobby notification and in WTT.

Unlike other modes of transport, train movements are controlled throughout their formation and run. Their priority for running and consequently their transit time and speed are affected by every station, section, division and zone they pass through. Train operations thus require close coordination at all these levels. Working of trains is the most efficient when the best asset utilization is achieved and the needs of passenger & freight customers are satisfied to the maximum extent.

\* \* \*

## Chapter – IV

# Control Organization



Train operations happen round the clock on all days of the week and throughout the year. A train is run as a result of coordinated working of staff of various departmental field units. In order to have a center for coordinating all such field units, each division, zone and railway board has a control organization.

Control Organization functions as the nerve center of the Railway Operations. It deals with monitoring, planning, directing, organizing, coordinating and controlling the multifarious activities associated with train running on a real time basis. The goals of the control organization are...

1. Safe running of trains, ensuring no harm to passengers; damage/loss to freight or impedance to smooth flow of traffic.
2. Punctual running of coaching trains, ensuring path for freight train running and blocks for maintenance.
3. Maximizing loading and freight movement with optimum asset utilization.
4. Coordination in disaster management to ensure relief and restoration of traffic.

### **Divisional Control Office**

Every division office has a Control Office for the entire jurisdiction of the division. It is under the administrative control of SrDOM. In few larger divisions in other zones, there are Area Controls also covering a specific part of the division. The Chief Controller in charge heads the divisional control office. Chief Controllers, Section Controllers, Train Clerks and other assisting staff work under CHC in charge.

### **Control Board**

The divisional jurisdiction is split into many control boards, each of which covers one or few sections. Each board is operated by a Section Controller. The control board is provided with continuous communication facility with all block stations, important cabins, freight terminals, loco shed etc. over a section. The Section Controller controls all the interstation train movements in the section. The timings of every train at every station are reported by Station masters to the controller. On blocking of a train by adjacent SM, the action to be taken for the train at his/her station has to be obtained immediately by the SM from the controller. As many trains usually are on

run at any point of time, many such events occur in parallel which requires the decision of the Section Controller. For performing this function, a controller has to be sharp and swift. He/she should have a thorough knowledge of the section and train running. All these actions of timings sharing and decisions communicating happens seamlessly in order to ensure that there is no detention or slowing down of any train running in the section.

The real time data logger based simulation of train operations in all the stations of the section is also made available to the Section Controller so that voice interactions are reduced. Lay out diagrams of stations under its jurisdiction should also be kept in printed form with details of holding capacity of each of the running & non-running lines, gradients and signals including shunt signals for reference. In electrified sections, OHE sectioning diagram depicting the elementary sections in different colors & other details of sectioning post (SP) and Sub-sectioning post (SSP) should also be available in each control board.

## Train Running and Reporting

1. Every Station on the section must report the movement of every train-passenger, goods, special, departmental, light engines, TTM, Tower Wagons, trollies etc. to the controller with timings.
2. No Terminal Station should start a goods or unscheduled train or block the section without the permission of the controller.
3. When the control is in function, Station Master of every station shall take permission from SCOR to send the trains to advance block station.
4. The Controller's permission must be obtained before stopping a train that should run through except to avert an accident or dangerous condition.
5. 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.
6. Station Master must advise the controller of any unauthorized or undue detention to trains at their stations with full explanation.
7. The permission of the Controller must be obtained before the performance of any shunting that will affect crossing and precedence of trains.
8. 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, class and home shed, Loco Pilot's and Guard's name, load of the train (in tonnes and vehicles), content, BPC details, time of departure, particulars of shunting to be done on the journey, and brief reasons of late start, if any.

## 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 procedure 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. Superfast trains like Shatabdi, Rajdhani etc.
5. Mail / Express trains.
6. Military personnel special, if instructed by emergency control/DOM.
7. Fast Passenger train
8. Special engaged by the public.
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: 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.).

1. 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 later train is more likely to make up time and reach its destination punctually than the former.
2. A train running to time should not be detained more than 30 minutes to effect crossing on single line. 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.

## Charting

Trains are plotted by Section Controllers on Control charts which are graphs consisting of Stations with their km and inter distance on vertical axis and time on horizontal axis. Each one hour is divided into 6 units of 10 minutes each which is further sub-divided into 5 smaller units of 2 minutes each.

These charts are made one per shift and a Section Controller records all the timings of the trains in the section and represents the train by drawing a line connecting the timings received from the station. The details of the trains are entered in the chart and linked to the respective lines so that the movement of the train can be traced throughout. The 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. Other details like stabled loads, traffic blocks permitted, failure details etc. are also mentioned in the charts.

Based on the train running trend, the controller assesses and projects the train movements further and plans crossings or precedence judiciously.

### Manual Charting

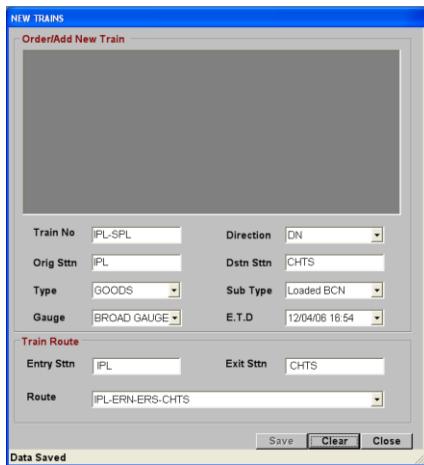
Before, the advent of computerized charting, the control charts were manually drawn with various color pencils / pens by Section Controllers. On shift completion, these charts were then used for checking, analyzing and then preserved to the mandated period of time. Manual charts have to be kept ready and in sufficient quantity in case of any emergency where computerized charting becomes unavailable for longer period of time due to technical / network problems.

## Control Office Application

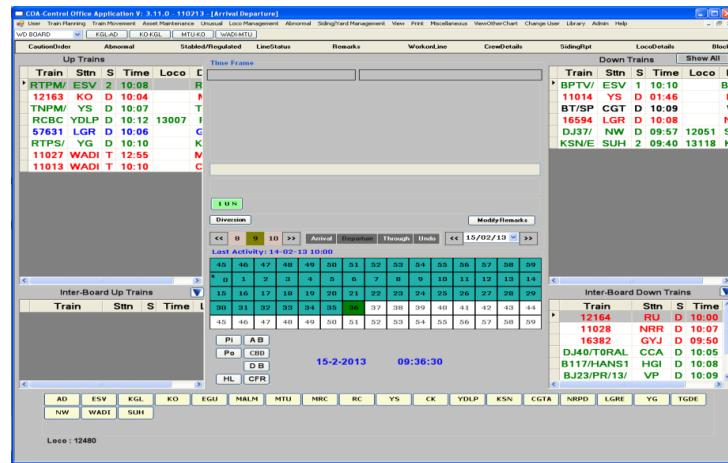
CoA – Control office Application is the computerized charting software. Most of the basic facets of manual charting have been computerized and the timings are now marked in the computer terminal by the Section Controller.

With computerization, the first-hand information of train running which was only available with Section Controller is now available to all others involved in train operations like adjacent board controller, Chief Controllers, Other department controllers and officers. With the linking of CoA to ICMS and FOIS, this information is now available on a real time basis to the traveling public and freight customers, thereby enabling greater transparency and satisfaction.

Some of the screens available in CoA for the Section Controller to input data for control charting are furnished below...



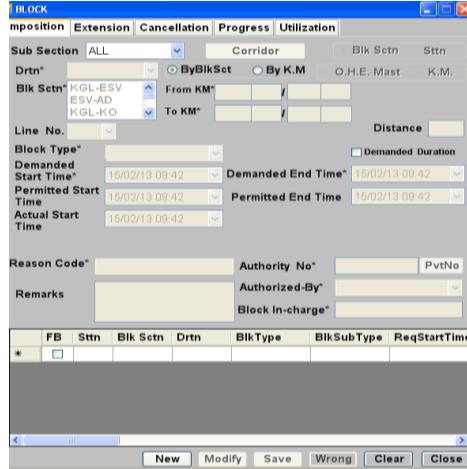
Train ordering



Train timings entry

## Train Movement

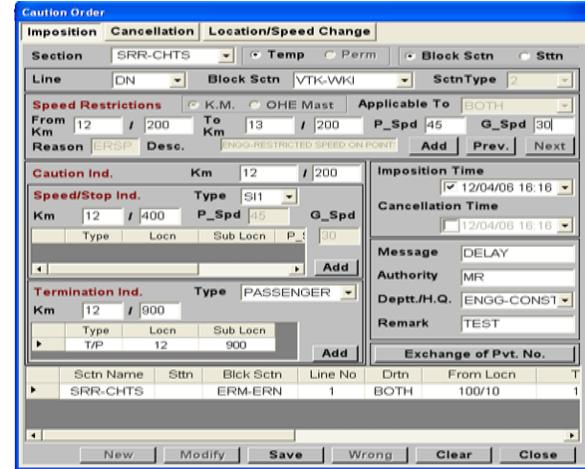
- Facilitates the user to report arrival/departure/through status of a train at each station
- Reporting detention details for every block section and station
- Stabling and regulation of trains
- Reporting abnormal working (obstruction, engine failure, train parting, work on line, accidents)
- Single line working on a double line section



Traffic Blocks

## Traffic Blocks

- Imposition, Extension and cancellation of maintenance blocks
- Provision to modify various timestamps.



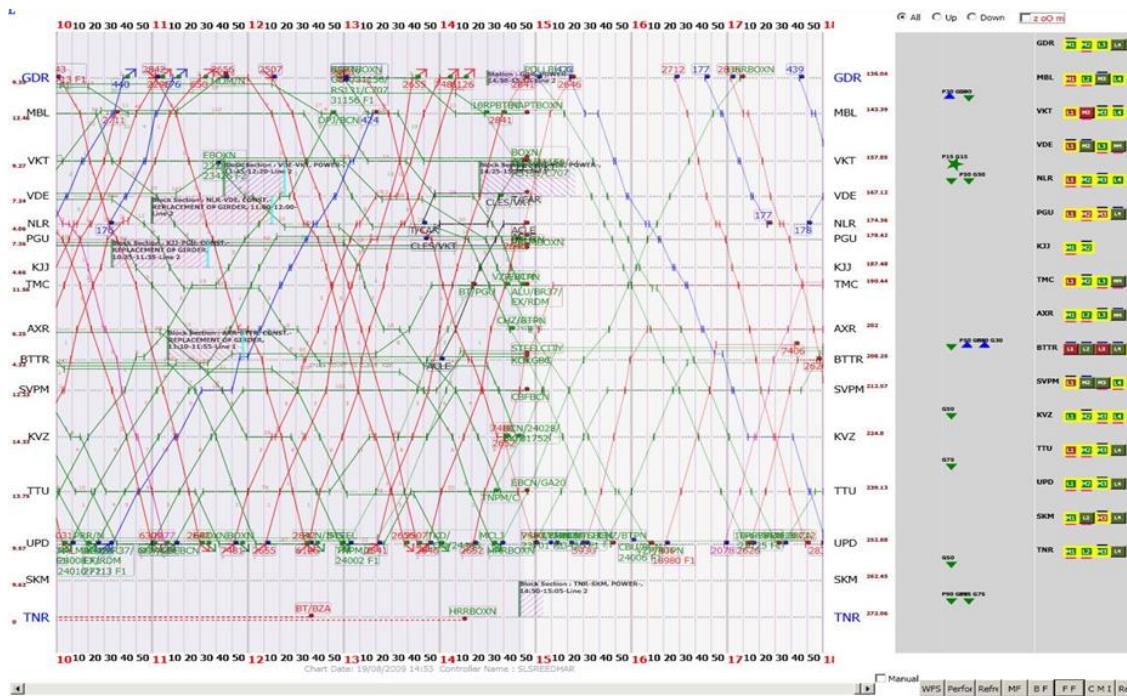
Caution orders

## Caution Order

- Imposition of speed restrictions (Temporary and Permanent) in a block section and station.
- Cancellation of speed restrictions
- Modifying speed for any speed restriction

## Unusual Occurrence – General

- (a) Reporting unusual occurrences (10 Types) both Train specific and Duration specific.
- (b) Facility to report occurrences at a station or in a block section
- (c) Enables user to define expected detention to trains (Up/Down) for advance plotting.



## Advance Plotting

- (a) Projection of the estimated arrival, departure and run through of a train over the defined section.
- (b) Indicate ideal precedence/crossing points based on the actual running of the train(s) under dynamic situation with the core objective of ensuring punctuality.
- (c) Facilitates manual intervention by the controller to change points of crossing or precedence.
- (d) Focus on right time arrival of all scheduled passenger/express trains at the section/divisional interchange point or destination if within the division.
- (e) Detention is kept to bare minimum in conflict situations

## Advance Features of COA

The following are some features of CoA enabled by the computerization...

### Chart

- (a) View of chart is configurable (number of hours).
- (b) Collapsing/Expanding of sections/stations in master chart;
- (c) Horizontal scrolling to view any portion of chart.
- (d) Zoom facility to view a particular area of chart;
- (e) Line occupancy depiction;
- (f) Cautions/Unusual depicted through visual icons and
- (g) Abnormal working – Depiction showing all movements.

### MIS Reports

- (a) Reports Related To Punctuality of Trains;
- (b) Reports Related To Freight Operations – Hours On Run (Train Wise/ Section Wise), Interchange;
- (c) Reports Related to Asset Maintenance- Speed Restrictions, Utilization of Maintenance blocks, Programmed maintenance blocks;
- (d) Reports Related to Unusual Occurrences including Equipment failures and
- (e) Additional customized reports based on user requirements.

### SMS

- (a) Facility to send SMS alerts to pre-defined users for specific events like equipment failures and
- (b) In case of unusual occurrences/accidents etc. it will be possible to flash immediate information to all concerned.

### COA Integration with other applications

- (a) COA-FOIS integration has been done;
- (b) COA-ICMS integration has been done;
- (c) COA-NTES integration has been done;
- (d) COA timings will flow from division to Integration Server at NDLS and
- (e) Other applications will consume data from Integration Server at NDLS.

Integration allows focus on single point data entry and facilitates real time transfer of data from one division to the adjoining division. And also real time updating of other systems. Back reporting time in COA is limited to 30 minutes. (In FOIS it is 60 minutes).

## 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, maintenance blocks and for guidance of section controllers. It should be displayed on boards for easy reference.

## Checking of Control Charts

Control Charts have to be checked regularly to scrutinize all cases of detentions. The reasons have to be studied in detail to bring out any irregularities or constraints in working in order to identify appropriate corrective measures.

- All cases of poor controlling have to be brought out and the concerned Section controller has to be counseled or taken up appropriately.
- All cases of failures have to be reported as unsatisfactory feature and logged against the concerned department. All unsatisfactory features have to be investigated in detail by the respective departments and failure of staff, poor maintenance and any other issues have to be taken up to minimize and eliminate such failures.
- Control charts have to be checked daily by the CHC in charge and he/she must bring out the critical deficiencies and put up the checked charts to AOM on a daily basis.
- DOM / SrDOM shall do test checks and call for checked charts while analyzing bad cases.

## Operational Discipline

### Control orders

All orders given to the Station Masters or Running staff and lobby by Controller should be entered in the control order register by the staff. Each entry must be initialed with date &time. At the end of each turn of duty the relieved as well as the relieving Station Master or Loco Foreman must sign their name in full below the last entry in the register. When a station Master or Loco Foreman has received an order from the control has to enter it in his control register at his station.

Control orders are sacrosanct and all Station staff, Shed staff, Crew and Guards etc. must obey them, duly following the General and Subsidiary Rules. Any inconsistency felt should be immediately brought up to the CHC in charge who shall resolve the understanding or issue modified orders.

### **Unusual reporting**

1. Any unusual occurrence has to be informed to the control by the Station Master on duty at once.
2. Station Master must promptly advise the Controller of any defects of signals, points, interlocking apparatus and line clear instruments at his/her station. Information should also be given of any defects in any other station machinery such as cranes, wagon weigh bridges, turn tables, water columns etc.

### **Engine Movements to and from sheds to be reported**

Power Controller/Traction Loco controller must communicate to control the time at which train engine will leave from or returns to the shed. This will in no way, relieves the Station Master of the responsibility for issuing necessary all concerned messages regarding engine failures and engine trouble enroute. The Controller shall record the duration of such defects in his chart, diary and registers.

### **Time to be checked with control**

Station Master, Loco Sheds and Lobbies must check their time with control at appointed hours every day when control gives a general ring for setting their watches. It is usually done at 1600.

### **Mode of using the control phone**

- (a) Station Master and others must not ordinarily attempt 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 out and a demand made for the telephone line to be cleared. The Controller will then discontinue all other conversations in which he had been engaged and attend to the Station making the interruption. Such 'clear line' must be made exceptionally when there is a genuine reason to do so.
- (c) Station Masters must attend 'Control Call' promptly.
- (d) Staff must obtain Station Master's permission before speaking to Controller;
- (e) The Control telephone is to be used only for transmitting official information. Private conversation is forbidden.

## **Accidents**

Controllers and other staff should thoroughly understand and act on the guidelines contained in G&SR and Accident Manual.

## 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 regulation of trains, keeping in view the instructions issued by the railway administration.

The section control is the focal point of coordination for train running. In order to assist the section controller as well as to manage all the associated activities of train operations, the division control office has the following department wise control set up.

## Operating Control

The operating control has the following personnel to assist the CHC in charge for carrying out the coaching and freight train operations. Chief Controller (Main Line) and Chief Controller (Stock) for Freight and Chief Controller (Punctuality) for Coaching train operations. They are assisted by train clerks and assistant staff in their duties. Its functions are to control train running and traffic operations like loading, unloading etc. The operating control is the general and over-riding control for supervision of the movement of goods and coaching traffic on the division. It is exercised by:

- (a) Collecting stock position from the different stations, marshaling and terminal yards.
- (b) Collecting information on demands registered / outstanding for freight loading at stations.
- (c) Arranging supply of wagons against pending registration
- (d) Securing optimum utilization of stock, with minimum detention.
- (e) Monitoring and coordinating working of yards, goods shed, sidings, loco-shed, C&W depots etc.
- (f) Securing maximum loads for trains.
- (g) To keep liaison with adjacent Railways and divisions for interchange commitments.

## Power Control/Traction Loco Control

It functions to monitor and control the locomotives. Its area of working includes...

- (a) Requisitioning engine 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) Planning in co-ordination with DyCHC for Schedule due locos to work in direction of sheds.
- (d) Coordinating with DyCHC for moving of trains so that crew shall not exceed 9hr rule.

- (e) Balancing crew at outstation depots for smooth functioning of trains.
- (f) Ensuring all link locos are moved in time to connect Exp/Pass services.
- (g) Ensuring relief loco for any loco failures.
- (h) In the event of any unusual, when MRV/ART/140T crane are ordered, ensuring proper locomotive for it on priority.
- (i) Ensuring the return of engines to “Home Sheds” at regular intervals for servicing and maintenance.
- (j) Ensuring an even balance of engines from running sheds for meeting demands of traffic;
- (k) Ensuring that light engine kilometers is kept to the minimum and
- (l) Providing guidance to running staff for trouble shooting.

## **Carriage and Wagon Control**

It functions include the monitoring of activities related to rolling stock – wagons and coaches. They include the following.

- (a) To ensure timely examination and fitness of all trains.
- (b) To keep a watch over the detachment of sick wagons and to arrange for their early repair and fitness, duly monitoring and ensuring availability of critical components failing frequently.
- (c) To keep a watch over placement of wagons in sick line and their release.
- (d) To monitor movement of POH due stock to workshops.
- (e) To keep account of detention of trains on C&W account and take remedial action;
- (f) To provide guidance to running staff for trouble shooting.

## **Commercial Control**

It monitors and manages the commercial aspects of train running over the division like....

- (a) To keep a watch on detention to passenger trains on account of Alarm Chain Pulling, Parcel working etc., and take remedial measures
- (b) To ensure loading and unloading activities targeted for the day as planned by Operating control.
- (c) To ensure proper maintenance of public amenities available at stations.
- (d) Monitoring of public complaints lodged at the stations.
- (e) To ensure quick transshipment of sick wagons by arranging matching stock and labor.
- (f) To ensure relief, ex-gratia payment and assistance required during accident relief and restoration.;
- (g) To expeditiously dispose of unclaimed and unconnected wagons, loads, smalls and parcel consignments

## Traction Power Control

It houses the SCADA which monitors and controls the power supply of the traction OHE over the entire division. It has critical role in...

- (a) Ensuring continuous power supply at 25KV and arranging alternative power supply in case of tripping etc., through remote control.
- (b) Arranging maintenance blocks for OHE
- (c) Monitoring OHE failures and taking remedial action.
- (d) Monitoring detention of trains on O.H.E accounts.
- (e) Guiding running / station staff in trouble shooting.
- (f) It also monitors the MD of each sub section and takes necessary action in coordination with operating control to advise changes required in CMD as well as avoid penalty as far as possible.

## Engineering Control

It coordinates and monitors the aspects regarding engineering department related to train running like...

- (a) Monitors imposition and cancellation of Caution Orders.
- (b) Coordinating works during Engineering blocks.
- (c) Coordinates with Traffic Controller for movements of Track machines and material trains.
- (d) Ensures safety in work spots and sensitive locations like recording and monitoring of earth works being executed along the track in all the sections.

## Security Control

It monitors the security aspects of train running like...

- (a) Law and order situations
- (b) Attending to complaints of passengers like theft, women safety etc.

## Signal & Telecom Control

It monitors all the aspects of Signaling and communication across the division. Its functions include...

- (a) Keeping watch over proper functioning of signals, communication equipment along with their networks.
- (b) Managing S&T failures and taking remedial action.
- (c) Ensuring setting up of emergency controls at the site of accidents.

## Telecommunication Facilities in Control Office

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.

### Section Control Circuits:

These are exclusive omnibus circuits connecting Control Boards, Chief Controllers, Dy. Chief Controllers and Operating Officers with Stations, Cabins, Yards, Crew Lobbies etc.

### Traction Power Control circuit:

This additional telephone circuit is available on the electrified sections connecting Traction Power Controllers with OHE sub stations, railway stations, control boards and other selected work places. The TPC can also be contacted from the emergency sockets provided over the sections by means of portable telephone. The emergency sockets are provided at every kilometer. Every OHE mast is provided with indications with arrow mark directing towards the nearest point to enable crew to identify the nearest socket.

### Test Channel for S&T staff:

In order to speedy conveying of S&T failures and ensure quick rectification, every Control Board is provided with telephone connection to Test Room, which is managed by the Test Room.

### FOIS and ICMS networks:

FOIS and ICMS terminals are provided in Control office to get data from field units and feed Divisional data.

### 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.

## Books/Documents to be kept in Divisional Control Office

1. Station Working Rules of all stations with diagrams.
2. Rake links, Crew links, Loco links etc.
3. Details of maximum moving dimensions permitted on the various section of the railway.

4. Map showing the maximum permissible axle load on all the railways with which traffic is interchanged.
5. Index sections and plans of the various sections of the jurisdiction and details of train watering, Engine fuelling etc.
6. Master charts depicting all trains indicated in the working time table in force.
7. Charts showing jurisdiction of the various officials details of:
  - (a) Maintenance branch of the Signal & Telecommunication responsible for the upkeep of control communication in good condition.
  - (b) 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.
8. Line patrol chart

## Registers generally maintained in Division control

- 1. Control Board wise:**
  - (a) Sections controller's diary and HOC/TOC book.
  - (b) Stock report register
  - (c) Incoming and outgoing trains RD (Running Diary) (other than passenger)
  - (d) Incoming and outgoing passenger Train Running Diary.
  - (e) Train Advice / Train Notice
  - (f) Caution order register.
  - (g) Caution order message book.
  - (h) Morning (6'O clock) position registers.
  - (i) Interchange Register.
  - (j) Control failure Register.
- 2. By the Chief Controller (Main line), (Stock) and (Coaching)**
  - (a) Yard Running Balance Register.
  - (b) Dy. Chief Controller's Diary & HOC/TOC Book.
  - (c) Bans and Restrictions register.
  - (d) Forecast and Acceptance Book.
  - (e) Train Ordering Book.
  - (f) Punctuality Register.
  - (g) Without brake van / guard movement register.
  - (h) Accident Register.
  - (i) Conference instructions Register.
  - (j) Central control register.
  - (k) Emergency control register.
  - (l) FATO register.

- (m) DRM's Unusual Occurrence Register.
- (n) ODC Register.
- (o) Rajdhani Express (and similar trains) Caution Order Register.
- (p) Emergency and General Control Office Message Register (Outward)
- (q) Interchange Register.
- (r) Inward message book.
- (s) Outward message book.
- (t) Working order registers.
- (u) Weather warning and acknowledgement register.
- (v) Safety circular register.
- (w) Road map register.
- (x) Night order book.

## Zonal Control Office

Every zonal headquarters has a zonal control office situated in the General Manager's office premises. It functions similar to the division office but to the zonal level covering all the divisions of the zone. There are no section wise control boards as such activities are not done by the zonal control office. The zonal control main function is that of coordination between divisions and be a single source of communication with Railway Board to monitor, improves the coordination between zones. All departments are also represented in the zonal control set up with their own controls.

## Organization of Zonal Operating Control Office

**Central Control:** Central Control collects information from the Divisions, puts up the same to Officers concerned and communicates the orders of the Head Quarters to the Divisions. Central Control provides link between Head Quarters operating officers and Divisions. Chief Controller is the head of the Central Control. All the functions are done on his direct supervision. Dy.Chief Controllers (Coaching, Goods, and Stock) will assist the Chief Controller.

Following are some of the functions performed by the Central Control:

1. Prepare reports on wagons available in divisions, received and forwarding wagons, yard balances at ZERO hour and figures of wagons at 24:00 hours i.e. clearance.
2. Keeps a close watch on the relief trains.
3. Collection of figures of stabled wagons with description of vehicle / train.
4. Analysis of detention to trains.
5. Allotment and distribution of goods stock to the divisions.
6. Issue proper instructions for train working during major dislocations affecting two or more divisions.

7. Coordinating speedy relief in case of accident.
8. Help connecting the unconnected wagons.
9. Advice divisions regarding weather warning to take necessary precautions.
10. Arrange periodic census.
11. Permissions for diversion, rebooking and short of destination delivery.
12. Monitoring local and foreign restrictions for loading.
13. Inter zonal coordination like interchange, ODC movements, military movements etc.
14. Managing the manning of the disaster management room.
15. Ensuring that instructions of HQ officers like GM, AGM, PCOM, PCSO reach the divisional and field officers in case of emergencies.

#### **Emergency Control:**

1. The Chief of Emergency Control Office is CHC assisted by Dy. CHC in shifts.
2. Dy. CHC prepares figures of passenger trains run shift wise and as per the directives of CHC.
3. In emergency control, advance diary is prepared in which special instructions are mentioned. This diary is made date wise in different pages.
4. Maintain punctuality of all passengers, M/E trains run in CR.
5. Inform the running position of trains to foreign Railway along with late running and also the description of late running trains and departure time of trains.
6. Observe loss of punctuality percentage, its causes, and position of coaching stock, current situation of wagons, parcel vans etc and collection of data.
7. Record of operation of special trains, bogies is kept in this office.
8. Concerned divisions are informed of passenger trains and other coaching trains.
9. All the data regarding coaching such as Fair Special, Summer Special, Relief Special etc., is collected.
10. Assist in the preparation of timetable in coordination with neighbouring divisions, and Railways.

The train operations between stations is thus regulated, monitored and controlled by the Control Organization. As the train running is sequential and any detention has a domino effect on all the train operations in the section, each activity is minutely controlled by the Control office, thereby achieving an efficient system of train running.

\* \* \*

## Chapter – V

# Traffic Blocks



All material assets being used in operations require maintenance. In an ideal scenario, maintenance and operations should not interfere with each other. However, there are works of maintenance, failure restoration and new projects that require train operations to be stopped. Such works are carried out under traffic blocks. For accommodating such works to the extent possible, coaching trains are charted in such a way that time slots are available in a section to provide traffic blocks without affecting punctuality. Such time slots called as 'corridor blocks' are incorporated in the Working Time Table.

In some cases like suburban, since the need for transportation is almost nil in night time, corridor blocks are slotted at night time. In branch line and sections with less traffic, providing slots for traffic blocks are easily done. In sections where there is congestion due to growth in traffic disproportionate to the line capacity, path becomes critical. Also, the fixed assets are most utilized in the congested lines and hence the issue of maintenance in such lines becomes important. Thus sections with heavy traffic often become the focus of both operations as well as maintenance. In these sections, every path is precious and should be utilized to the maximum by obtaining maximum output both in terms of train running as well as maintenance. Long haul trains and Integrated Blocks are two such measures in this direction. Many such measures are required to ensure that such congestion do not result in loss of loading/earning or a backlog in maintenance.

### Types of Blocks

Based on the purpose for which traffic blocks are taken, they are classified as...

**Emergency Blocks** – These are taken to rectify failures that result in unsafe condition for train running. Since such blocks are not planned per se, staff of various departments are trained to do such works in shortest possible time with the primary goal of restoring the traffic. Complete restoration is then planned subsequently.

**Maintenance Blocks** – These are planned blocks to ensure that the current assets are kept in proper shape so that failures are prevented. When machines are used for such blocks they are termed as Machine Blocks. As the output of machine is dependent on the effective block hours, longer blocks are preferred to the extent possible.

**Mega Blocks** – These are of longer duration and are taken for major works involving bridges, subways etc. As these works are well known, they need to be planned in advance and programmed to have the least impact on train operations. A temporary change in the pattern of train working like rescheduling, diversion, partial and full cancellations is planned for one or two days with adequate advance intimation to traveling public.

**Pre NI / NI Blocks** – These are blocks required for carrying out yard modifications needed for commissioning new projects. As every yard is different from other and works are also different from each other, there needs to be meticulous planning of such works. The primary goal of such blocks is to keep the duration of “Non-interlocked working” to the barest minimum. The blocks should be planned to have the least impact on train running. As in mega blocks, a temporary change in pattern of train running and maintenance are also planned to tide over the block period.

In all the above type of blocks, advance planning is very vital in improving the block utilization. When blocks are better utilized, block hours become optimum and train operations are least affected. In sections where block availability is not an issue, works can be planned for execution at an economically optimum method. However, in congested sections, works need to be planned for execution at the most time efficient manner. Block time should be minimized by doing additional preparatory works and choosing the fastest method of execution etc.

**Power Block** – When only OHE power supply is disconnected, the block is termed as power block. In some cases, such blocks allow movement of diesel locomotive hauled trains. This must be specifically mentioned while seeking the block.

Power blocks are generally taken for OHE maintenance. Emergency power blocks are imposed during abnormalities like hot axle, fire in train etc. where power supply is switched off immediately on receipt of such information. As electrification has reached almost 100% in the railway, it is imperative to have an understanding of the basic features of the OHE and power supply arrangements.

**OHE** – Over Head equipment comprises of a catenary wire and contact wire. The contact wire is a grooved copper wire that carries the 25KV current and feeds it to the locomotive when the loco's pantograph touches it. The contact wire is supported by the catenary wire through dropper wires. The catenary wire is a stranded cadmium copper or aluminum alloy wire that runs above the contact wire throughout its length. Both these wires are supported by masts or portals in a span of 72 meters in straight alignment. On curves, the mast span reduces up to 27 meters depending on the radius of the curve. The wires are connected to the mast through an insulated cantilever bracket assembly. For some less important lines, the catenary wire is not provided and only contact wire is provided. Such OHE is called tramway OHE.

The 25KV power supply is derived from the power grids through traction substations. The number of such substations in a section depends on the intensity of traffic and load of the trains. The lines which supply power from the grid to the substations are called feeder lines. They are supported by feeder posts (FP). At locations where supply from two different sub stations converges, a sectioning and paralleling post (SP) is provided with a neutral section. These posts keep the supplies of two substations isolated from each other. If a supply from one substation fails, the SP has provision for bridging and providing the supply from the adjacent substation. Also additional sub sectioning and paralleling posts (SSP) are provided between each FP and adjacent SP depending upon the distance between them, which can do similar functions like SP.

When there is a fault or there is a requirement of maintenance, the power supply can be isolated between any two SSPs/SPs by using the power interrupters. The shortest section of OHE which can be isolated by opening interrupters is called a ‘sub sector’. Each sub sector is further sub divided into ‘elementary sections’ by providing manually operated isolator switches. These isolators are provided with earthing arrangements.

Power blocks are usually planned elementary section wise to limit its impact on train operations. The impact of a power block will depend on the number and positioning of elementary sections that are to be switched off.



*Tamping Machine*



*Ladder working*



*Tower Car working*

**Disconnection / Reconnection** – Some of the S&T works should only be done duly disconnecting the gear required and making the corresponding signal inoperative. Such works are done on disconnection. These gears are then taken for normal working only after issue of reconnection memo by the authorized S&T staff. Train operations if required to be done during this period, has to be done duly intimating the S&T staff working and by ensuring the proper setting of points manually by cranking and clamping. All conditions that are needed for train movements have to be ensured and proper authority has to be issued to the Loco Pilot. A prolonged disconnection leads to “Non-interlocked working” where Temporary working instructions need to be issued.

## Integrated Blocks

When more than one works which are required to be carried out under block, are executed in a single block, it is termed as Integrated Block. In most cases, works of different departments are integrated in a single block. For example, a machine block of BCM is integrated with OHE maintenance in the same block section. In congested sections, ideally all blocks should be integrated blocks. At present, blocks are planned for integration only after reaching the execution level. With this strategy, it is not always possible to have more number of integrated blocks. Hence an inter departmental exercise has to be done to align all the maintenance schedules of different assets thereby leading to integration at sanction stage, which will favor an increase in the number of integrated blocks.

**Shadow block** – These are blocks that are planned in the shadow of the main block. They are usually planned in adjacent block sections so that the additional impacts of the shadow blocks to train running are very minimal. Depending upon the sectional characteristics like single line / multiple lines, number of loading / unloading / examination terminals, the pattern of traffic flow, shadow blocks may or may not be possible to be availed. However in most cases, they can and should be planned to reduce the overall detention to traffic.

## Rolling Block Programme

In order to streamline the activity of planning, executing and reviewing the activities of traffic blocks, guidelines were issued by the Railway Board in 2017-18 to implement the system of multi asset maintenance through formulation of annual traffic block plans. In June 2023, Railway board has given guidelines and instructions to formulate a 26 week rolling block programme by the divisions which should be continuously extended after each week, so that all the departments are aware of the blocks in advance for the next 26 weeks. After formulating 26 week programme, a 12 days programme for integrated blocks to be finalized at the divisional level and circulated among the various departments involved in safety. The basic idea behind advance planning is to increase information flow across departments.

There are three steps to this planning process, first is the listing and identifying of all the activities that need to be carried out in the next 26 weeks (renewals as well as maintenance), second is the sequencing of the activities for the next 12 days in such a manner that there is maximum co-ordination between all the stakeholders, and the third is to create a schedule of supplementary activities that are required to make the plan succeed.

## Block Productivity

The actual output of a block as compared to the designed / standardized output is a measure of productivity of the block. Block productivity is critical in congested sections and it has to be the maximum there. It can be improved by reducing ineffective time in a block and also by improving the output obtained during the effective time. Some of the indicative targeted output of machines for a 4 hour block is furnished in the below table...

<i>Track Machine</i>	<i>Purpose</i>	<i>Deliverables</i>	<i>Output</i>
09-3X	Plain track tamping	It corrects track geometry i.e., alignment, twist, cross level, longitudinal level, packs ballast under sleepers. This machine can pack three sleepers at a time.	1.6 km.
CSM	Plain track tamping with two sleepers at a time	Same as above. But can pack two sleepers at a time.	1.2 km.
UNO	Plain track tamping	Same as above. Generally deployed at work site. But can pack one sleepers at a time.	0.5 km.
DUO (0)	Plain track tamping	Same as above. Generally deployed at work site. But can pack two sleepers at a time.	0.8 km.
WST	Plain track tamping		
BCM	Ballast screening of Plain and Turnout track	It screens track ballast by removing muck, thus improve drainage & elasticity of track for safe & comfortable running.	0.2 km.
FRM	Shoulder Ballast cleaning machine.	It is used to carry out cleaning of shoulder ballast by removing muck, drainage of track and improving elasticity of ballast bed.	0.4 km.
UNI	Turnout packing	It corrects turnout track geometry i.e., alignment, twist, cross level, longitudinal level and pack ballast under sleepers.	1 T/out.
DGS	Consolidation of newly packed track	It builds up lateral resistance & consolidation of track faster and helps to relax speed restriction early.	1.0 km.
TRT	Laying of track	It is fully mechanized system of complete Track Renewal.	0.36 km.

<i>Track Machine</i>	<i>Purpose</i>	<i>Deliverables</i>	<i>Output</i>
PQRS	Laying of track	It is a semi-mechanized system of track renewal wherein prefabricated rail panels are laid and existing panels are laid and existing panels removed with minimum labour.	0.24 km.
T-28	Turnout replacement	It is fully mechanized system of replacing complete turn out with minimum labour.	1 T/out.
UTV	Utility Vehicle	It mechanizes system of transporting heavy material like rails, sleepers etc., from one station to another station under traffic block.	50 rails per hour in one BFR.
BRM	Ballast Regulating Machine	It is fully mechanized system of Track Ballast equalization, regulation and profiling.	2 Km.

The output of any block depends on level of preparatory works done, strength of staff and labour used, level of detailed planning etc. This is critical especially in congested sections. Also a judicious mix of periodical and condition based maintenance will also be needed in such sections so that the block requirements are optimized and assets are fully utilized.

\* \* \*

## Chapter – VI

# Unusual Occurrences



As discussed in earlier chapters, train operations are complex involving various resources such as locomotives, wagons, signals, track, OHE etc. All staff involved in train operation and maintenance of assets has to follow laid down rules in their respective rule books, manuals and safety instructions, in order to ensure safety. However, in the system of such a large scale, there are occasions when failures or unusual occurrences happen. The actions to be taken; procedure to be followed and rules to be complied during such failures and unusals have also been well documented. A few of the unusual circumstances are discussed in brief in this chapter.

### **Alertness**

All railway servants including Station staff, Loco Pilots, Guards, Gatemen and maintenance staff of Engineering, Mechanical, Electrical and S&T; their supervisors and officers shall always be alert especially while on duty. They must keep a look out for any unusual happenings in the fixed infrastructure like track, OHE, signals etc. and also in the trains passing by them or in which they are traveling. Railway servants normally travelling by trains such as TTEs, AC mechanics, power car staff shall also be alert to any possible unsafe indications. All railway servants shall be well acquainted in identifying unusual occurrences and the follow up action to be taken.

### **Protection and Reporting**

Any Railway Servant who notices an unusual occurrence that endangers or likely to endanger safety of trains or public shall take immediate steps to prevent an accident. If there is a train approaching towards the danger location or is involved in the unusual, immediate action has to be taken to bring the train to a stop by showing danger signal; red flag or red lamp; using banner flag; setting up detonators on track etc. Only in train parting cases, the staff shall not show danger signal to Loco Pilot. If there is no train approaching, danger signal has to be shown or placed in the direction on which the train is expected.

Once the protection is done, or in parallel, information regarding the unusual has to be reported to the adjacent station master, so that no train is allowed towards the danger location. In case, where the staff is unable to contact the station master,

they should immediately contact control office and convey the information. There are emergency phone sockets available in the block section for every km with direction boards. Their locations are also mentioned in the WTT. These can be accessed by portable control telephones. Portable control phone is a part of the SLR equipment of coaching trains.

On receipt of the unusual message from the staff or control, SM shall advise the other end block SM also and should not allow train movement before confirming safety and fitness as per the rules laid down for such an unusual. If there are trains that are already on run towards the danger location, he/she shall immediately advise control to switch off OHE in electrified sections. The SM shall also advise gate keepers or other railway staff working in mid-section to stop the train. The SM shall also try to alert the crew through walkie talkie or guard's mobile. Where rules permit the train movements, the SM shall permit duly following all the precautions laid down in such rules.

## Unusuals in the block section

### Jerk due to track defect while train on run

If Loco Pilot and/or Guard experiences a jerk of such severity that can only be caused by track defects like rail fracture, they shall stop the train to ensure that all wheels are on track and the track under the wheels is intact. Once ascertained that the train is on track and it is safe to proceed, in absolute block system of working, they shall proceed cautiously and stop the train at home signal of the next block station and inform the Station Master through available means of communication or message. In case of IBS and automatic block territories, the Loco Pilot must not start the train from the spot without ensuring that all the Loco Pilots of trains that had already left the station in rear, are advised through available means of communications either directly or through the Station Master. Thereafter, the Loco pilot shall proceed and give a written memo indicating the details of the occurrence. The Station Master on receipt of such a memo must issue a message to the Station Master at the other end of the block section, concerned Engineering Official and SCOR.

The engineering official will inspect the track and shall allow the train to pass only after satisfying that the track is safe for the passage of train. He/she shall advise the condition of the track and any restriction of speed to be imposed to the Station Master through a written memo which has to be conveyed to the Loco Pilot.

In rare case of absence of engineering official, a train can be sent towards the suspected spot with a Caution Order instructing the Loco Pilot to stop dead before the affected kilometres and after satisfying himself about the condition of track, pass over the track in question at 10 kilometres per hour or if he/she finds the line unsafe

to pass, return to station in rear. If the Loco Pilot is not able to find anything doubtful, subsequent trains shall be dispatched with a speed restriction of 10 kilometres per hour over the suspected track length until the track is certified to be safe by engineering officials. If the condition as reported earlier is confirmed by the Loco Pilot, then no train movement shall be allowed till the track is certified to be safe by engineering officials.

### Obstruction on adjacent track

If Loco Pilot and / or Guard notices any obstruction or any other unsafe condition, on or near the track adjacent to the line over which his train has passed, they shall immediately switch on the flasher light of loco and inform the Station Master(s) concerned through the available means of communication. Concurrently, the Loco pilot and Guard shall also stop their train and proceed with danger hand signals to protect the obstructed line. If there are trains on run towards the obstructed track that cannot be stopped by the Station Master, in electrified section, OHE shall be immediately switched off from the Traction Power Control.

Once it is ensured that there are no trains that are on run towards the affected spot, they shall continue journey to the next station cautiously keeping flasher light on and be prepared to stop any incoming train approaching on the affected line by exhibiting danger hand signal or any other available means of communication like walkie talkie. On arrival at the next station, he/she shall inform the Station Master through a written memo about the occurrence. On receipt of such information, the Station Master shall take action as per SR 6.07.1(c) to (f).

### Patrolman not turned up in time

When patrolling is in force, if a Patrolman does not turn up within 15 minutes of his/her scheduled arrival, the Station Master shall stop run through trains proceeding into the block section and issue a Caution Order to all trains proceeding into the block section advising the Loco Pilot to be alert and specify a speed restriction of 40 KMPH. The Station Master shall also immediately advise the Station Master at the other end of the block section to take similar action and advise the SCOR, the concerned section Gangmate and the PWI. The Caution Orders shall continue to be issued till the Patrolman arrives and report that the line is safe for passage of trains.

## Unusals in a running train

### Hot Axle

Hot Axle is a condition where the axle of the wheel gets heated up because of reasons like faulty bearings, insufficient greasing etc. that leads to excess friction during wheel rotation. If the condition continues, it can result in seizure of axle and derailment.

Hot Axle can be identified by the following symptoms:

- (1) Splashed grease marks on wheels;
- (2) Smell of Burning grease;
- (3) Smoke from the Axle Box;
- (4) Discoloration of Axle Box;
- (5) Red glow of Axle Box (visible during night);
- (6) Whistling sound or metallic screech;
- (7) Flames coming out from Axle Box and
- (8) Wheel not rotating due to seizing of bearing.

These symptoms occur in stages in the order shown. As the stage shifts, the condition of bearings will progressively deteriorate. The earlier the detection, the lesser will be the damage. Hence all the staff shall keenly look out for such possibility in a train which passes by them. As and when a Hot Axle is detected, efforts shall be made to show danger signal to the Loco pilot / guard to stop the train immediately. If the train could not be stopped, the incident shall be brought to the notice of the Station Master who in turn shall take action to stop the train if the train is approaching his/her station or inform the other end Station Master who shall stop the train and advise train crew to examine the affected wagon.

If the block section is long and the Hot axle is in an advanced stage, and Loco Pilot could not be alerted to stop the train, in electrified sections, efforts should be made to switch off OHE through control. On stopping, the train crew shall examine the suspected vehicle and share the details to the C&W control. After consultation, the train can be moved with necessary conditions to clear the block section.

The train with hot axle vehicle shall be received onto main line or in case of junction stations, onto the line not involving turnout negotiations. In cases where these lines are not available for reception, the train shall be brought to stop at Home signal. After examining the wagon concerned and if found safe to run over turnouts, it shall be received in the most adjacent loop line. The affected wagon shall be detached from the train for attention by TXR.



*Hot Axle*



*Obstruction on track*



*Fire on train*

### Fire on train

If fire is noticed in a running train, the staff who noticed the fire shall alert Loco Pilot at once to stop the train by showing danger signal, red flag or red lamp or by any means available. In electrified sections, the OHE power supply should be switched off. Once the train is stopped, if it is a passenger carrying train, the passengers in the vehicles shall be evacuated at once with the help of on-board staff. The vehicles behind (in the direction of wind) the one on fire shall be detached and the front portion of the train then moved forward so as to prevent the rear vehicles catching fire. As soon as the front portion of the train has moved forward to a sufficient distance, the burning vehicle shall be detached and the vehicles in front of it shall then be moved forward to a safe distance. While and after doing these actions, each portion of the train shall be secured properly as per the gradient so as to avoid rolling down.

When a fire occurs in a train composed of vestibuled stock, the 'Link' holding the Fastening Lever on both the sides of the vestibule connection shall be disconnected immediately and then the vestibule is separated with handle provided. The couplings of the vehicles shall be unfastened and then the vehicles are separated. If circumstances do not permit unfastening the vestibule fitting, immediate action shall be taken to unfasten the couplings beneath the corridor foot-plate and an attempt shall be made to separate the vehicles by making the engine pull them apart, thereby tearing off the vestibule.

In case of CBC coaches, the Guard or Assistant Loco Pilot, whoever nearer to the affected coach, shall unlock the CBC operating handle and open the couplings for detaching affected coaches. The CBC operating handle key is provided as personal equipment of Loco Pilot and Guard.

The Guard shall immediately switch off the electric lights and fans, by operating the control switch to the 'off' position. The Guard shall disconnect the Kent couplers, at each end of the vehicles in which the fire has occurred. After isolating the vehicle every effort shall be made to extinguish the fire and to save the contents of the burning vehicle.

### Wagons Tilting

Wagons run tilted due to shifting of load inside the wagon. Loads get shifted inside the wagons due to improper stacking or unequal unloading of contents leaving more loads on one side. Such wagons have possibility of derailment on sharp curves. Train crew, Station staff while exchanging alright signals, Gatemen and such other railway staff on noticing tilted wagons on a running train shall make efforts to stop the train. Once the train is stopped, if it is in the mid-section, it has to be examined by Loco Pilot and guard for safe running to clear the block section with restricted speed. If they are satisfied, the train shall be taken to the next station for getting the load adjusted.

### Train parting

If any portion of a train, while in motion gets parted, the staff who notices the same has to attract the attention of the Loco Pilot and guard by shouting that the train has parted and displaying train parting hand signal by putting both hands together above the head and separating them repeatedly. In night time, train parting signal is shown by waving a white light up and down vertically as high and as low as possible. The staff shall not show stop signal to Loco Pilot.

On becoming aware of the train parting, the Loco Pilot shall use his/her judgment to keep the front portion in motion, if possible, until the rear portion has been brought to a stand so as to avoid the chance of a collision between the two portions; and sound the prescribed code of whistle to inform the Guard of the parting. The Guard in the rear portion shall promptly apply hand-brakes of the Brake van and take all other possible steps to stop the rear portion of the train to prevent it colliding with front portion.

If there is any Banking Engine, the Loco Pilot of a banking engine, shall bring the rear portion to a stand and sound the prescribed code of whistle to attract the attention of the Loco Pilot of the front portion. As soon as the rear portion of a train has been brought to a stand, the Guard of the train shall take steps to secure the vehicles in stationary position by applying hand brakes and by use of wedges and protect that portion in accordance with GR 6.03 and SRs thereunder both in the front and in the rear.

When both portions of a parted train are brought to a stand within sight of each other and it is possible and safe to couple them, the train shall be coupled with due caution under hand signals from the Guard. If the Loco Pilot of the parted train has already reached the block station in advance before he/she could bring the front portion to a stop, he/she shall instantly warn the Station Master or the railway servant in charge of a cabin, if passed on the way, of the parting, with 'one long, one short, one long, one short' whistle repeatedly. However, the Loco Pilot shall act as per the aspect of the signals at gate or station, while proceeding.

On receiving information of train parting, the Station Master shall promptly admit the front portion of the train into the station on a vacant line, and immediately inform the station in rear and SCOR that the train has parted and that the rear portion may roll back. If, the rear portion has not stopped and is following the front portion, the Station Master shall endeavor to divert it, if possible, to a vacant loop or siding line or bring it to a stand by the application of wagon brakes or by heaping up earth on the rails or other suitable means.

### Vehicles escaping from station

If any vehicle escapes from a station, the Station Master shall take immediate steps to warn the other stations or persons concerned, such as Gatemen of Level Crossing

gates, as far as practicable, to prevent an accident. If the vehicles/train has escaped into a block section, the SM has to put the concerned block instrument on a refusal to line clear position and inform the adjacent SM to set the point to an unoccupied line. After the escaped vehicles come to a stop, they shall be secured and moved to clear the block section.

### Flat-tyre

Flat tyre can be identified through the continuous hammering sound generated by the affected wheel during its run. It can cause extensive damage to track by causing rail fractures and weld failures resulting into serious accidents to the following trains. Flat tyre can happen due to brake binding causing hardening/stopping of wheel movement thereby a particular area of wheel tyre wears excessively resulting in flatness on the wheel tyre.

TXR staff during 'rolling-in' examination at all major train examination points shall observe keenly to detect flat tyre in the train while in motion.

Station Operating Staff while exchanging 'all-right' signals & Engineering Gatemen shall be vigilant to hear any unusual / hammering sound in the running train and make efforts to stop and examine the train or intimate the Station Master if they failed to stop train in case they observe any such sound.

On-board staff like TTEs, Coach Attendants, AC Mechanics and other Supervisor / Officers travelling by the train/particular coach shall also take appropriate action to bring it to the notice of Train Guard/Loco Pilot/Station Master of nearby station on detecting any unusual / hammering sound in the coach / train.

Once such information is received, the Loco pilot shall bring the train to a stop at the earliest. On stopping, the train crew shall examine the suspected vehicle and share the details to the C&W control. After consultation, the train can be moved with necessary conditions to clear the block section.

If TXR staff is available at that station or they can come quickly from other station, the flat tyre shall be examined by them and they will certify whether the flatness is within the permissible limits or beyond. If the flatness is within the permissible limit, they can certify for running the train further at normal speed and if flatness is beyond the permissible limit, the wagon has to be detached at the same station. If no TXR staff is posted to work at that station, and it is likely to take more time for TXR staff to come, the Loco Pilot, Guard and Station Master shall decide in consultation with the SCOR to detach the coach/wagon at the same station. Under no circumstances, the Station Master shall allow the train to run with a suspected flat tyre, once the information is received.

Apart from examining the wagon, the track on which the flat tyre ran should also be inspected. The SSE (P. Way) / JE/P. Way / P. Way Supervisor of Engineering Department shall inspect the rear block section passed by the affected

train either by travelling in a light engine/Tower Car with a restricted speed of 30 KMPH or by proceeding on a motor/push trolley if Loco/Tower car is not readily available and certify the track duly taking protective action for any failure noticed.

Engineering Control in consultation with SSE/JE-P.Way Supervisor who has inspected the section shall impose SR of 50 KMPH for Passenger trains as well as for empty Goods trains in the affected section till USFD test is conducted in the affected section (point of detection of unusual sound to next station) is completed and protective action thereafter is taken. No loaded goods train shall be allowed to run unless USFD testing is completed. On completion of USFD testing, speed of passenger trains and that of empty goods trains shall be raised to 75 KMPH and after observing for 24 hours, normal sectional speed shall be restored for these trains. Loaded goods shall be permitted at 50 KMPH on completion of USFD and after observing for 24 hours, normal speed shall be restored for such trains.

### **Brake Binding**

Brake binding of a wagon/coach occurs when any of the following happens:

- (1) Hand brakes are not released;
- (2) Distribute Valves (DV) are not released after engine change;
- (3) Load/empty wagon is placed in load position when the wagon is empty or gross weight of the wagon is below 42.5 tonnes;
- (4) Release of Distribution Valve is not ensured after resetting ACP or
- (5) Defect in C3W DV.

Brake binding jams the wheel movement and causes flat tyre which in turn damages the track. Hence, as and when Brake binding is noticed, the train shall be stopped and the brakes must be released.

### **Trains unusually delayed in section**

If a train carrying passengers does not arrive within 10 minutes or if a goods train does not arrive within 20 minutes more than its normal running time from the station in rear, the Station Master at the station in advance shall immediately advise the station in rear and the Control of this fact. On double or multiple lines, the Station Masters at either end of the block section shall immediately stop all trains proceeding into the block section on adjacent line or lines in either direction and warn the Loco Pilots and Guards of such trains by issue of suitable Caution Orders and shall also ascertain the whereabouts and the condition of the delayed train.

### **Trains stopped in Block section**

If, for any reason, a train is brought to a stand for a period longer than 15 minutes, the hand brakes of the locomotive shall be applied in addition to the application of air brake etc. If such stoppage happens to be on sections with a gradient of 1 in 150 the following additional precautions shall be taken:

On trains carrying passengers, the Guard shall apply hand brakes in the brake-van and wedges to the wheels of two vehicles towards the falling gradient. On goods trains, hand brakes of at least one third of the wagons in the train or 10 wagons behind the engine and 5 wagons inside the brake-van, whichever is more, shall be pinned down, in addition to the application of Guard's hand brake in the brake-van.

When the train is expected to start, proper air pressure must be built up to prescribed levels; hand brakes must be released; wedges and skids have to be removed. Thereafter, the air brakes may be released to start the train.

### **Precaution to be taken during storm and heavy wind**

When the weather warning message regarding forecasting cyclone, storm or strong wind has been received from the Meteorological Department and/or there is a reasonable doubt that severe storm is going to break out endangering the safety of passengers, trains, etc., the Station Master shall, in consultation with the Guard and the Loco Pilot of the train, detain the train and also refuse to grant "Line Clear" to a train coming to his station until storm abates and he/she considers movements of trains safe.

If a train is caught on the run either in a cyclone, storm or strong wind of an intensity which, in the opinion of the Loco pilot, is likely to endanger the safety of the train, he/she shall immediately control the speed of the train and bring it to a stop at the first convenient place taking care as far as possible to avoid stoppage of the train at places like sharp curves, high embankments and bridges (including approaches thereof). In controlling the speed and bringing the train to a halt, the Loco Pilot shall stop the train carefully and without a jerk. He/she shall restart the train in consultation with Guard only after the cyclone, storm or strong wind abates and it is considered safe to proceed.

The Guard and the Loco Pilot of the train in co-operation with the Railway staff travelling in the train shall try to see that doors and windows of the coaches are kept open by the passengers to allow free passage of the wind through the coaches.

Unusual and failure occurrences are vulnerable periods for safety of train operations. It is that time when the human interface is enhanced and becomes critical as compliance to all conditions for ensuring safety is ensured manually. An alert and knowledgeable staff can prevent major mishaps by detecting unsafe conditions in time; taking immediate action to prevent accident and inform all concerned immediately through available means.

\* \* \*

## Chapter – VII

# Operating Statistics



Statistics is a collection of data which is used in management functions like finance, production, marketing, service operations etc. In Indian Railways, statistics are collected and published annually in the form of Annual Statistical Statements. One of the popular and significant statistics used to measure the performance of Indian Railways is Operating Ratio. It reflects the overall financial performance and health of the organization. The data and indices that are related to train operations and used by operating department in its management and working are called Operating Statistics.

Operating Statistics can be divided based on the purpose it serves into the following three categories...

1. **Traffic Output statistics** – They measure the output of the train operations. The end service delivered by train operations is transportation of goods and people, which is measured by statistics like loading, no of passengers etc. The trends of these data also give an indication on the direction in which rail traffic is heading towards.
2. **Operational tools** – Some of the statistics are required for daily planning and monitoring of the train operations. They help in adjusting to actual field developments and take corrective action in order to achieve the optimum results.
3. **Asset utilization statistics** – They measure the efficiency of utilization of assets like locomotive, rolling stock, crew and path. The more the efficiency, the lesser will be the asset requirement and the lesser will be the cost incurred. These statistics also give us an idea on which of the assets become critical at a given point of time and helps management to focus on it for achieving overall efficiency.

Many statistics have multiple purposes and can fit into more than one of the above categories. They are used both for day to day working as well as long term decisions and policy making.

## Traffic Output Statistics

**Originating Loading** is one of the important statistics in freight transportation. Loading in terms of number of wagons loaded is measured on a daily basis. With train loads becoming more common, this statistic is also measured in terms of number of rakes. As Railway is essentially a bulk commodity carrier, Originating Loading in tonnes is a better measure of the freight output. Since freight loading has close correlation with freight earnings which is the major part of overall railway earnings, Originating Loading is a closely monitored statistic at divisional, zonal and board level on a daily, monthly and annual basis. It is also collected and analyzed commodity wise, wagon type wise in order to monitor and take appropriate decisions and corrective measures.

**Lead** is the distance for which transportation has been done. It is the distance between loading and unloading point in case of freight; boarding and alighting point in case of passenger. Lead is affected by lot of factors that influence demand and supply. Longer lead traffic is generally favored by Railways because of the telescopic nature of freight and fare. Lead is also measured commodity wise and siding/station wise to understand the business / traffic patterns.

**Originating Passenger** in numbers is an important statistic in coaching operations. It is one of the significant measures targeted by Railways and is expected to continuously improve with the additional services and improvements made in coaching operations every year.

**NTKM – Net Tonne Kilometer:** A longer lead loading of same quantity is different from a shorter lead one. To have a better idea of the loading incorporating both quantity and distance of transportation, NTKM is calculated.

$$\text{NTKM} = \text{Loading in tonnes} \times \text{Distance in km for which the load is moved}$$

There are through running divisions / zones where originating loading is low. However, these units do operate loaded train movements. NTKM of a division / zone reflects these through load running also.

**GTKM – Gross Tonne Kilometer:** The tare weight of the wagons is not included in NTKM. Hence, empty rakes earn zero NTKM. However, the tare weights add to haulage load and the resultant impact on infrastructure like track and OHE. GTKM includes tare weight and is calculated as

$$\text{GTKM} = \text{Total weight of train in tonnes} \times \text{Distance in km traveled by the train}$$

A ratio of NTKM to GTKM reflects the proportion of empty running in the freight operations. GTKM is an important statistic used in planning for track maintenance and haulage capacity of locomotives. GTKM also closely corroborates with

electricity consumption in traction area and is used to decide on Maximum Demand projections to Electricity Boards, which is critical in keeping power costs under control.

**Passenger KM** includes the distance to which a passenger has travelled. Passenger-kilometers are measured as travel distance between origin and destination stations multiplied by the number of passengers traveled between them. Passenger KM when compared with Coach KM gives an indication about the occupancy ratio.

**Throughput** of a section is the total quantum of traffic which is transported over the section in a period of 24 hours.

- a. The passenger throughput could be measured in terms of number of passengers or passenger kms.
- b. The goods throughput may be expressed in terms of
  - i. Number of wagons or trains
  - ii. GTKM or NTKM.

In Railways, generally throughput refers to 'goods throughput'. Improving throughput can be achieved by either operational means like increased train length, increased trailing load etc. It can also be enhanced by improvements in infrastructure like track strength, improved axle load of wagons, increased carrying capacity of coaches and wagons etc. It can also be increased by implementing some of the freight incentive schemes like concessional fare in traditional empty flow direction.

## Operating Tools

**Divisional Wagon Balance (DWB)** is the total number of wagons held by the division, including the ineffective and departmental. It indicates the status of freight train operations in a division. When there is a congestion or unusual change in demand for loading, the wagon balance of the division increases above the usual average or the railway board target. The wagon holding of a division is divided into effective and ineffective based on its fitness and availability for handling traffic. Effective wagon holding consists of Inwards (Terminal units) that need to be unloaded in the terminals of the division; Empties that need to be supplied for loading or handed over to adjoining divisions; Outwards (Foreign Loads) which need to be handed over to the division as per their destination routes.

**Interchange** is the number of wagons or trains handed over / taken over between two units like divisions or zones. This is forecasted and exchanged between divisions and zones to their adjoining units on a daily basis. Such forecasts help in controlling the traffic pattern and ensure the requirement of assets in a division for maintaining efficient train operations. Efficiency of train operations can be assessed through

fulfillment of the interchange commitments by a division / zone as planned in its forecast. An increase in interchange indicates improvement in freight train operations.

**Terminal detention** is measured in hours. Wagons get detained in terminals for loading, unloading and examination activities. These detentions are closely monitored to keep them under minimum and ensure that wagons are on run as quickly as possible.

**Average speed** is measured in Kmph. Coaching trains are timetabled and hence their average speed is determined during timetabling. Mail Express trains are faster than passenger trains. Superfast trains have a higher average speed of  $\geq 55$  kmph. Freight trains receive the last priority in train running normally and hence their average speeds are lesser. Any regulation, under powering, speed restrictions affect the speed of trains. This statistics is a good indicator of the efficiency at which goods trains are run. To achieve maximum throughput and to make use of the existing section capacity all trains should run at the maximum permissible speed.

The average speed of goods train is calculated from the time it leaves the dispatching yard to the time it reaches the destination at the other end of the section. This includes detentions enroute on account of crossing, precedence, shunting etc. The total distance covered during the journey divided by the total time taken will be the average speed of a particular train.

**Punctuality** is the measure of adherence to time table timings by a coaching train. A coaching train based on the time it reached its destination is classified as 'before time (BT)'; 'right time (RT)'; 'not lost time (NLT)'; 'lost time (LT)'. Punctuality is measured in terms of percentage of such trains on a daily basis.

$$\text{Punctuality \%} = \frac{\text{Number of (BT + RT + NLT)} \times 100}{\text{Total number of coaching trains}}$$

**Outage** of an asset is the number of such assets made available for traffic use in a day (24 hours). Wagon and Loco outages are calculated on a daily basis. When worked out for all locomotives owned by a shed irrespective of their physical location, it is termed as 'shed outage'. When worked out for locomotives in a territory of an unit like a division, it is called as 'territorial outage'.

If an engine is maintained in shed for 6 hours and provided for operations the rest of the day i.e. 18 hours, the outage is calculated as  $18/24 = 0.75$ .

Whenever loco outage is disproportionate to wagon outage, the division/zone is asked to balance out the locos to the needy units adjacent.

**Fortnightly Crew Working Hours** – Crew utilization is a critical aspect in train operations in terms of safety as well as efficiency. Crew must be used optimally within the HOER (Hours of Employment and period of Rest Rules). This is being monitored through Crew Management System so that all crew are utilized fully and no crew is overworked.

**Line Capacity** – Path is measured in terms of line capacity. Line capacity is the number of trains which can be run in the line in 24 hours. It can be worked out block section wise, but usually it is worked out for a section. The sectional line capacity is limited by the line capacity of the critical block section.

- Maximum line capacity is the maximum number of trains that can be run without giving any margins for other allowances and maintenance schedules.
- Practical line capacity is the number of trains that can be run making allowance for maintenance and traffic fluctuations. If number of trains is more than this, it leads to congestion and reduction in block availability.
- Economic line capacity is the optimum number of trains which can be run on the section economically. This is generally worked out by commercial/private railways which focus on keeping costs of train running and maintenance lower than returns.

There are many ways to calculate the section capacity. One way is to draw the various paths available on a master chart. This is called Charted line capacity. The other ways depend on various formulae. One commonly used formula is Scott's formula.

$$C = 1440 / (T + t) * E$$

Where

'C' = Line Capacity.

'T' = Running time of the slowest train over a critical Block section.

't' = Block Operation time.

'E' = Efficiency Factor.

- Critical block section is one which takes longest running time to clear. It is usually the lengthiest block section or one with unfavorable geographical and other conditions.
- The formula will give total number of trains including both directions for a single line section.
- On Double line sections this will give number of trains separately for Up & Down directions. These can be different if the running time of critical block section in Up line and Down line are different.
- Any factor that reduces the running time in critical block section will improve the line capacity. It can be higher tractive power, easing out gradient, splitting up of block section through IBS or automatic block signaling etc.

## Asset Utilization Statistics

**Wagon Turn Round** is the time interval between two successive loadings. It is normally expressed in number of days. It is the time taken by a wagon to go through one complete cycle of loading, movement to destination, unloading and next loading. A drop in wagon turn round without a corresponding drop in lead is a healthy sign indicating better wagon mobility.

In order to calculate WTR on a divisional basis, where many a times only part of the wagon cycle gets completed, the following formula is used.

$$T = B / (L+R)$$

Where

T = Wagon Turn round (in days);

B = Number of effective wagons held at odd hours;

L = Loading for the day in number of wagons and

R = Number of loaded wagons received during the day.

**Wagon KM per wagon day** is a measure of wagon mobility and indicates the average number of kilometers moved by a wagon per day, both loaded and empties run included. A drop in this index indicates wagons are not smoothly moving and there is a hold up. The time spent under maintenance by a wagon is not included while working out this index. However any other idling when on line will bring down the figure.

As an example, for a freight train that ran 1000 kms in 36 hours,

$$\text{WKM per wagon day} = 1000/36 \times 24 = 667 \text{ kms/day.}$$

**EKM – Engine Kilometer** is the distance traveled by an engine in a day. It includes train kms hauled by the engine as well as distance travelled by the engine as ‘light engine’. It also includes ‘shunting kms’ to include work done by the engine for shunting in a station calculated as a thumb rule of 15 km per hour. This statistics is daily and periodically monitored for ensuring that locos are not kept unwarrantedly idle and they are put to maximum use. EKM for a division is calculated by the formula...

$$\text{EKM} = \text{Total Engine kilometers earned in a day} / \text{Outage}$$

**Coach KM per coach day** - This unit of measure gives an idea of how efficiently the coaching stock is being utilized. When same numbers of coaching trains are run with lesser number of coaches, coach kilometer per coach day improves. The rake links are reviewed to maximize coach kilometer per coach day. This is worked out in lines of WKM per wagon day.

**Crew Kilometer Run** is the number of kms worked by a crew. The higher the km, the better is the utilization of the crew. Some short lead movements which are significant for train operations are given benefit of additional kms (pilot kms) in order not to disincentivize the crew engaged in such critical operations.

**Line Capacity Utilization** is the percentage of actual number of trains run in a section as compared to the designed line capacity. It gives an indication on level of congestion in order to identify, propose and execute works to improve the designed line capacity. As infrastructure works take time and cost for execution, quite often busy sections face with the challenge of accommodating more number of trains as well as ensuring maintenance blocks. In these sections, any improvement in either of the aspects will lead to improved line capacity utilization. Running long haul trains, reducing ineffective block time, improving block output, and integrated blocks are few such measures.

**Average Gross Train Load** (in tonnes) - This figure is the average overall load of a goods train i.e. the freight load plus the weight of the rolling stock.

$$\text{Average Gross Train Load} = \text{GTKM} / \text{Total train kms.}$$

This statistics gives an idea of the load required to be hauled and hence significant in planning for adequate tractive effort; the most economic or the best for seamless operations etc.

Many more indices are measured depending on the need to understand the train operations better, thereby contributing to better decision making. These can either be directly collected or derived through various formulae using two or more sets of data. With the implementation of IT in many areas of train running like FOIS, ICMS, TMS, Data logger etc., Indian Railways now has 'big data'. Web reports in required format can be sought from CRIS, New Delhi for deciding on any specific matter. Analyzing these big data based on traditional indices and improved indices will go a long way in improving the efficiency of train operations.

\* \* \*

## Chapter – VIII

# Inspections



Train operations in Indian Railways is spread over 68 divisions across more than 7300 stations. On an average, about 20000 trains are running per day in the system. In order to manage such a large scale operation, every functional unit and staff operating them are provided with a set of rules and regulations. These rules are laid down carefully indicating clear individual responsibility so that there is proper accountability for every step of an operation.

Implementation of these rules is monitored and ensured through Inspections. The functioning of the system; performance of the staff are assessed during the inspections. The need for review of the rules is also a part of the inspections. Inspection is thus an important management tool, to ensure safe and efficient railway operations at all levels.

### **Objectives of Inspections**

The following objectives shall be borne in mind while conducting inspections...

- Ensuring adequacy of knowledge of staff.
  - ✓ Every railway employee should be fully conversant with rules, instructions procedure relating to his duties.
- Ascertaining that rules are put in to practice religiously.
  - ✓ All staff should perform their duties according to rules, instructions and procedures in force.
  - ✓ Undesirable shortcuts, irregularities of unsafe practices being resorted to by the staff should be detected and appropriate remedial action has to be taken which can be...
    - Educative, in case these are resorted to out of ignorance.
    - Corrective, if there is something wrong in the working conditions, or there are system deficiencies.
    - Punitive, if resorted to willfully or negligently and persisting even after repeated guidance and counseling.
- ✓ Registers, documents and other records have to be maintained and preserved according to instructions.

- Creating good working environment.
  - ✓ Inspecting official should observe the conditions prevailing at the work spots to understand the difficulties experienced by staff including their personal grievances and seeking on the spot redressal, wherever possible, or bringing to the notice of the concerned authority.
  - ✓ Inculcate discipline and build up the morale of the workers.
  - ✓ Monitor the behavior of staff towards customers, particularly promptness of response and willingness to help.
  
- Ensuring adequacy of resources.
  - ✓ Inspecting official should check for the availability of full complement of staff and equipment; staff should be fit for duty and equipment should be in working order.
  - ✓ Analyze the actuals vs targets in performance; identify bottlenecks if any.

## Types of Inspections

Based on the preplanning and scheduling, inspections can be classified as....

### Casual inspection

Such inspections are not planned in advance. These are done incidentally when the inspecting official gets time to do so along with the primary purpose of visit like monitoring performance of train running, block, conducting enquiry into unusual or accident etc.

### Periodical inspection

They are done as per schedule and are planned in advance. They have to be done thoroughly going through every aspect in detail. Advance information shall be provided about the inspection so that staff keep all the necessary records and documents ready for scrutiny.

### Surprise inspection

These inspections have to be conducted with an element of surprise. Such inspections check the alertness of staff and are effective only when sufficient care is taken to ensure that the information about the inspection is not known to the concerned staff. Surprise speed checks at caution sites / caution signals and Ambush checks on whether the Loco Pilot is following the rules during signal failures especially in automatic sections are some examples. In order to ensure the element of surprise, most of these inspections are done by Inspecting officials moving by road vehicles.

Based on the unit being inspected, inspections can be classified as...

### **Station inspection**

Each station on the division must be inspected in detail by the Section TI 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. Regular inspections shall be carried out more frequently. Officers' inspections shall also be scheduled such that all stations are covered at least once by an officer in a year. All aspects of station working should be covered in these inspections.

### **Level crossing gate inspection**

Level crossings are one of the weakest / vulnerable spots in the railway system as they involve the road users. The inspections shall include checking of availability of road signs, warning boards and speed breakers/rumble strips; safety equipment and its working condition; competency and medical fitness of Gateman on duty; availability of Gate Working Rules, its suitability to the LC and knowledge of the Gateman on duty regarding rules; loco pilot's whistling while passing the LC gates, where required, protection of the LC by the Gateman before opening of the Gate to road traffic and Guard's observance of Gateman. Surprise inspections shall be conducted to observe the safe practices of Gatemen and crew of trains passing through. Whether Gateman is opening and closing of the Gate in time to avoid detention to train traffic and minimize road traffic detention shall also be checked. Tendency of trespassing by road users and any exertion of any undue pressure on the Gateman by the Road traffic shall also be checked.

### **Running room inspection**

During regular, safety and surprise and night inspections running rooms should also be inspected to ensure that running staff are getting proper food, resting and other facilities as per the instructions in force and the staff are resting properly. Kitchen and other facilities shall be inspected and ensured that proper hygiene and cleanliness are maintained. It shall also be checked if the kitchen staff are undergoing periodical medical examination and having valid fitness certificate. Safe stacking of full and empty gas cylinders and availability of firefighting equipment in the kitchen shall also be checked. Inspecting official shall interact with the crew, with those not sleeping, and inquire any problems they are facing. They shall also be counseled to take proper rest. Running rooms should also be jointly inspected by the team of officers as nominated and prescribed.

### **ART inspection**

The ART and the Crane Special inclusive of the Mechanical and engineering Tool vans shall be inspected at least once in six months jointly by Divisional Officers of Medical, Safety, Civil Engineering, Mechanical, Electrical and S&T to ensure that all equipment pertaining their respective departments are available and in good working condition. ART inspections are further detailed in the Accident Manual.

## ARME inspection

Each Medical Relief Van, Auxiliary Van and Scale-II equipment shall be inspected monthly by Divisional Medical Officer, Station Manager, SSE (S&T) SSE (C&W) and SSE (Electrical) and ensure that their respective items are available and in good working condition. Further Medical Relief Van and Auxiliary Van shall be inspected at least once in six months jointly by Divisional Officers of Medical, Safety, Civil Engineering, Mechanical, Electrical and S&T to ensure that all equipment pertaining to their respective departments are available and in good working condition. ARME inspections are further detailed in the Accident Manual.



*Station Inspection*



*Bridge inspection*



*Points & Crossings inspection*

Based on the time of inspection, it is differentiated as day and night inspections.

**Night inspection** is done between 00:00 and 04:00 hours which is the most vulnerable time period as human alertness will be at the least. The body is prone to be lethargic leading to possible negligence in duties. Instances like staff sleeping on duty, not exchanging alright signals etc. are detected during these inspections. Also the critical aspects like signal visibility during night can be best checked during the inspection.

Inspections can be classified on the basis of where the inspecting official travels as...

## Foot plate inspection

They are carried out by the Inspecting official traveling on the engine of running trains. These afford an opportunity to observe and check the working of the engine crew like identifying and calling out of signals, engineman ship, observance of cautions, maintaining communication with the Guard, observance of Gateman's signals, exchange of all right signals with the station staff etc. In these inspections, the following items are also checked - the condition of Locomotives, availability of loco equipment, visibility of signals, condition of track and any problem being encountered by the crew in safe and efficient driving. Footplate inspections also enable to understand the working of the station staff and Gatemen which cannot be checked otherwise. To understand all the above in different field conditions, it is essential that these are done by day as well as by night and in clear weather and also when the visibility is poor due to thick, foggy and tempestuous weather. The

footplate inspections shall be carried out by various trains including coaching and goods trains in order to not only ensure safe working and but also to improve efficiency in running of trains and to suggest any improvements in the system.

During footplate inspections, care shall be taken that the crew are not distracted from safe and efficient discharge of their duties. It shall also be checked if the engine crew had sufficient rest and periodical rest before signing on for duty.

### **BV/SLR inspection**

It is done by the Inspecting official by traveling along with the Guard in the brake van or SLR. The inspecting official shall check the working of Guard like observance of rules by the Guard, exchange of alright signals, Guard's observation of Gateman's signals and communication between Engine crew, station staff and the Guard. Availability and working condition of SLR equipment, condition of sidelights (in case of coaching trains) and its operation by the Guard are also checked. Guard's personal equipment and its working condition, competency certificate, road learning for the section shall also be checked. Guard's knowledge of their rules shall also be tested and counseled if necessary.

### **On-train inspection**

Whenever an inspecting official is traveling by a train on duty, he/she must pay attention to the performance of duties by Guard, Loco Pilots, Station staff, Gateman and other staff inside the train. Rake shall be checked for provision, location, indication boards and working of Emergency exit windows, Fire Extinguishers in AC coaches, evenness of vestibule fall plates, ensure non-accumulation of garbage, etc. Pantry Cars shall also be inspected, if available by the train.

*Window Trailing inspection, Tower car inspection, Motor trolley inspection* are few other types of inspections.

Apart from individual inspections, interdepartmental joint inspections are also carried out like Signal Sighting inspection, NI preparedness inspection, Intra zonal and inter zonal safety audits.

### **Joint Footplate Inspections by Signal Sighting Committee –**

These are carried out jointly with officials of Operating, Loco, Permanent Way Signaling and Tr. Distribution departments, to check the visibility of signals, their locations, focus, brightness etc. The signals normally have to be in LHS and every effort shall be taken to ensure the required distances and visibility of the signal in LHS. Any infrastructure changes like shifting of masts, slewing of tracks etc. shall be done to achieve it. The signal shall be planned in RHS as a last resort, in cases where there is no adjacent track with the same direction of movement and only when no other alternative is possible.

### Safety Audits

SrDSO, along with his/her team comprising Inspectors of different departments, will conduct Safety Audits at major stations, way-side stations, sections, Level Crossings and other installations in the Division covering all aspects pertaining to all departments involved in train operation and safety and make a detailed report.

In addition to the Divisional Safety Team, Safety Audit will also be done by other Divisional Safety Teams (Inter Divisional safety Audit), Head Quarters Safety Team (High Level Safety Audit) and other Railway Safety Teams (Inter Railway Safety Audit). These Safety Audits and compliances to the Safety Audit Reports will be monitored at Zonal and Railway Board level. Controlling officers of the concerned departments shall take necessary corrective actions and submit a compliance report to the concerned Safety Team.

### Scheduling of Inspections

In order to ensure that all areas of a division are covered in an effective periodicity, a schedule for various types of inspections is made. Based on the goals to be achieved, the schedules can be tailored. However, a minimum level of inspection should always be ensured so that safety is not compromised at any point of time. The schedules are generally issued by divisional or zonal headquarters.

### Quality of Inspections

*(Excerpts from PCOM's DO letter No. T.387/Insp./Optg/Rules/Vol.II dated 29.11.2021)*

While carrying out inspections, the following points may be noted:

1. Quality of inspection shall be ensured. Exceptional reports that require corrections/ improvements in safe working shall be reported prominently and first. List of factual information/items found in order shall be reported in the last, if required.
2. Stations nearer to headquarters and bigger stations that have easy access are being inspected frequently. It is desirable to cover remotely located stations as well. Covering all stations/locations periodically shall be monitored by divisional headquarters.
3. Inspections shall be spread throughout the month, instead of month end rush to complete as per schedule.

There is a need to ensure prompt compliances to the observations noticed by various inspecting officials, at Station, Divisional and Zonal level. Station Superintendents shall submit 'Action Take Reports (ATR)' on the observations made by inspecting officials by taking appropriate corrective actions such as counseling, advising concerned departments in writing etc., and submit the Action Taken Report to SrDOMs, with a copy to concerned Inspecting Official. The ATR shall not be mere 'Noted' remark.

Station Superintendents shall escalate the issues to the concerned authorities, if the observations are beyond his/her purview. DOMs/AOMs (General) shall monitor the compliance of scheduled inspections made by various inspecting officials.

## **Effective Inspections**

In order to ensure that an inspection achieves its purpose, the following action needs to be taken before / during / after the inspection time.

### **Preparation for inspection**

1. The inspecting official should have a clear understanding of the unit to be inspected. For a station inspection, the station lay out – it's signaling, special features of working and the instructions in regard to reception, dispatch crossing shunting and running through of trains should be studied in advance, especially for a detailed planned inspection. The inspecting official should have a good knowledge of not only General and Subsidiary Rules but also of Station Working Rules.
2. The inspecting official should have a detailed check list for the inspection. Standard formats / check lists are available for all types of inspection. The inspecting official shall also identify select features of working which he/she intends to check during his inspection. For instance, one may like to emphasize on the correct reception and dispatch of trains, and observance of safety rules by the staff or on utilization of stock, detention to passenger or goods train, knowledge of staff etc. The inspecting officials shall keep in mind of the recent incidents/issues that have come for discussion.
3. All books, forms and registers shall be kept ready for the inspecting official so that time is not wasted in searching for those during the inspection. Machine generated reports like Data logger exception reports, Speedometer reports, FOIS/ICMS reports for terminal stations shall also be taken out before the inspection. Specific time period shall be chosen in line with the purpose of inspection, so that old records can be kept ready for perusal. This will help in observing any trends in irregularities if identified.

### **Conducting the inspection**

1. All registers, books and forms should be carefully pursued to check whether the staff has complied with their instructions. If any of these instructions have not been carried out written explanation of the Station Master should be obtained.
2. Observe the actual working of staff and equipment by means of personal observation as well as cross checking with registers for the same.
3. Intensive scrutiny of selected features during preparation and ones identified through intuition through careful observation and cross checking in detail and questioning the staff concerned.

4. All books and registers inspected must be signed by the inspecting official with date.
5. If any irregularities are found, they shall be discussed with the staff concerned as well as their supervisors. Such a discussion will prove to be educative and produce desired results.
6. 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.
7. As far as possible, discuss the points common to two or more branches, like the Signaling & Telecommunication branch or C&W, Civil Engineering and Commercial branches jointly for objective and acceptable solutions. This will help in not only arriving at correct conclusions and forming sound views but also in avoiding unnecessary correspondence.
8. Interact with the staff and test their knowledge on aspects pertaining to their duties and recent developments in railways and counsel them wherever required.
9. Inquire on their welfare and any issues cropping up and try to solve or give suitable advises to the problems. Make the staff comfortable to express their problems without any inhibition as hidden dissatisfactions will demoralize and de-motivate, which cause unimaginable loss to the administration.

### **Compliance monitoring**

1. All inspections should be followed up with a clear, precise inspection note bringing out the deficiencies to the forefront along with the desired action to be taken. They need to be marked to the concerned person and it shall be ensured that the inspection note reaches to all the concerned including the unit inspected.
2. The action taken by the concerned staff / supervisor / officer / department on the deficiencies brought out should be followed up closely for satisfactory compliance. Non complied deficiencies of previous inspections done in the same place have to be highlighted and escalated to higher ups as the case may be.

\* \* \*

## Chapter – IX

# Traffic Planning



In a growing economy like ours', the need for transportation keeps on increasing. Without a commensurate increase in capacity / efficiency in transportation, this growing demand leads to congestion and resultant strain on the existing assets. In order to avoid such a scenario, Network expansion and capacity improvement works are planned and executed by Railways.

Traffic planning is critical in deciding the scope and requirement of such works. It includes planning for new lines (Plan Head 11), doubling/tripling/quadrupling of sections (Plan Head 15) and works that remove the current constraints in the yards, terminals and sections improve the capacity and efficiency of train operations that are called as Traffic Facility Works (Plan Head 16). Apart from these works that form part of the capital expenditure budget of Indian Railways, private sidings/terminals are also planned and approved by operating department. These works are executed by private entities themselves or by depositing money with Railways for execution.

### **New Projects / Works**

Any new work required to be executed in the Railway requires specific sanction of competent authority with associate finance concurrence as per Schedule of Powers and corresponding earmarking/availability of funds. Depending upon the nature of the work, they can be processed under different sources of funds.

Projects/works of very urgent nature/safety related works and works having lesser financial implications can be processed for sanction under Railway revenue expenditure. Projects/works related to passenger amenities which are having lesser financial implications can be processed for sanctions through Corporate Social Responsibility (CSR) fund duly following extant policy guidelines. Projects/works which are going to remove the bottlenecks at the serving station and enhance the mobility and throughput due to the additional traffic offered by the siding (siding related works viz., doubling of the lead line to the siding, Y connectivity, additional loop line etc.,) can be processed based on the lumpsum amount deposited by the siding authorities with proper justification, associate finance concurrence and sanction of the competent authority as per the Schedule of Powers (SOP) or as per extant policy guidelines.

All the remaining projects/works having higher financial implications can be processed through Works Programme in the Indian Railway Projects and Sanctions Management (IRPSM) system.

Some projects/works which are of huge financial implications which have long term benefits for the private party and also going to decongest the existing Railway lines and increase the mobility of the trains for the additional traffic offered can be processed in Public Private Partnership (PPP) as per the Memorandum of Understanding (MOU) signed at the Apex level of the respective organizations.

## Traffic Survey

It is a detailed study of traffic conditions and prospects of an area with the object of determining the most promising routes for the railways in the area.

Traffic surveys are ordered and conducted to study the feasibility of major works like new lines, doubling/tripling/quadrupling, gauge conversion. It includes an assessment of Financial Internal Rate of Return to see if the project is economically viable. For certain strategic lines which are critical for country's defense, socio-economic development of a backward area etc., the sanctions are awarded by the government despite poor financial returns.

The traffic survey wing is headed by an experienced administrative officer of the traffic (Operating/Commercial) department. To ensure that the estimates of anticipated traffic, capital cost and recurring expenses etc. are realistic and the financial appraisal of the project including the phasing of investments and returns at each stage are worked out as correctly as possible and with great deal objectivity, an accounts officer of appropriate status is associated with the traffic survey officer. The traffic survey team is supplied with terms of reference containing instructions regarding the scope and nature of the investigation to be carried out.

The team should work closely with the HQ at various intervals both during the progress of the work in the field and during the period of recess in order to consult the General Manager and where necessary, have the original terms of reference modified by the competent authority. This enables the main line administration to determine the design of the new line under investigation.

The traffic survey team should also work in close collaboration with the engineering survey party if there is one in the field at the same time, and while collecting information should visit all the trade centers in the area, consult local authorities and prominent citizens freely both on regard to trade and industry and most suitable alignment for the proposed railway line.

Traffic survey is mainly of two types.

- (a) Reconnaissance / Preliminary Engineering cum Traffic survey (RET/PET)
- (b) Final Location Survey (FLS)

### **Reconnaissance (RET) / Preliminary (PET) survey**

RET/PET surveys are also called as feasibility studies. They are undertaken to determine how a proposed line will fit in the general development of railway and what return is likely to yield on the estimated total cost. It is based on the careful study of the following...

1. Existing map
2. Trade and population
3. Financial and statistical data of the railway of similar area
4. Modes of transport available in the area

From this investigation, the railway administration decides whether final location survey should be undertaken or not and what would be the standard of construction. All estimates for traffic survey require the sanction of the railway board and the cost of the survey is included in the budget.

DRMs/GMs are empowered to sanction feasibility studies for required projects in their Division/Zonal Railway considering coal, port connectivity, revenue potential for cargo loading, etc. subject to availability of funds. The feasibility study for projects lying exclusively within the Division can be approved by DRM. Similarly, feasibility study of inter-divisional projects within the Zonal railways jurisdiction can be approved by General Manager. Feasibility study of Inter Railway projects will be approved by the Railway Board.

Feasibility studies of projects are to be carried out by Gati Shakti units of Divisions in the Division and CAO/C for inter Division and inter Zonal Railway projects (for New Lines, Doubling, Gauge Conversions etc.) as per coverage of length and jurisdiction using resources & capability available on the "PM Gati Shakti" portal, designed/hosted by BISAG-N, and engagement of expert agency.

### **Gati Shakti units**

Railways are one of the key drivers of the PM Gati Shakti National Master Plan. Ministry of Railways has set up a multi-disciplinary Gati Shakti Directorate in Railway Board. The Gati Shakti Units in all 68 divisions have been created to fast track all the important works from sanctioning to commissioning. These Gati-Shakti Units have been provided with enhanced sanctioning powers with necessary SOP changes and all these works required are to be processed in IRPSM with Gati-Shakti Tag, duly following the necessary policy guidelines issued by Railway Board. The PM Gati Shakti National Master Plan has helped in expeditious sanction of projects, monitoring of execution of works and co-ordination with other Ministries/State Governments.

The Railway projects costing above Rs. 500 Crore each are sanctioned by the Hon'ble MR/CCEA depending upon the value of the work after appraisal by NITI Aayog and Expanded Board for Railways (EBR). All such projects are required to be examined by Network Planning group (NPG).

Each Division and Zonal Railway Headquarter will have a Network Planning Group (NPG) for selecting feasible projects for the preparation of DPR to improve mobility, throughput/loading in the Railway. The constitution of NPG is as given below:

Zonal Level: PCOM/CTPM of Railway (PCOM/CTPM & SAG officers of Engineering. Electrical. S&T & Finance) as approved by GM.

Division Level: CPM/GS (Dy. CPM/GS/T or equivalent with SG/JAG officers of Engineering, Electrical, S&T, Operating. Mechanical & Finance) as approved by DRM.

On completion of the feasibility study and submission of its report, approval of the DRM/GM is obtained for preparation of DPR for feasible projects required to be executed by Zonal Railway for improving mobility, throughput and loading in the Railways. DRM/GM is empowered to sanction works for preparation of DPR for such projects (whose feasibility study was approved by them) that are found feasible.

### Final Location Survey

Final location survey is done with the sanction of Railway Board. It is sanctioned for those approved feasibility studies after their scrutiny and acceptance as described above. It includes detailed assessment of various aspects like...

1. Acquisition of land
2. High flood level
3. Boundaries of village lands
4. State Govt. requirement
5. Position of canals, rivers, culverts etc.
6. Station site and junctions
7. Diversion of traffic
8. Protection work required
9. Road ways and gradients
10. Expected cooperation of local public
11. Requirement of military and civil authority
12. Requirement of clearance from ministry of environment and forestry
13. Demolition of sensitive structures like religious places and burial places

The final survey reports also include a detailed financial assessment on the project by calculating the FIRR – Financial Internal Rate of Return.

## **Financial Internal Rate of Return**

In order to streamline and standardize calculation of FIRR across Indian Railways, an approach paper has been developed. The methodology explained in the approach paper is based on the Finance Code issued by Indian Railways and best practices being followed by Zonal Railways. This methodology is adopted while calculating Financial Internal Rate of Return (FIRR) for the projects at the time of preparation of the Detailed Project Reports for New Line, Doubling, Gauge Conversion and Traffic facilities. Associate Finance ensures that the guidelines set out in this model are scrupulously before being vetted.

Financial appraisal of a railway project consists following phases and inputs:

### **Construction Phase:**

The following inputs are taken in the construction phase of the financial appraisal...

Asset development – The project estimate should be as economical as possible. The project cost should consider all incidental cost, inflation/escalation and interest, if any, as on the date of commissioning of the project. Project cost includes the following - Land Civil- Building & Bridges Civil-P way; Electrical; Mechanical Rolling stock & S&T costs. The estimate should be approved by the General Manager of the zone and vetted by the Associate Finance.

Interest and Inflation during construction – The project cost is generally arrived at the prevailing cost indices whereas the construction period lasts for longer period. Accordingly, inflation has to be factored in for the construction period. The WPI of a country captures over all inflationary impact and hence it is assumed that the project cost with WPI will give fair estimation. An escalation of 5% annually during the construction is recommended. Inflation should be considered from the second year onwards.

Rolling stock – In accordance with the Para 208 Finance Code Volume 1 if the line capacity work is undertaken on account of increase in traffic and in case there is a construction of new line then in such scenarios the project cost should invariably include cost of rolling stock. Procurement of initial rolling stock should be considered in the year of completion of the project. Requirement of rolling stock should be aligned to traffic projections. The project should also consider additional rolling stock as and when required to support projected traffic. The cost of rolling stock should be based on latest accepted rates (LAR).

Credit from Rail Released Material – In case of Railway projects which are brownfield in nature there are released material which lead to cash inflow to the projects. Same should be considered as credit to the project. CRRM should be shown separately while determining FIRR and should be considered in the year of realization of money. The CRRM should be estimated by the respective project team on best estimate basis.

### Operation Phase:

The following aspects are assessed / used in the operation phase of the appraisal.

Earning Goods & Coaching – In case of the projects which results into additional revenue from goods/coaching, the same should be calculated based on traffic projections. The revenue for the first year of commissioning of the project should be calculated. Estimation of Goods & Coaching Earnings have to be worked out keeping in view the following points...

1. Outward traffic
2. Inward traffic
3. Cross Traffic.
4. Long distance traffic
5. Short distance traffic
6. Economic condition of the area
7. Agricultural development in the area
8. Industrial development in the area
9. Existing market in the area
10. Merchants and Govt. departments will also be consulted
11. Number of Coaching trains proposed in the project section.
12. Number of Coaches.
13. Carrying capacity of each coach/rake.
14. Number of trips proposed in the section.

Working Expense Goods & Coaching – The working expense related to goods and coaching are calculated on the basis of the benchmark rates published by the statistical department of Railway Board from time to time as available in Annual statistical statement (ASS). Estimate of Expenditure is made under the following main heads.

1. Maintenance of structural work
2. Maintenance of supply of locomotive power
3. Maintenance and supply of carriage and wagons
4. Expenses on traffic developments
5. Expenses on general developments
6. Expenses on electrical developments
7. Miscellaneous expenses

It is seen what would be the return after 6 years and 11 years which is known as productive test taking the life period of the line as 30 years.

**Detention Savings Goods & Coaching** – The projects related to line capacity work leads to savings in detention time of rolling stock. This saves cost of procurement of additional rolling stock. Accordingly, these savings should be accounted for while appraising the project. Saving should be calculated based on latest available Annual statistical statement (ASS) as published by statistics department of Railway Board from time to time.

**Asset replacement** – The assets deployed during the project have certain useful life. These assets are expected to last for useful life. Accordingly, the replacement of any asset should be considered only on expiry of its useful life.

#### **Terminal Phase:**

It is the final phase of the financial appraisal in which the following points are taken into account...

- i. Project life should be considered as 30 years from the date of Commissioning as per Para 345 of Indian Railways Engineering Code.
- ii. At the end of the project life cycle project cash flow considers the residual value of the assets. The residual value of the asset should be the balance useful life of the assets if available.

Terminal value other than land, preliminary and earthwork/formation should be based on useful life of assets and terminal value of land, preliminary and earthwork/formation should be the actual cost incurred on these items. Terminal value of replacement capex should also be considered while calculating FIRR based on residual life.

Following standard assumptions are taken while calculating financial IRR.

1. **Growth Factor**: The Year on Year Growth factor for earning is considered 5% based on 30 year historical CAGR of average earning from passenger and freight per KM. The growth factor for expenditure purpose is 5%.
2. **Interest during construction**: Interest has to be calculated only for projects funded through EBR/IF.
3. **Project cost**: The cash outgo for the project should factor in inflation, escalation, interest etc. up to the date of completion. For the purpose of financial appraisal, the date of completion of the project should be 31st March of the financial year in which the project is completed.
4. **Replacement cost**: The assets should be replaced post completion of useful life and the replacement cost should consider inflationary impact of the asset value if any.

5. Depreciation – Some of the DPRs consider depreciation as cash outgo while computing IRR. Depreciation is a non-cash item and should not be considered while arriving at discounted cash flow and FIRR.
6. Non-Fare revenue- There are various non-fare revenues which will also accrue due to new development in the form of advertisement, rental income, retails etc. The cash inflows due to Non Fare Revenue should be factored at the time of preparation of DPR.
7. Time series: FIRR calculation should consider the cash flow for the period of construction and 30 years of operations. The operation period of 30 years should commence from 1<sup>st</sup> April of the year immediately after the financial year in which construction is completed.
8. Reference rates: The calculation under FIRR calculation considers rates and references from standard like Annual Statistical Statement (ASS), End result for Freight, End result for coaching and All India Engine Hour Cost. Likewise, EIRR (Economic Internal Rate of Return) is also calculated for assessing the projects. In this model, projects are evaluated beyond financial terms by including economic and social impact of the projects.

The final survey report including all the above, is submitted in the form of a DPR – Detailed project report to the appropriate authority on the basis of the cost worked out.

## **Detailed Project Report (DPR)**

Detailed Project Report is required to be prepared for all works costing above Rs.5 Crore. DPRs are sent to Railway Board by Zonal/PSUs for appraisal and obtaining sanction of the competent authority as per the prevailing delegation of powers.

DPRs are submitted by DRM to Gati Shakti Directorate of Railway Board with Finance concurrence of Divisional Gati Shakti unit through PCOM/NPG and approval of GM. DPRs of inter divisional/inter Zonal Railways are submitted to Gati shakti Directorate of Railway Board by CAO/C with the concurrence of FA&CAO/C through PCOM and approval of GM.

Under Mission 3000 MT plan, many such capacity enhancement works are required to be sanctioned in near future for which DPRs are being prepared and sent by zonal railways to Railway Board. On acceptance of the DPR by the appropriate authority, the works are duly sanctioned and included in the IRPSM – Indian Railway Projects Sanction and Management system.



New line Tunnel



Bye pass line

## Uploading proposals in IRPSM

Apart from the major works which are dealt through survey and DPRs, the works required by the concerned branches of the division, which are to be undertaken in the next year with order of priority are uploaded with brief justification in IRPSM. The abstract estimates for these projects/works are sought from the relevant branches as per the requirement with a rough sketch if necessary. After getting the abstract estimates from all the concerned branches after site survey, by adding these abstract costs the total cost of the work is arrived. If the work has a portion of procurement or completely related to procurement, then a budgetary quotation from the GeM website will be the basis for arriving at the cost of the work.

List of such projects/works, identified by the concerned branch officer with the order of priority is uploaded in the IRPSM with abstract estimates, justification and rough sketch if required with the administrative approval of DRM. Subsequently the proposals are forwarded by divisional Engineering branch (Sr.DEN/Co-ord) with order of priority to headquarters engineering branch (CE/P&D) in IRPSM which in turn is forwarded to the concerned Plan-head Nodal Officer at the Zonal Headquarters for each plan-head for shortlisting the proposal.

The Nodal Officers at The Zonal Headquarters after consolidating all the proposals received from all the divisions scrutinized and with an overall order of zonal priority the administrative approval of GM is obtained. After this the projects/works are shortlisted duly uploading the administrative approval of GM with the revised order of priority (Zonal) is sent back to headquarters engineering branch (CE/P&D) in IRPSM which will in turn forwarded to the respective divisions for further processing in the IRPSM.

All the projects/works which are shortlisted are processed by the concerned branches for divisional finance concurrence and sanction of DRM if the cost of the work under the plan-head permits as per SOP. If the work requires the sanction of PHOD/GM as per the SOP, then initial divisional finance concurrence is obtained and with the approval of DRM, forwarded to Zonal headquarters for final finance concurrence of Headquarters finance and sanction of PHOD/GM as the case may be.

If the work requires the sanction of Railway Board (RB) as per the SOP, then the proposal is forwarded to Railway Board (RB) after final finance concurrence at Zonal Headquarters and approval of GM for sanction of the competent authority at Railway Board as per the plan-head. The processing is done duly keeping the latest policy guidelines and necessary SOP changes issued by Railway Board from time to time.

#### PWP – Preliminary Works Programme

These are works of higher financial implications which can only be sanctioned by Railway Board. Such work proposals are shortlisted by zones and prioritized and sent to Railway Board through IRPSM. On approval and sanction by the Railway Board, these works are consolidated and presented in the form of Projects/works, Machinery and Rolling Stock Programme of Railway, popularly known as "PINK BOOK" to the Parliament along with Budget Paper. The approved projects/works are published in the PINK BOOK along with demand for grant under different heads for different railways.

#### LSWP – Lump Sum Works Programme

Apart from PWP, sometimes a lump sum provision is made in the PINK BOOK Zone-wise plan-head-wise for the Zonal Railways to process the projects/works under the respective plan-heads for sanction for different projects/works as per the SOP.

#### Umbrella Works

To give additional flexibility to sanction works throughout the year, and to channelize railway investments in identified focus areas by the Zonal Railway, lump sum fund PUs/ZRs plan-head-wise the Umbrella Funds are allotted by Railway Board and they are UMBRELLA Works/Projects. Based on this, the respective PUs/ZRs have to identify and process the proposals in IRPSM as per the policy changes and guidelines given by Railway Board with the required SOP changes where required are given from time to time.

#### Out of turn works - OOT

The projects/works that are not included in LSWP but required urgently by the railways are processed in IRPSM for sanction of the competent authority under the Out Of Turn (GM-OOT) projects/works as per the SOP for each plan-head.

All sanctioned works are followed up for their execution and completion within time through IRPSM for achieving the desired benefits.

## Private Freight Handling Terminals

There are 3 types of Private Freight handling terminals on Private land / fully or partially on railway land.

1. Private Sidings.
2. Private Freight Terminals (PFT).
3. Gati Shakti Multimodal Cargo Terminal (GCT)

The proposals of Private Siding / Private Freight Terminal / Gati Shakti Multi-Modal Cargo Terminal proposals are processed as per the latest Railway Board policy guidelines issued from time to time and subsequent corrections/modifications made by Railway Board from time to time and their corresponding SOP changes wherever required are issued. All the new proposals for freight terminals after 15.12.2021 are covered under new GCT Policy. The existing Private Sidings / Private Freight Terminals can opt duly following the procedures laid down for migration to Gati Shakti Multi-Modal Cargo Terminal.

The following are some important circulars in this regard...

1. Policy Circular on Private Sidings vide Railway Board letter No.99/TC(FM)/26/1/Pt.II dated 22.08.2016.
2. Master Circular on Private Freight Terminal (PFT) vide Railway Board letter No. 2018/TC/(FM)/14/04, dated 23.06.2020.
3. Master Circular on Gati Shakti Multi-Modal Cargo Terminal (GCT) vide Railway Board letter No. 2021/TC(FM)/18/23 Rail Bhavan, New Delhi-110 001, Dated 06.12.2022.
4. Joint Director/GS (Civil) – II / Railway Board Lr. No.2021/W-I/Genl./Gati Shakti dated 28.10.2022.

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