SOUTH EAST CENTRAL RAILWAY

OPERATING MANUAL

(For Official use only)

2025

(SECOND EDITION)



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PREFACE

1. The Manual is intended for the guidance not only of the operating staff but also all other staff connected and engaged in train operations. Besides it contains important guide lines which would help the staff in understanding the operating and safety practices better.

2. Instructions contained in this Manual shall be equally binding on the staff as in the case of General and Subsidiary Rules and should be read in conjunction with the General and Subsidiary Rules of this Railway. However, nothing is these Instructions should be read as cancelling, amending or modifying any of the General and Subsidiary Rules, IRCA Rules, Rules of Tariffs and Block Working Manual etc.

3. Any Addendum and Corrigendum issued should be serially numbered and recorded in the page nominated for the purpose and pasted nearer to the corresponding Rules to which amendment is issued. Every Official to whom a copy of this Manual is given shall be responsible for maintaining it upto date.

February, 2025
Bilaspur

(RAHUL AGARWAL)
Principal Chief Operations Manager
SEC Railway

Printed at...
Printwell & Stationers
Bilaspur (C.G.)
Mob. : 9893201278

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N.B. Adddendum & Corrigendum No. 01 to 24 of Operating Manual/SECR/Edition 2008 have been incorporated.

CHAPTER - I

SIGNALLING AND INTERLOCKING

1.01. Types of Fixed Signals.-

The following types of fixed signals are in use on this Railways :-

(a) Semaphore Arm Signals :-

(i) Two aspect Lower quadrant signals.

(ii) Modified Lower quadrant signals.

(b) Colour Light signals :-

(i) Manually operated multiple aspect signals.

(ii) Multiple aspect Semi-Automatic signals.

(iii) Multiple Aspect Automatic signals.

(iv) Manually operated two Aspect signals.

(c) Subsidiary Signals :-

(i) Supplementary signals :-

(a) Calling-on signals.

(b) Co-acting signals.

(c) Repeating signals.

(ii) Shunt signals :-

(a) Miniature Semaphore Arm type

(b) Miniature Semaphore on Revolving Disc.

(c) Position lights.

1.02 Signals between Traffic and Loco Limits.-

Signals are provided between Traffic and Loco Limits to control the movement of engines to and from the shed. Shunt signals are also have been provided in major yards for the movement of engines. Loco Pilots must make themselves

conversant with the same and move their engines according to the aspect of signals.

1.03 Commissioning or re-erection of signals.-

(a) For commissioning or re-erection of signals, the instructions contained in GR 3.26 and SR thereto shall be followed.

(b) The Divisional Signal & Telecom. Engineer or Assistant Signal and Telecom. Engineer will, whenever necessary; requisition the services of a sighting committee.

(c) The sighting Committee having decided on the site and determined the height of the proposed signal or signals, all the members will sign the certificate in the prescribed form and the same will be forwarded to Sr. Divl. Signal & Telecom Engineer/Divisional Signal & Telecom. Engineer.

(d) On the date that the new signals are first brought into use, the Divisional Transportation Inspector, the Locomotive inspector and the SSE/SE/JE(Sig) will attend and jointly send message to the divisional Engineer, Divisional Mechanical Engineer, Divisional Operations Manager and Divisional Signal & Tele Communication Engineer stating whether the signals are satisfactory or otherwise, both by day and night. On receipt of this message the Divisional Signal and Telecommunication Engineer will endorse on the space provided on the Sighting Certificate Already received.

(e) While deciding the site and determining the height of the signal the minimum visibility distance as indicated in SR 3.16.01, infringement to schedule of dimensions and the visibility of signals not being obscured by OHE masts in electrified section should be taken into consideration by the Sighting Committee.

(f) Minor alteration to signals:-

Minor alterations to signals in order to provide better sighting such as increasing the height or moving the post across the track may be carried out after the approval of authorized officer of the Railway. Sr. DSTE/DSTE will advise the Sr. DOM / Sr. DSO / DSO of the time and, date on which

the alteration will be made and manner in which it will be carried out. The Sr. DOM / Sr. DSO / DSO will then arrange to issue a memorandum detailing the work as information to all concerned staff.

1.04. Responsibility for repairing, maintenance and replacement of signals and signal lamps.-

(a) The signal and Tele-communication department is responsible for repair, maintenance and replacement of signals, signal lamps and their fittings. In case of any damage to the signal, signal lamps and their fittings- the Station Master must intimate the SSE/SE/ JE (Sig) and Signal Maintainer concerned for necessary action.

(b) Proper care must be exercised by the Traffic staff in working slots/Signals/Block Instruments as per the working procedure. The slot/ slide must be put back to "normal" after the concerned signal is put back to "on". A slot or slide or signal lever should not be kept in the pulled condition after passage of a train. This may cause an accident or failure. Refer GR 3.36 and SR thereto.

1.05. Examination of hand signal lamps, flags and their replacement.-

At a fixed hour daily the Station Master will examine all the Hand signal lamps and flags in use and see that they are in proper order. He should take immediate action also for the replacement and repair of the hand signal lamps and flags. Any deficiency of hand signal, lamps and flags must be immediately brought to the notice of the Divisional Safety Officerand Divisional Transportation Inspector.

1.06. Basic Principles of interlocking.-

The basic principles of interlocking are as follows:-

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

(ii) It shall not be possible to take 'off' signals for a running line unless:-

(a) all points on the running line are correctly set and facing points locked;

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

(c) level crossing gates controlled by interlocking are locked across the roadway.

(d) The running line referred to above should include adequate distance also.

(iii) Once a signal lever is pulled to take 'off' signal, it must lock or back-lock, as necessary, the levers operating the points & gate locks referred to above.

(iv) When a signal is in the 'on' position, all points which would be locked by taking it 'off'must be free for shunting purposes.

(v) It must be impossible to take 'off' a warner signal, until all the relative stop signals in advance have first been taken 'off' and when 'off' it must back lock all such signals.

1.07. Indirect and Direct Interlocking.-

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

(b) Direct interlocking means that all levers, viz the points levers, the points lock levers and the signal levers are concentrated in one lever frame and worked there from; the interlocking is effected by mechanical and / or electrical means.

1.08. Standards of Signalling and Interlocking.-

Standards of Signaling and Interlocking:- Interlocking at stations is standardized into four different classes viz. I(R), II (R), lll(R) and IV(R). The regulations prescribing the four standards have been drawn up primarily to meet the needs of crossing stations on the single line but, with such modifications as may be necessary in regard to the equipment

of signals; these are also applicable to other stations both on single and double lines. The standards are as follows:-

Note:- For details see para 170 to 174 of “Indian Railway Signal Engineering Manual”.

Two aspect signalling.

(a) Standard I(R)

(i) Speed -50 Kms. per hour.

(ii) Isolation- Isolation of the main line is recommended, but is not essential.

(iii) Points - The facing points should be provided with key locks, locking both switches independently and the switches detected independently by relative signals

(iv) Interlocking- Interlocking between points and signals may be carried out indirectly by means of key locks.

(v) Signals - Outer and Bracketted Home signals shall be provided. The provision of Starter signals is optional. Working Warners may be provided for metre gauge stations where trains run through, if considered necessary, but are not required for other for other stations signaled to standard I.

(b) Standard II(R)

(i) Speed - 110 Kms. per hour.

(ii) Isolation - Isolation of the main line is essential.

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

(iv) Interlocking- The interlocking between points and signals may be direct or indirect. Where

indirect interlocking is used, signals shall be worked from a position under the control of the Station Master and key must be provided to enable the Station Master to lock up the signal frame.

(v) Signal - Outer, Warner and Bracketted Home signals must be provided and Starters where considered necessary; where starters are not provided the 'off' position of the Warner signal shall be dependent upon the receipt of "Line Clear" on the block instrument.

(c) Standard lll(R)

(i) Speed - 140Km/h Unrestricted speed.

(ii) Isolation - Same as for Standard II.

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

(iv) Signals - Outer, Warner, Bracketted Home Signals and Starters must be provided and Advanced Starters as may be necessary.

(d) Standard IV(R)

(i) Speed - Upto 160 Km/h

(ii) Isolation - as per Standard III.

Multiple Aspect Signalling.

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

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

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

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

Sl. No.	Item	Standard I	Standard II	Standard III	Standard IV
	Allowable Speed (Kmph)	Upto 50	Upto 110	Upto 140	Upto 160
1	Isolation	Y*	Y	Y	Y
2	2 Aspect (2A) Semaphore/Multi Aspect (MA) Signalling	2A/MA	2A/MA	MA	MA
3	Double Distant	N	Y**	Y	Y
4	Point Operation	Meeh	Mech/Elec	Mech/Elec	Elec
5	Point Locking	Key/FPL/ HPL	FPL/Pt M/c	FPL/Pt M/c	Clamp type direct%
6	Point Detection	Mech/Elec	Mech/Elec	Mech/Elec	Elec
7	Lock Detection	N	Y	Y	Y
8	Interlocking	Key/Mech	Mech/Elec/ Electronic	Mech/Elec / Electronic	Electric/ Electronics
9	Track Circuiting	N	Meeh Interlocking: Run through Lines(Main) , Elec/Electronic: All Running lines	All Running lines	All Running lines
10	Block Working(Min.)	Token	Token/SGE	#SGE/TC	#SGE/TC
11	Preventing signal passing at danger	N	N	N	Y%

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

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

% Desirable

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

Note: The provisions of the revised Addendum & Corrigendum Slip no. 6 chapter VII, Para 7.131 Section "M" of Signal Engineering Manual will only apply to future signaling and Interlocking installations. Wherever existing installation do not fulfill these requirements, existing speed of operation may be permitted to continue.

1.09 Non-interlocked points.-

(a) Locks and Bolts for points:- At stations where the points are not interlocked with the signals, each set of points must be provided with a safety lock or a clamp of the approved type or screw locking bolts with nut and cotter and a padlock so as to secure the switch or tongue rail to the stock rail. In this position the switch is said to be closed. This should be ensured before allowing any movement over the point(s). Points of the marshalling yard over which trains are neither received nor despatched are not provided with padlocks. [Refer S.R. 3.39.03, 5.14.03 and 5.14.07 (a) (b).]

(b) Keys of points Lock.-The keys of points locks must not be kept in bunches, as when a bunch of keys is sent out to unlock points there may be other keys in the bunch which should be with the Station Master, and in such case it might be in the power of the pointsman or porter to unlock points that should be kept locked.

(c) Padlocking of points.- The clamp must be properly tightened to hold the tongue and stock rails together before being padlocked. Where bolts, nuts and cotters are provided the bolt should be passed through the tongue and stock rails near the nose of the closed switch, then the nut should be

screwed on tightly, cottered and padlocked. If the nut cannot be screwed sufficiently tight so as to hold the tongue and stock rails together without a gap, the bolts etc, should be renewed at once.

When keys are removed from locks, care must be taken to place the key hole shields over the keyholes so as to prevent rain and dust getting into the locks.

1.10 Explanation of certain terms.-

(a) Permanently locked points,- In non- interlocked yards or non-interlocked portion of interlocked yards, in order to isolate the running lines from the non-running lines and vice-versa points which are permanently locked are known as permanently locked points, keys of such points shall be kept under the custody of the Station Master except when handed over for the purpose of any work at the point.

The arrangement prevents any movement between the running and non-running lines without the permission of the Station Master.

(b) Isolation.- The separation of stabling lines, loops and sidings from main running lines by means of trap points, derail switches snag dead ends or sand humps prevent stabled vehicles from running away on to the main running line. A line is said to be isolated from the adjacent line(s) when any movement on the adjoining line(s) cannot foul it.

(c) (i) Panel Interlocking.-Panel interlocking is a system of power signalling where a lever frame is dispensed with. Small thumb switches or push buttons are provided for operation of signals and points, and these are placed on an illuminated track diagram geographically in their respective positions. The interlocking is achieved electrically by means of relays.

(ii) Route Relay Interlocking :- This is a system of Panel interlocking where the entire route is set by turning a switch or by pressing two buttons, one at the entry and other at the exit of the route being displayed on the panel. The setting and holding of

the route and interlocking is achieved through electrical relays.

(iii) Electronic Interlocking:- Otherwise known as Solid State Interlocking (SSI), is a modern system of interlocking where, the interlocking is effected through customized hardware and software. This enables operation through push buttons on the panel board or by giving necessary commands on the key board/mouse by viewing the yard layout displayed on the Visual Display Unit (VDU). The choice of operation, however, rests with the Station Master.

(d) Detectors:- An electrical or mechanical device which prevents a signal being taken 'off' unless the points which the signals protect are correctly set and, in the case of facing points, also locked. It also prevents the points being until worked the signal has been put back to 'on'.

(e) Facing points lock:- A plunger bolt provided at the facing points, which ensures that the points are correctly set and locked to prevent them from being moved unauthorisedly.

(f) Facing Point Lock bar:- A metal bar fitted near the facing point alongside the running rail and connected with the facing point lock lever in such a manner that the lever is prevented from being moved so long the presence of vehicle wheels prevent the bar being raised. Lock bars must not be less than 42 feet long for B.G.

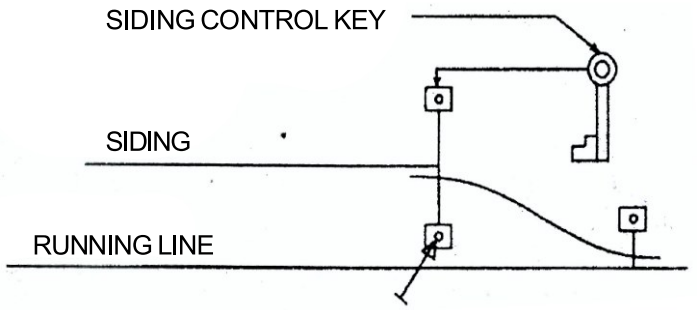
(g) Fouling bar: - A bar provided at the fouling mark between two diverging lines so as to prevent the points being set and locked for a movement over one line while a train or vehicle is standing on the other line infringing the fouling mark.

(h) Locking:- A lever is said to be locked when in the normal position it cannot be pulled over. A lever is said to be locking another lever when owing to the former's remaining in the normal or reverse position, the latter cannot be pulled over.

(i) Track circuit:-The running rails are used as conductor or electric circuit. The current is fed from one end and a track relay is connected to the rails at the other end of the track. There are two types of track circuits-closed and open. In the

closed track circuit which is normally employed in yards the relay is normally kept energised. When a train enters the track circuited section the axle of wheel provides an easier path for the current with the result the track relay drops, thereby replacing the relevant signals. The open track circuits are usually of shorter lengths, being provided for release of Block Instrument locks, occupation of wagon-axle completes the circuit thereby actuating the track relay. Ref. GR 1.02 (57).

(j) Standard type Siding and Succession locking:- The sketch below shows the general arrangements for securing the points and derail of a standard type of siding and succession locks:-



(k) Normally as shown above the siding points and the derail remain set and locked for straight and for the derail respectively. The derail is fitted with two single locks and the siding points with one single lock. To operate the siding, the Siding Control key must be inserted to its respective single lock at the derail. This releases the derail point to be operated to closed position when the 'succession key can be extracted from the other single lock at the derail. The succession key in turn when inserted in the single lock fitted on the siding points: releases the points to be set for the siding. In this arrangement the derail stands locked in either position when the respective key is out.

To restore the siding points for the running line, the keys must be in used reversed order, so that the Control key may be taken out from the derail to release the signal frame.

(l) Locking Facing points with Route Indication Keys at non-interlocked stations:- Each running line in a station will

be designated by a fixed number; the road nearest the platfrom will be known as No. 1 Route, the next No.2. Route and so on.

All points leading to two diverging routes will be fitted with triple locks, the middle lock will be the Release Lock, the two Outer Locks will be the Point Locking Locks.

The key of each lock will bear on the handle an inscription indicating its function.

The keys of the Points Locking locks will normally be secured in their locks. These keys cannot be turned and removed unless the points are first correctly set and the Released Lock then unlocked, the removal of either Points Locking Key will back- lock the Release key in its lock.

The Release Keys of the Outer most points will be known as the Up and Down keys. These keys must normally be in the personal charge of the Station Master on duty.

When there are more than one set of facing points on the same line, the key of the Points Locking Lock of the outer facing points when set for the direction of the inner points becomes the Release Key of the next set of inner facing points.

In setting the Points for a specified route, the locking must begin from the outermost facing Points.

When the points have to be set and locked for the reception of a train, the Station Master on duty will make over to the Points Locker (usually a Pointsman at such stations) the Up or Down Key, as the case may be, for the direction from which the train is expected and will give him clear instruction as to the running line on which the train will be received. The Points Locker will proceed to the outermost facing points and set and lock them for the specified route removing the Points Locking Key which, if there are no inner facing points to be set and locked, will be taken to the Station Master on duty. The inscription on the handle of this key will indicate the running line or route for which the points have been set and locked.

If there are inner facing points to be locked, the Points Locking key removed from the Outer facing Points will be the Release Key for the inner points.

After the innermost facing points on the specified route have been locked, the Points Locking Key removed from those Points will be taken to the Station Master on duty. The inscription on the handle of this key will indicate the running line or route for which all the facing points have been set and locked.

The Station Master, having satisfied himself by an inspection on the handle of the key made over to him by the points Locker that the points have been set and locked for the correct route required by him will order signals to be taken 'off' and will retain the key in his personal charge till the train arrived or passes through as the case may be. The facing points must also be manned.

Note In the case of crossing trains, the Station Master must also have in his possession the required route key in support of the points at the trailing end having been set and locked in accordance with SR 3.39.02(d) (iii) before ordering the signals to be taken off and will '.retain that key in his possession till the arrival of the train.

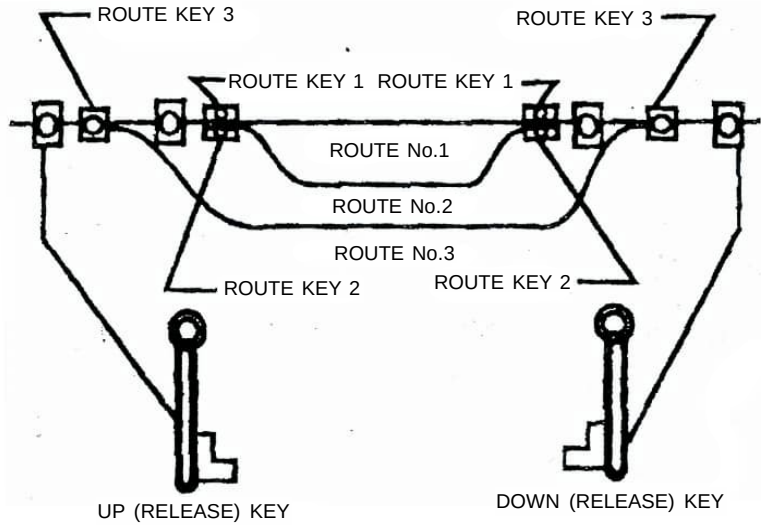
For the security of the Up and Down Release Keys when not in use, a key box is provided in which the Release Keys are interlocked with the Control Key of the dead- end and other sidings so that, before either Release Key can be removed from the key box, the siding Control Key must be secured in its key hole in the box and before the Siding Control Key can be removed both Release key must be secured in their respective key holes in the key box. When neither of the Release Keys nor the Siding Key is in use, the Siding Control Key must be removed from the key box and locked up in the glass fronted lock up key box, the key of which must be in personal possession of the Station Master on duty.

Before a key is removed from the box, the Station Master on duty must turn the indicator below the key to show the route which has to be set if the key is to be given out for points to be locked for the reception of a train, and to show "shunting", if the key is to be given out for yard shunting.

A key must not be removed from the box unless the indicator below is first turned as laid down above. After the indicator has been set, the key can be turned in its lock and withdrawn the turning of the key will back-lock its indicator.

The indicator in the key box serves as a visual reminder of the order given by the Station Master with the key.

The following diagram illustrates route locking.-



(m) Clamp.— Clamp is an appliance (made of iron) used to secure the switch rail hard against the stock rail in either normal position or reverse position as required.

(n) Sighting Point.- The plate where a Loco Pilot first sights a signal.-

(o) Sighting Distance.- The distance between the sighting point and the signal.

(p) Braking distance:— The distance required for a train to come to a stop when running at the maximum permissible

speed of the section. This distance varies as per the gradient, speed, break power and weight of the train.

(q) Points.- Movable tapered pieces of rail by which either of two routes may be set. Each piece is usually known as tongue or blade and the tongue has a toe (the thin end) which fits against the stock rail, the other end being known as heel.

(r) Coupled points.- When two or more points are worked by the same lever, they are called coupled points.

(s) Trap Points.- Points provided in a line to prevent unauthorised movements from that line to another line.

(t) Signal/Wire adjuster.- A device to enable the cabin staff to adjust the signal operating wires to compensate for changes in temperature.

(u) Treadle.- Treadle is a device by which the deflection of the rail due to the passage of an engine or vehicle or the impact of the wheels operates a contact to open or close an electric circuit.

(v) Cross Over.- A parmanent Way Connection between two lines.

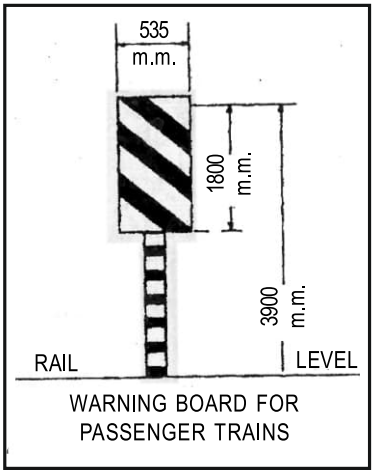
(w) Point indicators.- Point indicators show “White” on both sides towards the route when the line is set for the straight (i.e. the normal position) and “green” when the line is set for the take off. Refer GR 1.02(46).

(x) Trap indicators, Trap indicators show “red” on both sides towards the route when the switch is in open condition or the derail on the rail, and “green” when the switch is closed or the derail off the rail. Refer GR 1.02(46).

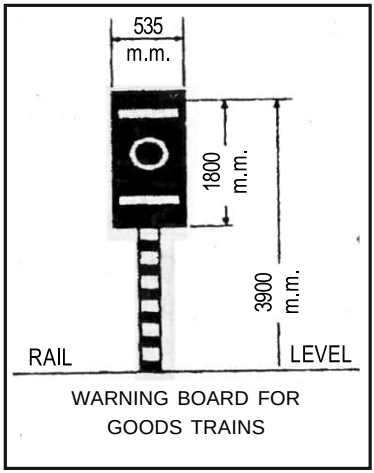
1.11 Warning Boards .-

(a) Warning Boards are provided with a view to warn the Loco Pilot of an approaching train that he is approaching the first stop signal of a station or an intermediate block stop signal or a gate stop signal, so as to enable him to bring his train under control and be prepared to stop at the signal, unless the ‘off’ aspect of the signal has been sighted by him authorising him to proceed past the signal.

(b) There are two types of warning Boards as follows:-



WARNING BOARD FOR PASSENGER TRAINS



WARNING BOARD FOR GOODS TRAINS

(c) Goods Warning Boards are provided at a distance of 1.4 KMs in rear of the first stop signal of a station or an intermediate block stop signal or a gate stop signal which is not prewarned by the provision of a Warner/Distant signal located at a distance of not less than 1.4 Kms, and these are applicable to all goods trains and also to all passenger carrying trains. The Loco Pilot will bring his train under control from the goods warning Board unless the 'off' aspect of the first stop signal or the clear aspect of the Distant signal has been sighted by him.

(d) Passenger warning Boards are provided at a distance of 1 KM in rear of the first stop signal of a station, intermediate block stop signal or a gate stop signal, which is not pre-warned by the provision of a Warner / Distant signal located at a distance not less than 1 KM from it. These are provided on the routes where the maximum permissible speed of Passenger carrying trains does not exceed 100 KMPH.

(e) The distance mentioned in paras (c) and (d) above should be suitably increased if the approach to a station is on a falling gradient.

(f) Where the sectional speed ranges from 50 to 72 KMPH on the board gauge, passenger warning boards should be

provided only at stations where the first Stop signal is not visible from an adequate distance i,e. 800 metres.

(g) Where, however, the sectional speed of a passenger carrying train is more than 100 KMPH, the goods warnings Board will be applicable to such trains. The Loco Pilot of such high speed train will bring the train under control from the goods warning boards unless the off aspect of the first stop signal or clear aspect of the distant signal has been sighted by him.

1.12 Custody of the Key of Cabin Basement Relay Rooms locks.-

At every station, the cabin basement/Relay room should be kept locked with two separate locks, the arrangement should be such that one key is kept with the on duty Station Master and the other key with the signal maintainer. Whenever required the Station Master shall hand over the key to the maintainer with proper acknowledgement in the basement/ relay room key register. The maintainer on receipt of the key from the Station Master may use the same and the key in his custody to open the basement/relay room by inserting the keys one after another separately into the earmarked locks.

After completion of the work, the Cabin basement/relay room is to be locked using both the keys separately and designated key should be handed over to the Station Master.

The details of transaction is to be properly recorded in the basement/relay room key register maintained at the Station and duly signed by the Station Master and Maintainer respectively.

1.13 Situation in which disconnection notice need not be issued provided suitable precautions are taken;

A. CLEANING AND/OR; LUBRICATING/ GRAPHITING WITHOUT AFFECTING ANY PHYSICAL / ELECTRICAL DISCONNECTION.

i) Lever frame basement.

ii) Relay room and battery room.

iii) Apparatus case / battery box / goomty.

iv) Lifting barrier mechanism including winch.

v) Lever lock and circuit controller without opening cover.

vi) Inspection and cleaning of inside equipment; by opening the covers at point machines, signal ; motors, reversers, apparatus cases and detectors.

vii) Point, facing point lock and lock bar.

viii) Cranks, compensators, pullies, wheels, roller stands, counterweights & levers.

ix) Power supply equipment.

x) Insulation joints.

xi) Lens / roundels of signal, point indicator, trap indicator & shunt permitting indicator provided covering lenses prevent phantom indication to Loco Pilot of an incoming train.

B. TESTING OF:

i) Track locking, approach locking, back locking, indication locking, route release.

ii) Checking various parameters of axle counter without disconnecting the equipment.

iii) Power supply equipment.

iv) Lever frame, SM's control frame, signal operation, point operation, level crossing, gate & slot circuits. :

v) Point by obstruction test for lock only.

vi) Checking and testing of track circuit parameters when the track is unoccupied.

vii) Focussing of colour light signal provided phantom indication to Loco Pilot of an incoming train is prevented by covering lenses.

C. ADJUSTMENT OF:

i) Wire transmission except double wire operated point transmission.

ii) Tightening of terminals using insulated tools without causing any shorts on adjacent terminals.

D. REPLACEMENT OF :

i) Electric signal lamp provided covering lenses prevent phantom indication to Loco Pilot of an incoming train.

ii) Bond Wire, one at a time.

iii) Plug in relay in case traffic condition permits.

iv) Indicator lamps.

v) Push button / switch / key of panel.

vi) Lock bar clips / bay stop, one at a time.

vii) G. D. tubes.

viii) Fuse, one at a time.

ix) Pulley, bottom roller / top roller in wire and rod transmission one at a time and split pins.

x) Batteries / cells without affecting disconnection of supply to main equipment.

1.14 New Technological developments

(A) AXLE COUNTER:

INTRODUCTION:

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

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

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

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

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

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

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

(B) COMPONENTS OF THE AXLE COUNTER SYSTEM:

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

In phase Reversal type Tracks devices, Trolley Suppression Track circuit is not required which makes the application of Axle Counters in Train Detection areas a simple one. Phase Reversal of 180° is used in these Devices to detect the presence of a wheel instead of the 'Dip' in the Signal in Analog type Devices. Use of High Frequency Signals in the range of 29 to 30 KHz. In Track Devices of Digital Axle Counters, as against 5 KHz. in case of Analog Axle Counters also reduces the effect of Noise interference. DACs, not having phase Reversal technology in Track Devices, however, can be in any case used for BPAC applications since we already have Home & Advance Starter Track circuits for use as Trolleys Suppression Track circuits.

1.15 BLOCK PROVING USING AXLE COUNTERS (BPAC):

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

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

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

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

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

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

(iv) The equipment is sensitive to mechanical vibrations.

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

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

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

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

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

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

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

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

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

(xiv) Majority of disturbances in Axle Counter functioning are caused by secondary sources such as Power Supply, Cable network and maintenance, rather than by equipment

failures or counting errors. Reliability levels of 1 mis-count per 5.5 millions Trains have already been achieved in the equipment.

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

1.16 SOLID STATE INTERLOCKING:

(A) INTRODUCTION:

With the development of Fault Tolerant and Fail Safe Techniques, Electronics and particularly Microprocessors have found acceptance in the area of Railway Signalling World over. Railways in advanced countries in Europe, North America and Australia have gone in for large-scale introduction of Microprocessors based Solid State Interlocking (SSI) Systems. SSI Systems occupy considerably less space, consume less power, are reliable, easy to install and maintain. Availability of these Systems gets enhanced due to inbuilt Redundancy, Self-Diagnostic Features, high Mean Time between Failure (MTBF) and low Mean Time to Repair (MTTR). Also, initial commissioning and changes due to Yard remodelling can be carried out in a very short time, requiring skeleton manpower for traffic management during the Blocks. Alternations in these Systems are managed through Software programming.

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

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

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

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

(5) Points first to be operated individually.

(B) ADVANTAGES OF SSI OVER PANEL INTERLOCKING:

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

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

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

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

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

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

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

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

(C) TYPICAL HARDWARE USED IN SSI:

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

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

t System should meet Functional requirements and have future expandability.

t System should meet the requirements of environmental conditions, Electromagnetic interference etc.

t System should be User Friendly and Economical.

t System Architecture should be such as to give very high overall availability, while ensuring high degree of safety.

t System Validation should meet safety integrity level-4 (SIL-4). The internationally accepted value of Probability of Wrong Side Failure (PWSF) for critical systems with lives on stake is 10-9 per hour, which has been furtherenhanced to 10-10.

(D) SOFTWARE USED IN SSI SYSTEM:

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

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

(ii) **Application Software:** This Software is as per the site requirements of the station. This software is specific to each station and depends on the table of control of the yard.

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

1.17 DATALOGGER:

(i) INTRODUCTION :

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

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

direction till the packet reaches front end processor at the Central Monitoring Station.

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

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

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

(ii) OBJECTIVES OF DATALOGGERS:

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

b) To detect SPAD cases.

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

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

(iii) BENEFITS OF A DATA LOGGING SYSTEM:

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

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

1.18 TRAIN PROTECTION AND WARNING SYSTEM (TPWS):

(A) INTRODUCTION:

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

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

(B) TYPES OF AWS SYSTEMS:

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

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

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

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

(C)TRAIN PROTECTION AND WARNING SYSTEMS (TPWS) :

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

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

Track circuits, Route, level Crossing between the interlocking and the Balise. Based on the details received in the Movement Authority, On-board computer supervises the Train.

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

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

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

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

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

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

(a) Fast call set up time,

(b) Location dependent and functional addressing,

(c) Voice broadcast calls and group calls, and

(d) Priority calls. GSM-R Technology can provide for seamless communication with 95% to 99% coverage, at Train running speeds up to 500 kmph.

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

(a) SOS Emergency call: <= 1 second.

(b) Mobile to Mobile urgent call: < 2 seconds.

(c) All operational calls: < 5 seconds.

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

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

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

Voice Group Call: Voice Group call allows a Group of Subscribers to hold a speech conversation. Voice Group call

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

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

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

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

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

(a) Fast call set up.

(b) Area definition.

(c) Single Emergency Key/Button operation.

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

1.20 Train Collision Avoidance System (TCAS):

TCAS is an Automatic Train Protection (ATP) System with the capability to prevent train accidents that are caused due to Signal Passed at Danger (SPAD) by a train, non-adherence to train speed restrictions etc. by automatic application of brakes if the Loco Pilot fails to do so. It would, in addition, also avoid certain other collision-like scenarios even in case of non-interlocked or non-signalled territory. It also provides

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

Main components of TCAS:

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

Stationary TCAS Unit:

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

RFID tags on Track Sleepers or Rail-Road Ties:

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

Loco TCAS Unit:

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

Assessment of Braking Characteristics:

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

Determination of Train Length:

Station Interlocking and Locomotive units together determine train length. The determination is crude but within tolerances to determine substantial change in configuration. The loco unit memorizes its position along the track in FIFO(First in first out) manner. The train detection mechanism of interlocking detects time stamps of 'Start' & 'End' events, and the Station TCAS unit passes on the information to the Loco Unit. The Loco unit registers locations pertaining to 'Start' and 'End' events. The difference between two locations is Train Length.

Radio Communication for TCAS:

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

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

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

Summarizing salient features of TCAS:

t TCAS is based on continuous real-time update of signal aspect or 'Movement Authority (MA)' which is quite suitable to requirements of operations in countries like India.

t Due to this continuous MA update feature, it is able to restrict the train before the signal at Red itself.

t Operational Convenience to Loco Pilots - no need to feed train configurations such as braking characteristics, train length etc.

t Retaining specific needs of Indian Railways which are fulfilled by other indigenous ACD systems -

provides protection in case a train derails and infringes adjacent tracks

t Quite Cost-effective - doesn't need Mobile Radio, Active track balise.

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CHAPTER - II

OPERATING CONTROL

2.01. Definition.-

Operating control means control over the movement of trains and traffic in a given area of a Railway from a Centralised Control Office.

2.02. System of Tele-communication.-

(a) The Control office is provided with suitable tele-communication system connected with all stations, yards, Loco sheds, traction sheds, Goods sheds, Crew booking points and officials of various departments. Deputy Control circuit is provided in each control office with telephone communication connected to important stations, yards and Loco sheds for collecting important particulars such as Yard reports, mid-night figures and train ordering etc.

(b) Non-electrified sections.- The tele- communication circuits are connected by overhead wires or cables and the Section Controller is provided with a selector board with keys for calling up wayside stations and other points(as mentioned in sub-rule (a) above) connected to his board. The Controller can contact a Station by turning the selector board key of that station / point.

(c) Electrified sections.- All tele-communication circuit in the electrified section have been installed with under-ground cables to avoid inductive interference.

(d) Emergency control circuit.- This enables the Section Controller being contacted from emergency socket on the sections by means of a portable telephone.

(e) There are two kinds of portable telephones, one for the non-electriefied sections and the other for electrified sections.

(i) On non-electrified sections, the portable telephone is connected to the overhead control circuit wires by means of two hooks provided on a pole with telephone wires running to the portable set. When the proper connection is made, contact with the Section Controller can immediately be established.

(ii) On electrified sections, the Controller can be contacted by inserting the plug of the portable telephone into a socket provided on short upright posts alongside the railway track at an interval of approximately 1 KM.

These posts are painted with alternative white and black horizontal stripes. The pressing of the key in the portable equipment lights on lamp and sounds a buzzer at the control point with indication on the electric mast direction-wise to the nearest circuit.

2.03. The Control Board.-

The Section Controller of each section is provided with control Board with tele-communication facilities for contacting stations, certain important cabins, Loco sheds, etc. over a given length. For the guidance of the Section Controller, a diagram showing the layout of stations and yards, loop capacities, the gradients; and the layout of sidings is exhibited in front of him. In electrified areas, the diagram showing the various sections, sub-sections and elementary sections is also exhibited.

2.04 Control Offices. -

(a) Divisional Control Ofices. - These may be described as the nerve centres of the Divisional Operating Organisation. On this Railway, a Control Office exists at each of the Divisional Headquaters stations viz. Bilaspur, Raipur and Nagpur.

(b) Area Control. - Area of exceptionally industrial or commercial importance is provided with subsidiary Control offices called area Controls.

(c) Central Control office. -

(i) This is situated in the Headqueartered office at GM complex. It is connected with Divisional headquarters and with important stations / yards with a view to regulating traffic over entire system and co-ordinating with adjoining railways.

(ii) It functions under the overall charge of a Chief Controller who is assisted by Deputy Chief

Controller and a few section Controllers in each of the 3 shifts and maintains detailed operating position and oversees the daily performance.

(iii) It maintains various operating records for reference and keeps the Head Quarters officers informed of the latest position.

(iv) The stock section of the central control collects various information and prepares detailed position of day to day operating performance; and

(v) Its Mechanical and Electrical wings assist in assessing the performance of their respective departments in every day's operation and in calculation of kilometerage and punctuality.

2.05. Control Office Organisation.-

(a) The Overall charge of a Control office is under the Chief Controller who is a senior operating supervisor. He is responsible to the Sr. Divisional/ Divisional Operations manager for the efficient working of the Control office under his charge, as well as for traffic operating under his jurisdiction.

(b) Each Divisional Control office is divided into one or more sections and each section is provided with a separate self- contained control circuit with a separate control Board. Each section or 'Board' as it is commonly called is manned round the clock by the Section Controllers on shift duty. The work of Section Controllers is supervised by Deputy Chief Controllers also rostered on shift duty.

(c) A power Controller is provided in each shift to keep a watch on the position, of engine and crew and also try to solve any problem raised by the staff concerning mechanical deptt. On a division having electric traction, a Traction Loco Controller is also provided in each shift.

(d) In all Divisional Control offices, a Deputy Chief Controller (stock) on general shift is provided for efficient control and distribution of stock.

(e) In addition to the above, a separate controller is posted in each shift for distribution and control of Traction Power in those Divisions where the sections are electrified.

2.06. Functions of Control -

(a) Train Control.-

(i) Ensuring the punctual running of Mail, Express & Passengers trains.

(ii) Running Goods trains to best possible paths and with the least possible detention enroute.

(iii) Arranging the running of engineering material trains to the best possible advantage of Engineering department.

(iv) Arranging Engineering and/or Power blocks in such a way as to involve the minimum disturbances to train running and best advantage of the Engg. Department.

(v) Arranging relief for engine crews and Guards in good time.

(vi) Arranging relief and regulating trains in the event of accident.

(b) Traffic Control:-

(i) Allotment and distribution of coaching and Goods stock in stations.

(ii) Securing maximum utilisation of stock.

(iii) Maintaining fludity of Marshalling yards.

(iv) Regulating traffic for fulfilling interchange commitments.

(v) Securing maximum workable load for each train compatible with the type of engine utilised and the special characteristics of the section over which the train is to be worked.

(c) Power Control:-

(i) Requisitioning locomotive power i.e. engines, direct from locomotive Running Sheds for all operating requirements, viz. train working, shunting and banking.

(ii) To ensure the most economical use of engine power available.

(iii) To ensure the return of engine to Home Running sheds at regular intervals for schedule attention and other maintenance requirements.

(d) Commercial Control: (assists the Traffic and Train Control)

(i) To expeditiously dispose off unclaimed and unconnected wagons, parcel consignments.

(ii) To keep a watch on detention to trains on Commercial account likeAlarm Chain Pulling. Carriage watering, Parcel working etc., and take remedial measures.

(iii) To ensure quick transshipment of sick wagons by arranging matching stock and labour.

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

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

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

(vii) Any otherjob entrusted by Sr. DCM/DCM.

(e) Engineering Control monitors imposition & cancellation of Engineering Restrictions, Working of track machines & monitoring integrated maintainable blocks. To co-ordinate works during maintenance blocks Running of Material trains.

(f) Signal Control assists Traffic and Train Control and is responsible

(i) To keep a watch over the S& T failures and take remedial action.

(ii) To ensure efficient working of communication channels

(g) Security Control is responsible for prevention of theft of property and assists passengers in trains/ stations.

(h) Carriage and Wagon Control is responsible to assist the train and traffic control and to-

(i) Ensure timely examination and fitness of all trains

(ii) To keep a watch over the detachment of sick wagons/ coaches and to arrange for their early repair and fitness.

(iii) Keeping a watch over availability of vital C&W components, like Air Hoses, Washers, Clamps etc. and efficient working of equipments & machines in C&W depotto avoid detention to trains.

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

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

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

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

(viii) Monitor the movement of POH due stock to workshops

2.07. Train Control Charts.-

(a) Each Section Controller shall record on computerized control chart the movement of all trains over his section on receipt of information from each station during his hour of duty. Each computerized control chart is printed for an eight-hour working shift with horizontal and vertical lines representing distance and time respectively. Alongside the vertical lines the Station names of the section are printed. Generally each hour is divided into 6 equal parts representing units of 10 minutes each and each such unit is further sub-divided into 5 smaller units of 2 minutes each.

(b) Each train computerized control chart usually has the following items printed on it:-

(i) Date,

(ii) Distance between consecutive stations in kilometres,

iii) Code initial of each station on the section on the right hand side.

(iv) Space for engineering restrictions on the section.

(v) General remarks.

(vi) Space for signatures of the section Controller and Deputy Chief Controller or Chief Controller.

(c) In plotting the paths of various classes of trains, the following colours shall be used:-

(i) Red - for Mails, Expresses and other trains requiring top priority.

(ii) Blue - forother trains carrying passengers.

(iii) Green - for Military special and Crack-Specials, Fast Goods, S.Q.T. and working trains and other important goods trains.

(iv) Black - for other Goods trains.

(d) All Up trains are plotted from the bottom of the chart upwards and from the left diagonally, towards the right; likewise all Down trains are plotted from the top of the chart downwards and also diagonally from the left towards the right.

(e) Section Controllers shall plan crossings and precedence in advance on the basis of the anticipated paths of the various trains on the section.

(f) Engineering Restrictions- All informations in respect of restrictions imposed on the section by the Engineering and / orthe Signal & Telecommunication or Electrical department affecting the movement of trains shall be recorded in this chart with full particulars of imposition and cancellation.

2.08. Master Charts.-

24 hours charts basically similar to Train Control charts for every section are prepared which show the running of each Mail, Express and passenger trains over the section according to its scheduled running prescribed in the working Time Table in force. In between the running of trains carrying passengers, paths for goods trains are worked out and plotted. Such charts are called Master charts. They are helpful in revision of time tables and planning the running of any extra trains, arranging engineering blocks etc. Forthe guidance of section Controllers these charts are displayed on the boards, to which they refer.

2.09. Forecast.-

It is an information conveyed in advance by adjoining control offices, adjoining railways and MIL rail about the availability of stock indicating train, direction, commodity, type of stock (if there is need for stock of some particular description), and break of gauge transshipment.

2.10. Declaration.-

(a) Before staff are allowed to work independently as Controllers, they shall be required to pick up duties on the

boards they would be required to work. This learning must be under the guidance of the section controller on duty. The period of learning would depend on the aptitude for control work which the staff possesses but in any case, it must not exceed 5 days in each shift for each board.

(b) In case the Chief Controller observes that an employee would require more than 5 days for each shift on the board, he must bring the fact to the notice of the Assistant/ Divisional Operations Manager and take his special sanction forextension of the learning period.

(c) After the employee has taken learning, he shall write and sign the following declaration in a register specially maintained for the purposes;

"I hereby declare that I have taken learning on Board/ boards to my entire satisfaction and can, now work independently as a Section Controller on this/ these board/ boards",

The Chief Controller shall write the following remarks below the above declaration and sign it:

"Shri .....was given learning on .....board/boards from..... to..... I have watched progress and consider him fit to work dependently on the board(s)".

The Chief Controller may also test the employees before allowing them to work independently.

(d) Deputy Chief Controllers shall also be required to give similar declarations, but in their case the period of learning in each shift should not exceed 3 days. If this period is likely to exceed, the Chief Controller shall take action as mentioned in sub- para (b) above.

(e) The Chief Controller shall also append a certificate similar to the one mentioned in sub-para(c), below the Deputy Chief Controller's declaration.

(f) In case of sub-control offices where the Chief Controller is not posted, the duties herein assigned to the Chief Controller shall devolve on the seniormost Deputy Chief Controller.

2.11. Duties and responsibilities of Controllers.-

The main duties of control staff are outlines I. below. These are only guides to their day to day working and are not exhaustive.

(a) Chief Controller:

The Chief Controller shall be responsible for-

(i) Checking the control charts and the performance of all coaching trains over the division and bring it to the notice of Divisional Operations manager for taking up all cases of bad performance;

(ii) Checking the previous day's performance and analysing the causes of any shortfall or set back in the planned programme for the, supply of empties to the loading points and clearance of loaded stock;

(iii) Checking control charts and taking up promptly cases of faulty controlling and performance due to failure of signals, track, locos and other equipments;

(iv) Planning out the day's programme of movements including the forecast of traffic;

(v) Watching detention to stock at stations, goods yards and transhipment points

(vi) Watching the performance of marshalling yards;

(vii) Watching the turn-round of engines and wagons;

(viii) Keeping a watch on damaged wagons detached and way-side stations in order to ensure promt repair and clearance;

(ix) Paying personal attention to Divisional and Inter-Railway interchange obligations;

(x) Ensuring that the adjacent Divisions and/or Railway get the required locomotives and train staff in time;

(xi) Checking out-station rest of running staff;

(xii) Arranging engineering and / or power blocks when required and regulating trains and traffic to suit

the blocks; for the best possible advantage of engineering department.

(xiii) Maintaining proper disciplin and a high standard of efficiency in the control office;

(xiv) Checking of Guard's roster and taking up cases of irregular booking; and

(xv) Deal the accident cases in terms of instructions contained in the Accident Manual.

(xvi) Carrying out any other duties that may be alloted to him.

(b) Deputy Chief Controller:

The Deputy Chief Controller shall be responsible for-

(i) General supervision of the Control office during the absence of the Chief Controller and supervision of the work of Section Controllers and' the Power Controller;

(ii) Ordering of trains;

(iii) Ensuring availability of powers, Crews and Guards for all trains'

(iv) Maintaining co-ordination with adjacent Divisions and Railway by keeping in constant touch with the Deputy Chief Controllers of the Divisional Control Offices concerned;

(v) Attending immediately to any incident that causes or any causes detention to trains;

(vi) Keeping in constant touch with marshalling yards, stations serving colliery sidings, mineral sidings, and other industrial concerns to ensure that such yards/ stations are always kept clear to deal with the incoming and outgoing traffic and taking timely arid effective measures to deal with any signs of congestion;

(vii) Keeping a special watch on the running of Mail. Express and Passenger trains, crack specials, Military specials, trains carrying guaranteed traffic, coaching specials;

(viii) Ensuring availability of empties in time at collieries and other important loading points;

(ix) Watching the fulfilment of interchange committments;

(x) Supervising the runing of over size consignments;

(xi) Giving advice of accidents to all concerned and taking charge of the affected section;

(xii) Deal the accident cases in terms of Accident Manual.

(xiii) Carrying out any other duties assigned to him.

(c) Deputy Chief Controller (wagon check):

The Deputy Chief Controller (wagon check) shall be responsible for-

(i) Scrutinising the pervious day's stock report received at 12 hours, 18 hours and 0.0 hrs from yards and road-side stations and regulating supply of empties according to daily allotment keeping in view the oldest date of Registration, nature of goods and the type of stock required for lifting goods as per oldest date of registeration;

(ii) Watching the placements and releases of wagons in Goods sheds, Transhipment sheds, Loco sheds, Engineering sidings and other industrial and colliary sidings etc. and taking up any shortfalls or detention;

(iii) Keeping a watch on the performance of work trains and seeing that sectional loads and packages are regularly cleared from road- side stations and sidings;

(iv) Maintaining damaged wagons or hot-axle register (as it is commonly called) and unconnected wagons register and taking action for prompt repairing, clearing of damaged vehicles, connecting of the unconnected wagons;

(v) Controlling the traffic hand and steam cranes and arranging the loading and unloading of crane consignments expeditiously;

(vi) Keeping a special watch on the movement of special type wagons such as BFRs, BFUs, End-falling trucks, oil tanks, Petrol tanks, Cattle trucks, Timber trucks etc. so that they are not detained at any points;

(vii) Keeping a special watch on out of gauge loads and GTS loads to ensure that these are moved according to the instructions issued;

(viii) Keeping a watch on the daily performance of Divisional Material trains and arranging engineering blocks for the best advantages of engineering department and with least possible detention to train service;

(ix) Keeping a close watch over movement of seasonal perishable traffic and supplying suitable stock for their quick clearance;

(x) Cross checking daily restriction bulletins with restriction messages received from Headquarters office and issuing such restriction bulletins;

(xi) Ensuring that correct and accurate account of wagons on the Division is maintained; and

(xii) Carrying out any other duties assigned to him.

(d) Section Controller.-

The Section Controller shall be responsible for.-

(i) Reporting for duty 30 minutes before start of his duty studying the control chart and related documents carefully so that he is thoroughly conversant with the trains already moving and expected to run over the section under his control as also with instructions to be observed and other special instructions to be followed;

(ii) ensuring efficient running oftrains over the section he controls by arranging judicious crossing and precedence and giving clear and concise orders to stations well in advance;

(iii) Plotting neatly and clearly the movement of all trains on the control chart promptly as the trains

move and recording in the remarks column all special events affecting the running of each train;

(iv) Informing terminal stations,' Loco sheds of late running of trains to avoid the calling of Crews and Guards earlier than necessary or to put back trains where adviseable;

(v) complying with stock orders;

(vi) watching the working of Marshalling yards;

(vii) informing big stations, yards, and concerned section controllers of the trains on the section and their anticipated arrivals in orders to give them time for arranging reception lines and connecting trains onwards and also for making announcements for the information of the public in case of late running of Mail, Express and Passenger trains;

(viii) intimating to stations in advance the work to be done by shunting trains and van goods.

(ix) taking unloading particulars by passenger trains and leave room messages from stations and informing Guards enroute to avoid detention to coaching trains;

(x) keeping in close touch with engineering Power Block and working of material train in such a way as to involve the minimum disturbance to train running and to the best advantage of the engineering department.

(xi) keeping a watch over damaged wagons / vehicles detached at road-side stations and for arranging clearance for their expe-ditious repairs and clearance;

(xii) in case of accidents appreciating and regulating the situation promptly and adjust the movement of traffic in view of the circumstances prevailing under the guidance of Deputy and Chief Controllers;

(xiii) making timely arrangements for the relief of Guards and Brakeman whose duty hours are likely to be completed on road;

(xiv) passing on the messages regarding, reservation, meals etc. given by guards to the concerned stations;

(xv) maintaining the various registers and books as prescribed from time to time.

(xvi) relay information regarding accidents to Deputy Chief Controller and act according to his instruction for removing obstruction and other relief measures.

(xvii) relay information to all concerned officials promptly in case of any unusual occurrence such as stalling, rail fracture, wheel slipping and OHE break down etc.

(xviii) carrying out any other duties allotted to him by Deputy Chief, Controller and Chief Controller.

(e) Power Controller.-

Power Controllers are divided in two categories viz. Power Controller for Diesel engines & DEMU and Power Controller for Electric engines and EMU stock.

(i) The Power Controller for Diesel Engines & DEMU shall be responsible for-

(a) reporting for duty 30 minutes before his duty to commence and studying the disposition of engines and crews over the various sections of the Divisions and in the case of Diesel engine, the availability of such engines in the home and out-station sheds.

(b) obtaining timely assistance for shed running short of engines or crews;

(c) maintaining a record of engine movements and engine kilometreage for ensuring that engines are not detained and the turn round, is satisfactory.

(d) planning and directing engine movements in co-ordination with the section controllers so as to ensure efficient engine utilisation;

(e) marking timely arrangements for the relief of crews whose duty hours are likely to be exceeded on the road;

(f) giving advice on technical matters to Loco Pilots when their engines develop defects and keeping action to prevent engine failures.

(g) arranging relief to crew in case of an accident;

(h) keeping a record of engine failures, loss of time on road on Loco account and other unsatisfactory features with reasons;

(i) arranging loco or diesel cranes when required;

(j) watching movement and diversion of Diesel fuel tank wagons and maintaining day to day stock position of Diesel fuel:

(k) maintaining record of maintenance schedules and wash out of locomotives and seeing that engines become available in the Home shed for due wash out and prescribed schedules;

(l) keeping close touch for fueling of locomotives as and when necessary;

(m) carrying out any other duties assigned to him.

(ii) Power controller (TLC) for Electric engine shall be responsible for-

(a) planning and directing Loco movements so as to ensure efficient Loco utilisation;

(b) maintaining continuous watch over the movement of all electric locos and electric loco crews on the Division and arrange timely relief for crew in order to avoid excessive duty hours;

(c) maintaining in Loco link charts in the prescribed form indicating at a glance the movement of electric locos and exact position of each loco.

(d) keeping a close watch on the movement of link locos and ensure that the link working is adhered to the maximum extent possible, and high loco utilisation is achieved;

(e) regulating despatch of locos and running staff in the event of dislocation of scheduled working;

(f) co-ordinating with Traffic Department and the loco sheds to ensure that locos of the correct type are used on passenger and goods services;

(g) conveying timely advice to sheds regarding alterations in scheduled working, if any, so as to avoid idling of running staff;

(h) keeping a watch on detention to locos in yards and in co-ordination with the Dy. Chief Controller ensuring that such detention are reduced to the minimum;

(i) keeping a log of late starts and detention attributed to electric locos and electrical running staff and reporting to TFR for investigation;

(j) guiding running staff in regard to trouble shooting as required in the event of any unusual occurrence on line;

(k) arranging relief locosand running staff in the event of breakdown; also conveying informations in regard to accidents promptly to officers and Senior Supervisors of Rolling stock section;

(l) maintaining record of work done on locos by outstation sheds.

(m) carrying out other instructions given by officers.

Note:- Fordetailed instructions refer to Manual ACTM para 1204.

(iii) Traction Power Controller-

Traction Power Controller shall be responsible for.-

(a) while taking over shift duty, acquainting himself with the prevailing position of the entire section including the working of the Remote Control equipment, position of all transformers, circuit breakers, interrupters and isolators, sections under power block, any special instructions to be carried out, movement of important officials

connected with the distribution system, position of the tower wagons and breakdown vehicles etc.

(b) maintaining continuous contact with the Traffic section Controllers in regard to power supply affecting train movements, imposing power blocks etc.

(c) taking prompt action in accordance with prescribed rules and local instructions for restoration of supply in the event of power supply interruptions or other failures;

(d) imposing of and removing power blocks as required strictly following the procedure and safety rules in. all details with co-operation of Traffic Sectional Controllers;

(e) advising promptly the concerned officials in the event of failure of power supply, OHE breakdowns, accidents and keeping them posted with all important developments.

Note:- Fordetailed instructions refer to para 0716 of manual of ACTM.

2.12. Records and Registers.-

In addition to the records and registers which a control office may maintain suiting local conditions and in accordance with local orders, the following shall also be maintained in each Control office:-

(a) By a Section Controller:-

(i) Section Controller's Diary-

A record shall be kept by the Section Controller of all important items affecting the running of trains and the movement of traffic, which be requires to bring to the notice of his reliever for guidance. He shall also note down the action he has taken in regard to these items and indicate items left unattended. In this register the section Controller shall enter the orders he issues to the Station Masters. The orders shall be numbered consecutively and shall commence with No.1 after midnight each day;

(ii) Inward Message Book:- All important communications from Station Masters and messages given by Guards or loco Pilots on the section shall be recorded in this book and necessary action taken;

(iii) Damage Wagon Register:- In this register, necessary particulars of damaged wagons detached from trains at road-side stations shall be recorded; the action taken to have them repaired, the time repairs are completed and the time the wagons are cleared shall also be noted;

(iv) Work Order Book:- This books which is also called the 'Supply and Clearance Register' is maintained to evaluate the performance of Sectional Work Trains'. It shall show the empty wagons to be supplied to road-side stations against indents/ allotments, loaded and empty wagonsand packages to be cleared, wagons on trains to be detached on section and packages to be unloaded and the actual supply and clearance effected by these trains;

(v) Incoming and Outgoing T.N. Register:- These registers are maintained separately for incoming and outgoing Coaching and Goods trains. They shall show the detailed composition of each train together with load, engine number, Loco Pilot's name and Guard's name;

(vi) Out-station Train Ordering (T.O.) Book:-This shall show what trains are ordered by the contigeuous Divisional Control office to run over the section and' with what power and staff;

(vii) Yard State Register:- In this register, the state of important station yards on the Section shall be recorded at the appointed time; -

(viii) Caution Order Register:- The Section Controller shall take the messages from the stations about imposition and cancellation of Engineering Restrictions on his section and record them in the Caution Order Register;

(ix) Private Number Book:- This book contains printed numbers of two digits in a series, whenever any Private Number is issued, the Section Controller shall record the reasons and the station / shed etc. to which issued.

(b) By the Deputy Chief Controller:-

The deputy Chief Controller shall maintain the following records either personally or with assistance of a Control Clerk:-

(i) Yard Running Balance Register:- All the important yards shall repeat to the Control every four hours i.e. at 00 hrs, 4 hours, 8 hours, 12 hours, 16 hours and 20 hours daily, the stock position of the yard indicating also the stock arriving by incoming trains and dispatched by outgoing trains;

(ii) Deputy Chief Controller's Diary:- The Deputy Chief Controller shall maintain a running diary of all events affecting the working of trains and traffic.

(iii) Order Number Book:- The book shall be used for orders emanating from the Chief Controller and shall be maintained in the same manner as described in para 2.12(a)(i).

(iv) Forecast and Acceptance Book:- Once every eight hours or as frequently as necessary, the Deputy Chief Controller shall give under a serial number, a forecast of Goods trains he proposes to run contiguous divisions. The forecast messages and the acceptance to the messages received in reply shall be recorded in this book.

(v) Train Ordering Book:- The Deputy Chief Controller shall enter in this book, train ordering messages for all outgoing trains or light engines he prepares to order from his Division. These messages shall be serially numbered and shall be repeated to the originating Loco Sheds, marshalling yards and stations well in advance so that the necessary power and crew can be arranged by Loco Sheds and the trains can be formed in time with nominated load. Private Numbers shall be exchanged for each massage;

(vi) Goods trains Performance Register:- This register will show the actual departure of trains from the originating stations and the actual arrival at the destinations, with late starts, if any, and detention en-route;

(vii) Passenger Trains Performance Register: - A daily record will be maintained of all coaching trains i.e. Mail,

Express, Passenger and Mixed train with full particulars of detentions, if any, in the Division.

(viii) Unsatisfactory Features Register:- A running record of all unsatisfactory features will be recorded in this register for transmission to the Central Control office every morning. The report of unsatisfactory feature should be impartial & fair and without any touch of "Departmental" bias;

(ix) Night Order Book:- In this book, the Chief Controller will enter the instructions that the Deputy Chief Controller and the Control staff are to carry out during his absence;

(x) Accident Register:- As soon as an accident message is received the Dy. Chief Controller shall make an entry in this register and shall start a chronological log, as per instructions laid down in the Accident Manual;

(xi) State of Marshalling yards:- A record of the state of marshalling yards will be maintained at intervals of every four hours, showing the nature of occupation or otherwise of each line in the reception, sorting and despatch yards;

(xii) O.D. Register:- When there is any Over Dimensional Consignment or out-of-gauge load over the Division, the load with full Particulars will be entered in the register giving the particulars of the sanction granted for its movement by the Divisional Railway Manager or PCOM, as the case may be, and the precautions or restrictions to be observed on its run en-route.

(c) By the Power Controller.-

(i) Power Position Book - This books shall be maintained by the power Controller every 8 hours showing the disposition of every locomotive in the Division;

(ii) Out-station Loco Pilot's Roster- A roster of all the Home shed Loco Pilots who are at out-stations shall be maintained separately for each out-station shed;

(iii) Power Controller's Diary- The Power Controller shall maintain a running diary of all important events in regard to his sphere of duties. In this diary he shall also make a note of matters requiring his reliever's attention;

(iv) Engine Link Cards -A link card will be maintained for each engine separately so as to show the day-to day position and the turn-round time of every engine;

(v) Engine Failure Register- This register will be maintained to show all the unsatisfactory features in train operation due to engine failures or failures of rolling stock equipment

(vi) Washout and Schedule Register- This register will indicate the engines undergoing washout or schedule examination and the engines due or becoming due washout and schedule examination. The disposition of the engine will also be indicated;

Note:- Similar register will also be maintained by the Traction Power Controller showing the engines due for undergoing repair in the shed and their disposition.

(vii) Q. T. Register- This will indicate particulars of movement of wheels and other materials from workshop to Shed or Shed to shed.

(viii) Crew Position Register;

(ix) Register of movement and diversion of Diesel fuel tankwagons; and

(x) Register showing undue and abnormal detention for engine changing at engine changing stations and for carriage and wagon examination at examination stations:

2.13. Books and Documents to be kept in Control office.-

A copy of each of the following books of reference, corrected up to date, must always be available in the Operating room and the Control staff must be fully conversant with the rules and orders contained therein, so far as they concern the area they control :-

(i) General & Subsidiary Rules book,

(ii) Block Working Manual,

(iii) Accident Manual,

(iv) Operating Manual

(v) Manual of A.C. Traction Operation and Maintenance (for electrified section)

(vi) Station Working Rules for all stations on the Division,

(vii) Master chart for each section,

(viii) Charts showing jurisdiction of various officials.-

(a) of the different departments of the Railway on the Division,

(b) Civil, Police and judicial authorities exercising jurisdiction over the area.

(c) of the maintenance branch of the post & Telegraph Department responsible for maintaining control circuit connections in good order,

(ix) A list of stations where hospitals are situated which can be used in case of accident or emergency;

(x) Current Working Time Table of the Division and Appendix to the Working Time Table.

(xi) Current Gazette file,

(xii) Aroad map of all jeepable roads in the Division,

(xiii) Any other documents that may be ordered to be kept from time to time.

2.14. Staff to obey orders of Control.-

Station/Yard staff, shed staff, Guards and Loco Piolts shall obey orders issued by the Control so long as these orders are in conformity with the General and subsidiary Rules, Block Working Manual, Operating Manager and Accident Manual and other standing orders and instructions etc.

A section Controller has no authority to deviate from any Rules, Standing Orders and instructions.

If any orders are issued which contravence or appear to conflict with extant rules, standing orders, instructions etc. Such orders shall not be carried out by staff or running staff who shall promptly report the matter to the Deputy Chief Controller, Chief Controller and Divisional Operations Manager.

2.15. Control Order Register.-

(a) All orders given to the Station Master or Crew Controller by Controller shall be entered in the prescribed control order register maintained at all stations, yards, Loco Sheds and crew booking points. Each entry shall be initialled and the time at which it is taken down recorded. At the end of each shift the relieved as well as the relieving Station Master or Crew Controller shall sign their names below the last entry in the Register.

(b) When a Station Master or Crew Controller has received an order from the control and recorded it in the register, he shall repeat it to the control in order to satisfy both himself and the control that he understands it.

2.16. Originating stations /Yards to report particulars of outgoing trains -

As soon as a train leaves its originating station, the Station Master/Yard Master shall furnish the following particulars to the Control Office:-

(a) Number and description of the train;

(b) Engine Number & Class;

(c) Loco Pilot's name;

(d) Guard's name;

(e) Load of the train (in tonnes & vehicles);

(f) Particulars of shunting to be done on the journey of the train; and

(g) Time of departure.

2.17. Road-side stations to report arrival and departure time of trains.-

Station Masters of road-side stations shall communicate to Control, promptly the following information in regard to every train dealt with;

(a) In case the train has run through, the time it passed the stations,

(b) If it is a stopping train, the time of arrival and departure alongwith the explanation for any detention beyond the scheduled stoppage;

(c) If any shunting has been performed, the number of vehicles attached and detached; and

(d) Whether any extra time has been taken in loading or unloading of packages and if so, the number of such packages.

2.18. Terminal stations to report particulars of incoming trains.-

Station Masters of terminal and engine changing stations shall, as soon as possible after the arrival of a train communicate to control the time of arrival and load of the train.

2.19. Out of course stoppages.-

The Station Master shall obtain Section Controller's permission before stopping a train that normally run through.

2.20. Crossing and Precedence.-

The Section Controller shall give definite and timely instructions for crossing or precedence of trains and shall not alter them except in an emergency as " change of orders is likely to cause confusion and may even result in an accident. The Station Master " is entirely responsible for ensuring that reception, dispatch, crossing or precedence of a train is effected safely and strictly in accordance with the rules.

2.21. Use of Control Telephone. :-

(a) Station Masters and others shall not ordinarily attempt to speak to control unless they have ascertained, by lifting the receiver and listening in, that the line is free. They shall then announce the name of the Station or Loco Shed, etc. from which they are speaking and wait for its being repeated by the Controller before beginning the conversation. All conversations with Control must be to the point and brief. Conversation on private matters is forbidden. Only authorized Railway staff shall use the control phone and no member of the public should be permitted to use the control phone.

(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 line to be cleared. The Controller will thereupon discontinue the

conversation in which he has engaged and attend to the station making the interruption. Such a 'Clear the line' call must be made only when there is genuine reason to do so.

(c) Guards and Loco Pilots on duty can, with the permission of the Station Master, use the Section Control telephone when they have any report to make to the Section Controller.

d) When the Section Controller wishes to speak to a station, he shall give a ring to that station, whereupon the Station Master on duty must attend the phone promptly and callout the name of his station.

2.22 Accident or Abnormal Occurrence to be reported.-

In the event of accidents or any untoward incidents involving obstruction of running line or lines, or in any way affecting the safety of train working, full details shall be furnished by the Station Masterto Control indicating the nature of assistance required.

2.23. Reporting of defects in Signals, Points, Interlocking etc.-

Station Masters shall promptly advise the Section Controller of any defects in signals, points, interlocking installations and Block Instruments at the station, and also of any defects in weighbridges. The Section Controller on receipt of such information shall advise the staff of the department concerned over the telephone. These orders will in no way, relieve the Station Master of the responsibility for issuing the necessary all concerned message. The Station Master shall advice the Section Controller when the defect is rectified. The Section Controller shall record the duration of such defects in the Control Chart and in his diary.

2.24. Failure of Operating Control system.-

a) When the Control working is interrupted and no communication with the Section Controller is possible, the Station Masters will be responsible for the working of trains. Due regard must be given to all orders which may be received from the Controller. The daily stock position shall be sent by Station Masters to the Chief Controller by any other available

means of communication when Control working is suspended.

(b) When Train Control breaks down, the Signal & Telecom staff in the Test Room of the Control office will immediately take action to carry out the necessary test. The Section Controller must give all assistance to the S& T staff to help them to test the section and to locate the fault. When the exact location of the fault is detected, the Section Controller will give a Control Order to the Station Master at either end of the faulty section where P& T Linesmen are posted or are working, to advise the Linesmen concerned at once of the fault on the system. This will be followed up by all concerned message.

(c) It is imperative that no sooner a control order pertaining to a control failure is received, whether by day or night, the Station Masters shall pay special attention to the prompt delivery of the order to the respective P& T Linesmen to avoid delay in the restoration of Control Working. The Section Controller on duty must not waste any time to have the Control order issued for advising P&T Linesmen / S& T Linesman. ;

(d) In case of interruption of all communications, the messages for Linesmen must be transmitted through the Guards of the first train passing over the section.

(e) Where overhead lines / cable are maintained by S& T department, S& T lineman should be advised in case of failure of operating control system.

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CHAPTER - III

SECTION CAPACITY

3.01. Definition.-

Section capacity means the number of trains that can be run each way over a given section of the Railway in 24 hours.

3.02. Calculation of theoretical capacity.-

(a) Scott's Formula :-

$$N = \frac{24 \times 60}{R+5} \times \frac{7}{10} \text{ for Double line sections.}$$

and $$N = \frac{24 * 60}{R+5} \times \frac{1}{10} \times \frac{2}{} \text{ for Single line sections.}$$

Where-N represents the number of trains each way in 24 hours, 24x60 represents the number of minutes in a day.

R- represents the running time of a goods train in minutes over the ruling section (i.e. the section over which the running time is the longest).

5 - represents the time in minutes .allowed for 'block working', $\frac{Z}{10}$ -

R- represents the efficiency factor (to cater for delays due to human element and for the effects of irregular distribution of trains over the day).

(b) Indian Railways Formula for Goods trains:-

S (Number of Goods trains both way)

$$= \frac{2x24x60-(P)}{Lu+Ld+2t} \quad Y \quad \frac{6}{10}$$

Where - 'Ld' and 'Lu' represent the running time in minutes of the slowest Up and Down goods trains respectively over the ruling section.

't' represents the station time which is assumed to be 3 minutes.

'p' represents the total running time in minutes of the existing Up and Down coaching trains over the ruling section.

$\frac{6}{10}$

represents the efficiency factor.

(c) South East Central Railway Formula:-

(i) Single Line:- $\frac{24 \times 60}{A+2(B+C)} - x\frac{7}{10}$

N (Number of trains each way) :

Where - 'A'-represents the combined running time in minutes of Up and Down goods trains over the ruling section (which may be different for Up and Down trains).

'B'- represents the time in minutes allowed for "block working". This is assumed to be:

5 minutes at stations provided with tokenless block instruments.

7 *Vi* minutes on the Single line at interlocked stations.

10 minutes on the single line of non-interlocked stations.

'C'- represents the' Stop and Start' allowance. This is taken as 5 minutes of which 2 minutes are for deceleration and 3 minutes for acceleration

7 1- represent the efficiency factor.

(ii) Double Line:-

N (Number of trains each way) = $\frac{24x60}{A+B+C} \times \frac{7}{TcT}$

Where- A'- represents the running time in minutes of a goods train over the ruling section in the Up or Down direction as the case may be.

'B'- represents the time in minutes allowed for 'block working' which is taken as 5 minutes in all cases.

'C'- represents the 'Stop and Start' allowance which is the same as on single line.

Note:- No 'stop and start' allowance need be taken into account when one of the stations of the ruling section is a watering or notice or terminal or starting station.

3.03. Limitations of the formula/method of calculation of section capacity.-

(a) It does not take into account the total length of the section for which the section capacity has to be worked out. It is generally seen that the longer the section, the lesser usually is its section capacity, other conditions remaining equal.

(b) It does not take into account the spacing of the block stations. The larger the number of long block section, the less will be the section capacity.

(c) It is assumed that all trains will run at a uniform speed.

(d) It assumes as a rule that on the single line, when a train arrives at a block station, another train will be ready to leave in the opposite direction. In actual practice, this is not always so.

(e) It does not take into consideration the following factors which effect the section capacity:-

(i) Number and length of crossing loops,

(ii) The number of watering and notice station,

(iii) Whether stations are interlocked or non-interlocked and if interlocked, the standard of interlocking,

(iv) The number of reception lines at the terminal or junction station;

(v) Whether simultaneous reception and despatch facilities are provided at stations.

3.04. Determining the section capacity by means of a "Master Chart".

The calculation of the section capacity by means of any formula gives only a rough estimate of the number of trains that can be accommodated in a given section in 24 hours. It is, therefore, best to determine the section capacity by actually plotting the paths of trains on a Master Chart (see para 2.08). In this process the advertised paths of all coaching trains should be plotted first and the goods train paths then

interpolated so as to make the maximum use of the section capacity. While doing so the facilities provided at the different block stations as also the terminal facilities should be taken into account.

3.05. Various methods of improving the section capacity.-

The following are some of the methods for improving the capacity of a Section:-

(a) Having staff properly trained in their duties.

(b) Intelligent scheduling of goods trains.

(c) Close and constant supervision.

(d) Keeping a watch on engineering restrictions which should be imposed for the minimum possible period.

(e) Reduction of stopping time at stations by speeding up loading and unloading, shunting and marshalling of trains etc.

(f) Efficient train control.

(g) Running of more through trains with loads for the farthest point, so that such trains may be passed through intermediate yards without any further handling.

(h) Reducing the lengths or long block sections by providing additional crossing stations on single line and 'C' class stations or Intermediate Block Posts on double line.

(i) Improving facilities at terminal yards.

(j) Improvement at road-side stations, such as-

(i) facilities for simultaneous reception of trains from opposite directions on single line sections,

(ii) facilities for simultaneous reception and despatch of trains in the same direction, for single and double line section.

(iii) Provision of independent shunting facilities so that the use of the main or running lines for

shunting purposes may be avoided and shunting movements isolated from trains movements,

(iv) Provision of longer turn-outs. High speed turnouts of 1 in 16 or longer will increase the speed of trains through stations and thereby reduce the running time, and.

(v) Providing additional crossing .loops at strategic stations.

(k) Improvements in signalling & interlocking, such as-

(i) Provision of standard III interlocking,

(ii) Provision of Block Instruments at all block stations. On the single line, the use of tokenless Block Instruments considerably reduces the 'block working' time.

(iii) Provision of warners where necessary,

(iv) Provision of Manually operated Multiple Aspect signals or Modified Lower Quadrant signals to enable Loco Pilots to maintain higher average speeds,

(v) Introduction of Automatic Block System of working on double line sections, and

(vi) Provision of Power installations with Electric Control Panels and Route Relay interlocking to help in reducing the time taken in setting and locking points and in taking off' signals.

(I) Centralised Traffic Control (CTC) can considerably increase the section capacity on a single line section. CTC combines Automatic Block Signalling and interlocking at station, Protection and direction of trains and a train despatching system into an integrated operating tool which can be used by one central authority from a Cntralised Control office. The actual operation of points and signals on the section covered by CTC is remotely controlled from a Centralised control

office, by means of switches arranged on an illuminated control panel, which gives the whole lay-out of the section controlled as well as the stations on the section. This panel gives the Controller a constant view of the trains on his section and their movements as these are indicated on the Panel by means of strip lights.

3.06. Through-put.-

While section capacity represents the number of trains that can be passed over a particulars length of line in 24 hours, throughput represents the actual volumes of traffic moved over that length of line in 24 hours.

Any increase in section capacity naturally enables a higher throughput to be achieved. It can, however, be increased quite independently of section capacity by running longer trains or by using wagons of higher capacity.

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CHAPTER - IV
WORKING OF TRAINS GENERALLY

4.01. General Order of Precedence of trains.-

Unless specific orders to the contrary are issued by the PCOM or by those acting on his behalf, the following general orders of precedence shall be observed by control and stations.

1. ARME, ART proceeding to the site of accident.
2. President's and V V I P's specials (Unless otherwise specified in the Time Table).
3. Suburban train in peak rush direction.
4. Super fast trains like Shatabdi, Rajdhanietc.
5. Mail/Express trains.
6. Military personnel special, if instructed by emergency control/DOM.
7. Fast Passenger train
8. Special engaged by the public. (Precedence order may be revised)
9. Passenger trains.
10. Mixed trains.
11. Military stores special.
12. Express or special goods train.
13. Through goods train.
14. Accident relief train returning from the site of accident (unless otherwise ordered).
15. Shunting and van goods train.
16. Departmental trains.

Note: - The following general principles are mentioned for the guidance of Controllers but it must be distinctly understood that nothing in these instructions modifies the safety precautions laid down in the rules (General and Subsidiary Rules, Station Working Rules etc.).

(i) A Passenger train nearing the end of its run should not normally be detained in preference to a train which has a longer run before it, as the latter train is more likely to make up time and reach its destination punctually than the former.

(ii) A train running to time should not be detained more than 30 minutes to effect crossing on single line. (This should be decided by the Division based on actual condition.)

(iii) A train running late due to defective engine, or defect in rolling stock or any other cause which is likely to continue to operate against it and prevent it from making up time, should generally give way to a train running properly.

4.02. Crossing and Precedence of trains.-

The following principles should be observed when arranging crossing:-

(a) The train lower in the order of precedence should ordinarily be detained for a crossing. If however, the more important train is running to time, it may be detained for a few minutes provided this will save a heavy detention to the less important train.

(b) When crossing a train of the same class, generally preference should be given to the train that has less scope for making up lost time and the train that has a shorter distance to get to its destination.

4.03. Measures to improve punctuality.-

(a) Station Masters must ensure that-

i) Trains are not held up for such avoidable reasons as delay in obtaining "Line clear" or giving permission to start, ortaken off late, shunting in the yard, absence or late arrival of a railway servant at the foot of a defective stop signal to pilot the train, etc;

ii) there should be no delay in handing over the correct authority to proceed to the Loco Pilot;

iii) Mails and packages for loading should be kept in proper position and promptly loaded and those for unloading promptly unloaded;

iv) shunting should be completed as early as possible.

(b) Guards should.-

i) attend their trains in time and start them right time;

ii) exchange all-right signals with the Loco Pilot after the train starts from a station in absence of which the Loco Pilots likely to come to a stop;

iii) make over and take over packages and cash promptly at stations;

iv) where necessary seek the co-operation of the Control to ensure that trains are not detained unnecessarily.

(c) Loco Pilots must.-

i) attend their duties in time according to rules;

ii) ensure that there is no time loss or engine failure;

iii) see that extra time is not taken for loco requirements at stations, and

iv) try to make up lost time on the run without disregarding any of the speed restrictions or exceeding the maximum permissible speed.

4.04. Time train to be ready before departure.-

The time at which train is required to be ready before departure from the starting station will be laid down by the Divisional Railway Manager. In the case of Passenger trains, the rake should be placed on the platform in time to allow for loading of Mails, Luggage and Parcels, entraining of passengers etc. In the case of Goods trains, it should allow adequate time for carriage examination, detaching of wagons marked sick, if any, after such examination or for detaching excess or wrong wagons, or for correcting wrong marshalling, testing of air pressure & continuity, etc. Ordinarily, a Passenger train need not be placed on the platform earlier than 45" and at night, the lights should be switched on.

4.05. Custody and responsibility of trains.-

(a) The Guard is fully responsible for the train he works. Guards of Passenger, Mixed and Goods trains which do

not have separate staff to deal with such work of Luggage, Parcels and Goods will be in full charge of such work also.

(b) On a Passenger train having a Train Conductor, the Guard will be relived of such duties and responsibilities as are assigned to the Conductor. All staff on the train such as Train Conductor, Ticket Examiners, Loco Pilot, Assistant Loco Pilot, R. P. F. staff etc. shall obey the lawful orders of the Head Quarters and shall assist him when called upon to do so in the safe and punctual running of trains and when there is want on alarm chain pulling.

4.06. Recording of loads.-

(a) The load of each train, before its departure from the starting station shall be recorded in the Trains Clerk's Hand Book, wherein full particulars of each vehicle must be entered neatly and legibly. On arrival of a train at its engine-changing orterminal station, the load of the train shall be recorded in the Inward Trains Clerk's Hand Book. Separate Trains Clerk's Hand Books shall be maintained for Passenger and Goods Trains and for incoming and outgoing trains. In the hand Books the composition of the trains must be recorded from engine down wards to the last vehicle.

(b) In the case of Passenger trains the block rake number of the train service coaches must also be clearly indicated and in the case of Goods trains, the type of special stock, if any, as well as any other stock as ordered by the Divisional Railway Manager whether loaded or empty shall be clearly shown.

(c) In the case of outgoing trains, as soon as the numbers have been taken, the Vehicle Guidance must be prepared and after the Guard has checked over his train with it, he must sign for it in the Trains Clerk's Hand Book. Any alterations or corrections in this book to be valid must be initialed by the outgoing Guard.

4.07. Transmission of load reports to Control.-

(a) On the departure of a train from the starting station, its load should be repeated to the Control on controlled sections and sent message to the Divisional Railway

Manager and to the next engine changing and terminal stations on non-controlled sections. The load report should be in the marshal order from engine to brakevan.

(b) In the case of Goods trains and other trains the load of which is required to be adjusted in the engine-changing or the terminal station the Controller shall transmit the load report to such stations also.

(c) The composition of the Goods trains in the proper marshalling order from the engine indicating inter- alia wagon number, owning Railway, type, from and to (destination) should be transmitted with the available means of communication. If any wagon contains O. T. S. load, this should also be intimated.

4.08. Carriage of Passengers and others in Brake Van -

(1) The following instructions should be observed for permitting travel of persons other than those authorised to do so, in brakevan of Goods trains-

(a) Requests for permission to travel in the brake van of a Goods train should be obtained in writing by the Station Master from the person concerned indicating the special emergent circumstances warranting this facility.

(b) (i) On controlled sections the Station Master shall obtain the prior sanction of the Deputy Chief Controller on duty before giving permission to any person to travel in the brakevan of Goods trains.

(ii) On non-controlled section, the Station Master on duty may himself grant such permission.

(c) (i) Permission to travel in the brakevan of a Goods train should be granted only in exceptional emergent circumstances and not as a matter of routine.

(ii) Such permission may, in the said circumstances, be given only if no suitable Passenger train is available.

(d) No lady will be permitted to travel in the brakevan of a Goodstrain.

(e) (i) As a rule, permission shall not be given fortravelling in the brakevan of through Goods Trains, except for

journeys between stations where these trains normally stop for operational reasons.

(ii) If it is necessary to stop a Goods train out of course for this purpose, an "out of course" stoppage memo will be given to the Loco Pilot of the Goods train indicating where it is required to be stopped for the purpose of entrainment and / or detrainment.

(f) (i) The person should purchase a first class ticket or should be in possession of a first class season ticket to cover the journey involved.

(ii) He should also execute an Indemnity Bond.

(g) The Station Master on duty should give him a certificate of emergency in the form given below Para 4.08(k), at the station from which he wishes to entrain. Such certificate together with the first class ticket / season ticket will constitute the authority to travel in the brakevan of the specified Goods train between the stations specified.

(h) The certificate of emergency should be shown to the Guard of the Goods train by which the passenger desires to travel and should be surrendered to the Station Master of the destination station along with the ticket. The Guard shall also make a proper entry in the Guard Memo Book whenever such passenger travels in his brakevan.

(i) In the case of Members of Parliament, the same procedure will apply except that instead of the Ticket, the First Class Pass-cum-identity Card issued to the Member will be sufficient. The Member of Parliament will give the usual journey voucher at the destination.

(j) The number of persons permitted to travel in a Brakevan in addition to the Guard, should not exceed five. An exception to this rule may, however, be made, when in emergent circumstances, staff of the security services, Police, repair gang of S& T department, staff of medical department and other railway departments have to travel on duty. In such cases, it should be ensured that the Guard of the train is not handicapped in performing his duties.

(k) The Station Masters of the stations between which a person is allowed to travel in the brakevan of a Goods train will keep a record of the journeys in a suitable register.

CERTIFICATE OF EMERGENCY

.....is authorized to travel in the brake-van of Goods Train No. ..... from..... to..... on..... He holds First Class Ticket First Class Pass No. .....

Station .....

Date ..... Station Master.

(2) The following instructions shall be observed for permitting travel of persons other than the Guard of the train, in brake van of passenger carrying trains -

(a) In exceptional circumstances Crew/Guard, maintenance or security staff may be permitted to travel in the guard's brake van.

(b) On controlled sections the Station Master shall obtain the permission of the Chief Controller / Dy. CHC on duty. On non-controlled section such permission shall be given by the Station Master himself.

(c) The entraining and detraining of staff should be completed within the scheduled stoppage of the train.

(d) In case the train is to be stopped out of course, the prior permission of Sr. DOM of the concerned Division shall be obtained.

(e) Station Master on duty from which the person(s) may be entrained, shall issue a certificate of emergency, authorising the staff to travel in the brake van.

(f) In addition to the working Guard, maximum 3 persons may be permitted to travel in the brake van.

4.09. Detention to Train Engines at engine- changing terminal stations after arrival.-

(a) If train engines after arrival at destination are detained for any purpose, a detention memo for the whole period calculated from the time of arrival of the train to the time the

engine is released should be given to the Loco Pilot to serve the purpose of calculating his rest.

(b) In these cases, the reasons for the detention must be explained in the remarks column of the shunting and detention memo.

4.10. Positioning of Stores department line distributing van.-

On arrival of the van at the Station, the Stores Line Distributer will at once issue a memo to the Trains Clerk attending the train or in absence of any Trains Clerk to the Station Master on duty taking signature on the carbon (duplicate) copy. The memo must show clearly by what time and where the van is to be positioned.

Should the line Distributor subsequently require the van to be removed from the first position to some other position in the yard, he will issue a fresh memo in the same manner and deliver it to the subordinate official in charge of the yard obtaining signature on the carbon copy.

4.11. Repairs to vehicle standing on traffic lines.

No repairs are to be done to vehicles standing on traffic lines unless the sanction of the Station Master/ Yard Master has been obtained in writing. When such sanction has been obtained for blocking the line the Train Examiner must place a red banner flag or suitable indication board across the siding on which the vehicle for repair is standing, as near to the points as possible, and if the siding is a through one and not a dead end siding, a banner flag or suitable indication board must be put up at both ends so that traffic shunting staff will be able to see it and not shunt wagons into that siding. The employee of the Carriage Department in charge of the work will be held responsible for any accident that may happen due to the absence of red banner flags or other indications boards although the Station Master/Yard Master may have given orders for the siding to be closed.

4.12. Postal Vans withdrawn for Repairs.-

(a) When a Postal-van or other carriage containing fitted accommodation for sorting, is to be withdrawn for repairs,

painting, etc. timely notice must be given to the Superintendent, Railway Mail Service.

(b) In cases of accidents when previous notice cannot be given, information should at once be sent to the Superintendent Railway Mail Service, that the van is damaged and cannot be used.

(c) In all cases the approximate period during which the vans are likely to be in shop or under repairs should be intimated to the Superintendent Railway Mail Service and in view of the disorganization of the work of the Railway Mail Service sorters concerned, caused by the temporary withdrawal of the regular fitted accommodation, postal vans should be withdrawn only when they can be most conveniently spared, and care should be taken that they are not unnecessarily detained.

(d) If vans are available at other stations, they should be utilised to replace those withdrawn.

(e) When a postal van has to be detached from its train urgently on account of a hot axle box or some similar casualty, the Divisional Operations Manager will advise the local Railway Mail Service Superintendent.

(f) When a third class compartment has to be reserved for the Rail'.(Vay Mail Service, the compartment must be conspicuously indicated on both sides by means of special boards or prominent labels. As far as possible, this compartment should be alloted on the fifth vehicle from the engine.

4.13 Conveyance of Treasure Vans.-

(a) When a Police escort travels in charge of treasure van-

(i) The carriage or compartment in which the escort is accommodated should be one as near to the treasure vans as possible, so that the watch over the vans en-route can be kept without unnecessary inconvenience. The doors of the compartments occupied by the escort must never be locked.

(ii) Shunting of treasure vans should be avoided unless absolutely necessary, but when shunting is unavoidable, the official in charge of the Police escort must be advised before the vans are moved, so that he may arrange to have the vans watched during the shunting operations.

(iii) Station Masters and Guards of trains to which treasure vans are attached will be held responsible for the strict observance of this order.

(b) Conveyance of Treasure and Specie Vanswithout'Police Escort-

(i) When treasure and specie vans are conveyed without a Police escort such must be sent through by Mail or Passenger trains.

(ii) The van doors must be sealed and padlocked and the padlocks must, be bound with cloth and sealed. If the doors are not padlocked by the sender, the Station Master of the dispatching station must padlock them.

(iii) The marks on the seals and locks must be clearly entered in the Vehicle Guidance or Way Bill of the train to which the vans are attached.

(iv) If the padlocks are put on by the Station Master of the despatching station, the keys of padlocks must be sent to the receiving station, or if the receiving station is on a foreign line, to the junction station in a sealed cover, booked under free service way bill, by the train by which the vans are despatched. When there are more than one van on the train the keys of each van must be placed in a separate sealed cover. The sealed covers or cover, as the case may be, must be in charge of the train Guard.

(v) A special Guard must be deputed to travel with the train to which the vans are attached. This Guard must travel in a compartment or brake-

van as near the treasure or special vans as possible, and it will be his duty and personal responsibility to keep a careful watch on the vans in order to prevent the vans from being tempered with in any way or approached by unauthorised persons.

(vi) The special Guard must satisfy himself that the seals and locks are in order and secure and all axle boxes complete with covers properly fastened.

(vii) Before leaving a train examining station the Guard must have the axle boxes of the treasure or specie vans opened and examine in his presence by the SSE/SE/JE (C&W) and must obtain a special certificate from the SSE/SE/JE (C&W) that the vans are in good running order and all axle boxes properly packed and lubricated.

(viii) When the special Guard makes the vans over to his reliever he must in his rough journal book take a receipt in which the condition of locks, seals and axle box covers and mark on seals and locks must be clearly stated. At Guard changing stations the Station Master on duty must personally supervise the transfer of the van from one Guard to another and must countersign the receipt obtained by the relieved Guard,

(ix) At all stopping stations the special Guard should feel the axle boxes and if there is any indication of warmth, he must at once ask the Loco Pilot of the train to attend to the box, the Loco Pilot's decision should be final as to whether the box or boxes are unsafe to run or can be worked on to the nearest train examining station,

(x) Should a treasure or specie van run hot or meet with any other minor mishap on route, every effort must be made to take it into the next terminal station and not to detach it at a road side station.

(xi) When a treasure or specie van is detached short of destination, the special Guard in charge must take receipt for it from the Station Master. This receipt must show the condition of seals, locks and axle boxes and the marks on seals and locks, and the Station Master must place the van in a safe position in the yard under the Railway Protection Force. The sealed cover containing the keys of the detached van must be made over to the Station Master of the Station where the van is detached and must be locked up in the station cash safe.

(xii) Station Master must in all cases advise the Dy. Chief Operations Manager (Coaching) and Dy. Chief Commercial Manager (General), the Superintendent and the Circle Inspector, Security Deptt, the Inspector and Sub-Inspector, Govt. Railway police and the Divisional Operations Managerand the Divisional Commercial Manager by sending message when a treasure or specie van is detached short of destination. Station Masters of the starting and terminal stations will convey messages through their stations to the above officials.

4.14. Procedure to be adopted in cases of murder or serious assaults in Railway carriages.-

If a crime of a serious nature such as a murder or serious assault is committed in a Railway carriage on a running train, the following action shall be taken by the staff with a view to helping the police Officials in their investigation:-

(a) Immediately after knowing about such an offence, the Guard of the train should empty the compartment and lock it up. After closing all shutters from outside, so that blood stains, marks of struggle, foot prints, finger impressions etc. may remain undisturbed.

(b) If the crime took place in a second class or sleeper class compartment the carriage shall be detached at the

station where the crime was detected and will be kept under watch till the police arrive to take over the case.

(c) If the crime took place in an AC coupe/cabin/coach, the coupe/cabin/cubical shall be emptied of passengers and the carriage is allowed proceed to the nearest station, where it can be replaced. At this station, a member of the Railway Police will watch it, until a Police Officer arrives.

(d) No one, either Railway Employee or an outsider, shall be allowed to enter the compartment until the police arrive except in case if it is necessary to attend to the injured persons who are unable to leave the compartment without assistance.

(e) The concerned Railway Police Station will be advised of the station where the carriage has been or will be detached. After the carriage is taken overby the Police, it should not be removed or otherwise utilized without the written authority of the Police officer conducting the investigation. If an abnormal delay takes place on the part of the police in releasing the carriage, the matter should be reported to the Divisional Railway Manager concerned.

4.15. Hot Axles.-

A. (i) Attention of all Railway servants is drawn to the danger which result from allowing a vehicle to run with a hot axle.

(ii) An employee who notices a hot axle must immediately attempt to stop the train and bring the fact to the notice of the Guard and the Loco Pilot. If this is not possible he must report it to a responsible person such as Station Master, who must take steps to have it examined.

(iii) If necessary the vehicle must be cutoff. On running trains and at stations other than train examining stations, a hot axle must be dealt with in accordance with GR 4.29 and SRs thereto.

B. It is a serious offence knowingly to allow a hot box to remain in use unless under the supervision of the Train Examining staff. It is dangerous to commit any act, such as stealing waste or removing a cover, which will cause an axle

box to become unsafe and any person detected in such act is liable to be prosecuted.

C. (i) Hot boxes on trains, if not detected in time, constitute a grave danger to trains in motion and the attention of Station Master and their staff is drawn to GR 4.42 and SRs thereto which requires them to observe the condition of vehicles on trains passing their stations.

(ii) The attention of the train staff (Loco Pilots & Guards) is drawn to G.R. 4.41 and 4.43 which require that the Guard shall keep a sharp look-out and the Loco Pilot and the Asstt. Loco Pilot shall frequently look back to see that the train is proceeding in a safe and proper manner.

D. The greatest danger exists when on axle runs hot en-route on a non-stopping train. Station staff and Cabinmen must keep a sharp look out and arrange to send ahead the 'stop and examine' signals if a hot axle is detected or suspected. On a controlled section, the Station Master must advise the Controller on duty of the fact so that he can take immediate action.

E. The various signs of an axle running hot are given below :-

(i) The box commences to warm up and can only be detected in this stage by feeling with the hand, which should be placed on the side of the box face cover.

(ii) There is a strong smell of heated oil and waste, which can be detected at some distance from the vehicle.

(iii) A whistling noise may commence at any time during the process of heating. A box which is whistling must be examined.

(iv) When the box becomes sufficiently hot to ignite the waste and oil, flames and smoke can be seen emanating from the box and the metal of the axle becomes red hot. In this condition, the axle may break within a few kilometres.

F. At road-side stations where there is no Train Examining staff, before a wagon is despatched, the axle boxes must be examined. If the covers are deficient, it is simple matter to see if the box contains waste or not. If any box is empty, the wagon must be detained and message to be sent to the nearest SSE/SE/JE(C&W) who will arrange to pack it. Station Master must see that these orders are made known to all the class IV staff at their stations.

G. Water must not be thrown on an axle box or axle when hot. After a vehicle is cut off, the Station Master must send a message to the nearest SSE/SE/JE(C&W), stating its number and the owning Railway.

4.16. Running of vehicles with damaged journals or with defective bearing brasses -

A. To avoid the possibility of a vehicle running with a journal in a damaged condition or with the bearing brass defective due to heating, the following procedure is to be adopted:-

Any axle box when receiving attention due to heating is to be repainted as the heating invariable caused a box to become discolored.

B. By this procedure, it will be noticed that any axle box on a vehicle which is discolored through heating, should be stopped and attended to at once', before being utilised for traffic.

4.17. Marking of sick vehicles.-

A. To enable the Traffic staff to distinguish readily vehicle that are unfit to run, such vehicles will be marked with a small white Maltese cross, on the buckle of the spring immediately below the pocket label holders in the case of broad gauge stock, and on the panel near the pocket label holder.

B. The stenciled cross will be made by the Train Examiner when vehicles are unfit to run, and will be removed by him when vehicles are handed back to traffic as fit to run.

C. The special marking will be in addition to the use of the red labels and prescribed forms.

D. Sick vehicles that are to be sent to shops or to any other destinations for repairs will be stenciled with a white Maltese cross and the words “Shops” or the code initials of the stations to which the wagons are to be sent.

E. Station Master and Yard Master should be careful to explain to the yard staff the significance of these special marks.

F. When coaches are sent into shops the Train Examiners should paste the damaged labels on the inside of one of the windows in such a manner as to be readable from outside.

G. This window is to be raised and wedged in position by a piece of wood or any other means, which would prevent the window from being lowered.

4.18 Application for repairs to vehicles at road- side stations.-

A. When vehicles are not fit to run from any cause and have to be cut off, advice for repairs is to be given to the nearest SSE/SE/JE(C&W).

B. When a vehicle or wagon has been marked sick for placement in a sick siding, the Train Examiner will send a written memo giving the number of vehicles, owning railway, time and date marked sick and reason, and send it to the Station Master, Yard Master or Trains Clerk concerned. A register will be maintained in the Station Master’s or Yard Master’s office in which particulars of sick vehicles will be maintained and also the date and time at which a vehicle marked fit for traffic.

The Trains Clerk, Yard Master and Assistant Yard Master as they come on duty will examine this register and initial it.

C. All wagons marked sick shall be detached in to siding set apart for sick wagons and placed into the sick siding or Transhipment shed as required, without delay. If an inward load is marked sick at the destination station, the wagon must be placed in the sick line after unloading the wagon.

D. There is no excuse for loading vehicles that are marked “damaged”. Staff are warned that every case that

occurs of the Train Examining staff's intimation being disregarded, shall be made the subject of serious notice.

E. The SSE/SE/JE(C&W), the Guard, the Yard Master, the Assistant Yard Master, and the Trains Clerk are jointly responsible to see that no sick vehicle is worked away until certified fit to run. After the repairs are carried out, the stencil marks & labels must be removed.

4.19 Examination of couplings of Mail, Express and Passenger trains at engine changing station.-

(a) Guards shall examine the couplings of Mail, Express and passenger trains while such trains are standing at engine changing station, and be responsible for seeing that any coupling found slack, is tightened to the extent required.

(b) (i) Bogie vehicles should be carefully coupled up so as to avoid undue compression of the buffers. Coupling should be tightened only to the extent that buffer faces come in contact and are only slightly compressed.

(ii) The consequence of tightly coupling up bogie vehicles with buffer compressed is that any slight difference in the buffers levels causes undue weighton the bogies.

4.20 Screw Couplings -

(a) Under no circumstances must bent screw couplings or couplings too long to admit of vehicles being closely coupled together be used; all such couplings must be replaced. Loose screw couplings i.e. screw couplings not secured to the drawbar by means of a shackle and pin should not be used.

(b) Broken Screw Couplings.- Whenever a screw coupling is broken in a station yard in course of shunting or starting, the Station Master must send a message to the Sr. Divisional Mechanical Engineer, reporting the matter, in the case of a way-side station giving the engine number, train number and date, and in the case of coupling broken during shunting operation at large yards, giving the engine number and date.

Station Masters and Yard Masters must install into their staff the necessity of invariably reporting to them all cases that occur.

(c) When it is discovered by the station staff that a coupling is deficient or defective on a vehicle that has to be attached to a train at a station where no SSE/SE/JE(C&W) is posted, the Station Master must bring the matter to the notice of the Loco Pilot of the train to which it is required to attach the vehicle, and the Loco Pilot will arrange to fix a coupling or to remedy the defect.

(d) (i) In the event of a spare coupling being required on the road or at road-side stations the front engine coupling should be used. The Station Master will give the Loco Pilot a memo to this effect quoting the wagon No. for which the coupling was required.

(ii) On arrival at a Train Examining station, Loco Pilot will hand over this memo to the SSE/SE/JE (C&W) who will issue afresh coupling. The SSE/SE/JE(C&W) will also be responsible that the coupling fitted to the wagon is properly riveted on.

(e) Station Masters, Guards and Yard staff should be very careful when attaching vehicles to a train to see that the screw coupling are in all cases screwed up to the extent required.

Neglect in this matter may lead to a serious accident by a train parting on the road.

Under no circumstances any couplings that do not admit of vehicles being closely coupled up, be used.

The Guard's responsibility in this matter is clearly defined in GR4.34.

(f) When trains are stopped on a rising gradient owing to the engine being unable to haul the load, it frequently happens that the Loco Pilot reverses his engine and before the rear portion of the train has completed the backward move and become inert, the Loco Pilot again reverses his engine and goes forward, the result being violent jerking of the draw gear throughout the whole train and this causes breakages

of draw bar. In this connection, the attention of Guard and Loco Pilot is drawn to SR 6.04.02.

4.21 Proper locking of centre buffer couplers- BOXN/ BCN/BRN/ BOBRN/BOBS/ BOST/ BTAP/BLC wagons etc.-

(a) Ordinarily if Centre Buffer Couplers are properly coupled, train parting cases should not take place, and in the cases where train parting has taken place, the knuckles might not have been properly locked and trains started from the originating stations in that condition. The possibility of knuckles, once properly locked, to get uncoupled due to jerks and jolts of the vehicle are extremely remote.

(b) In order to ensure that such cases do not occur, the following instructions are to be observed.

(i) Yard staff while performing shunting on stock fitted with C.B. couplers shall ensure that the knuckles are properly locked; this can be ensured by seeing that the lock has dropped in which case the toggle is visible below the coupler head. Also a distinct sound is heared when the lock drops. In case of Transition couplers, a locking pin is also provided, which should be inserted in the slot coupler head. This further ensures that the lock has dropped.

(ii) SSE/SE/JE(C&W)s who pass the trains should observe the position of the knuckle and toggle of lock left mechanism to ensure that the knuckle on each C.B.C. is properly locked. They should endorse on the 'Fit Certificate' for an outgoing train to the effect that the train with a special type stock with C.B.Cs has been examined and their couplings found secure.

(iii) In case of shunting at wayside stations and sidings, proper locking of the knuckle will be ensured by the Guard in charge of shunting operations. The Guard of a train or a pilot must make sure that C.B. couplings on all the wagons are adequately secured.

(c) If, however, the breakage takes place between two stations the Loco Pilot shall load up the broken material on the engine and hand overthe same to the SSE/SE/JE(Loco) at the destination. The Guard will record the full particulars of vehicle in Guard memo Book.

(d) Procedure for Coupling of LHB Coaches

(1) Bring loco closure to LHB coach and ensure that loco comes to a dead stop maintaining ONE to TWO meter gap in between.

(2) Coach coupling will be kept in closed condition with operating liver in locked condition and additional pin, provided in coach CBC, should be kept in inserted condition.

(3) CBC of loco will be kept in open condition. For opening CBC, lift the operating handle and rotate it in clockwise direction (minimum by 90 degree) to a horizontal position. Before that keep the operating handle locking screw in unlocked position; if it is not then unlock it by rotating the locking screw in anti-clockwise direction by using the special key.

(4) Opening of coach coupling will only be required in those cases where because of curvature on platform/ yard lines/ pit line, it is not possible to match the alignment of coupling of loco and coach and therefore opening of CBC of both the loco as well as coach is required.

(5) Sometimes, even after opening of CBC of both loco as well as coach, it may not be possible to lock the CBC. In such cases, physical movement of CBC shank may be required to match the alignment between the loco and coach CBC.

(6) Now couple the loco with LHB coach at a speed of 5 kmph. This will cause a jerk which is very much required to ensure that lock of CBC drops completely. Complete dropping of CBC lock is essential to achieve complete coupling.

Note:

(i) LHB coaches are provided with tight lock couplers instead of screw couplers. LHB coaches are to be coupled with AAR type couplers of loco in jerk motion but not in micro motion as done for screw couplers.

(ii) While coupling LHB coach with another LHB coach, all operation mentioned above will remain same.

Uncoupling Procedure:

1. Unlock the handle by rotating locking screw anti clockwise.
2. Lift the handle and turn it in clockwise direction to a horizontal position by minimum 90° and pull the loco/ coaches apart.
3. Before uncoupling make sure that the couplers are not subjected to any tensile load and the operating handle is free to rotate.

4.22 Breakage of Couplings.-

(a) In all cases of train parting due to breakage of couplings the broken materials required for joint examination by the SSE/SE/JE(C&W) and the SSE/SE/JE(Loco) in order to fix responsibility for breakage.

(b) In the event of a train parting due to breakage, of Rolling Stock Draw Gear, the broken material shall be taken charge of by the Station Master in cases where the parting takes place at a station. It shall not remain in charge of any of the train staff.

(c) If, however, the breakage takes place between two stations the train engine crew shall load up the broken material which the Guard shall make over to the Station Master of the station at which the train stops. In doing so, the Guard shall supply the Station Master with full particulars of the vehicle from which the broken material was removed obtaining signature for it.

4.23 Haulage of dead locomotives:-

(A) Definition-

(i) A locomotive which is not worked on its own power is defined as a dead locomotive.

(B) Need for haulage of a dead locomotive. A locomotive may be required to be worked dead

(i) to balance engine from one another.

(ii) to clear a block section and take the locomotive to its destination in case of failure or break-down on the road, and.

(iii) sending the locomotive to workshop / shed for repairs and / or maintenance schedules.

(C) The following conditions shall be satisfied before attachment of dead locomotive to any train/light engine:

(i) Sr Section Engineer (Loco)ZCLI issues Certificate for 'Fit to run' for Passenger/Goods train.

(ii) A competent person not lower than Asstt. Loco Pilot shall escort the dead locomotive, when attached in the rear of brake van or has defect in under gear equipment. However, escorting of dead locomotives (diesel as well as electric) attached to freight and passenger- carrying trains is not necessary if the brakes including proportionate brakes are fully operational and the dead locomotive is attached next to the train engine.

(iii) Maximum permissible speed of the dead locomotive shall not be less than booked speed of the train on which it is being attached.

(iv) Running of double/ triple headed trains is permissible on the section over which the dead locomotive is to be hauled.

(v) When a dead electric locomotive has to be moved on a non-electrified section, special check shall be made regarding its infringement to the scheduled of maximum moving dimensions. In the case of any infringement, the dead locomotive shall be treated as an ODC.

(vi) As a final check, the coupled locos should be run for about 500 meters and the Loco Pilot shall check for any abnormal rise in the temperature of the wheels of the dead locomotive and shall also check, it at subsequent stops during the journey.

(vii) Locomotive with defects in under gear equipment can be attached only in freight trains.

(viii) On a dead locomotive all the circuit breakers and battery knife switch shall be off, the reversing handle removed and such other steps taken to ensure that the dead locomotive cannot be started inadvertently.

(ix) The locomotive traction motor reservoirs shall be kept in neutral position.

(x) When a dead locomotive is attached with the working power, the locomotive brakes shall be fully released. The MU2B valve (if fitted) shall be placed in trail position.

(D) Clearing of a Block Section in the event of failure of locomotive.

(i) When a locomotive working a train fails in section, the dead locomotive shall be attached coupled to the relieving locomotive and the train worked to the next block station, where the dead locomotive shall normally be detached.

(ii) In case the dead locomotive is not detached but the train is worked double headed with the dead locomotive upto the destination not more than 1 dead locomotive with break operative shall be attached to a goods train. In such case the total length of the train with locomotives shall not exceed 725 M.

(iii) In all the above cases the total number of locomotives including the dead one, shall-not exceed three, provided double heading of the locomotive is permitted on the section.

(iv) If double heading is not permitted in section where no banker is used in general, the train shall be pushed by the relieving locomotive observing the precautions laid down in GR 4.13 and SR there to, to clear the block section and at the next block station marshalling of the locomotive may be done, and it is ensured that they are not coupled together and there is a minimum distance of 11 ordinary wagons or 91 M between them.

(v) In sections where double heading is not permitted and banking engine is in use, concerned Divisional Engineer shall be referred to in regard to the location of the relieving locomotive who will after examining the presence of bridges in the section and the span, give instructions regarding the marshalling order.

(E) Haulage of a dead locomotive by goods train.

In addition to the fulfillment of general conditions mentioned in clause (C) of Para 4.23 the following shall be ensured:

(i) Movement of maximum three locomotives (2 working + 1 dead) with load, is permissible subject to observations of all restrictions on operation of double */* triple headed working locomotives in the section provided that brakes in dead locomotives are operational. .

(ii) If the dead locomotive is required to be attached on a Double/Multiple head train or on a section where Double/Multiple heading is not permitted, it must be ensured that there is a minimum distance of 11 ordinary wagons or 91 M or a minimum distance equal to the largest span of the bridge in the section, whichever is more, between the train locomotive and dead locomotive.

(iii) In case, the dead diesel or electric locomotive is fitted with the side coupling rods, it shall be

ensured that all coupling rods are in proper position.

(iv) In the case of a dead diesel/electric locomotive the air pipe shall be connected and the dead locomotive treated as a piped vehicle.

(v) Attaching of dead locomotive as the last vehicle on a train is fraught with the danger of the dead engine running away on a gradient if there is a breakage of coupling etc. Any type of locomotive without hand brakes in working order must not be attached to the rear of train.

(vi) In the case of a dead locomotive attached behind the brakevan, it will be the duty and responsibility of the said competent person travelling on the dead locomotive to apply the hand brakes judiciously in case of run away occurring en-route due to brakage of coupling etc. The hand breakes of the engine must be tested at the originating station to ensure that it is in perfect working order.

(F) Attaching/hauling of dead locomotives by Passenger / Mail/ Express / Superfast trains:

In addition to the fulfillment of general conditions mentioned in clause (C) of Para 4.23 the following shall be ensured:

(i) Room in the train should permit the attachment.

(ii) Only one dead locomotive (diesel/electric) can be attached.

(iii) Brake power of the train should be 100% excluding dead locomotive.

(iv) The dead locomotive shall be attached next to train engine only.

(v) As far as possible, brake should work on dead locomotive. However, if it is not possible, then in the case of air-braked train, brake pipe and feed pipe of working .locomotive shall be connected

to brake pipe and feed pipe of trailing stock and dead .locomotive will work as piped vehicle.

(vi) In addition to freight/passenger trains, a dead locomotive can be attached to Mail/ Express trains including Superfast trains but excluding Rajdhani and Shatabdi provided that the locomotive brakes including proportionate brakes are operational. Locos with inoperative brakes can be attached subject to the brake power of the train being within the permissible limits and conditions mentioned in item (iv) above are fulfilled.

(vii) In case the dead locomotive is attached to a Mail/Express / Super Fast train the following conditions shall be fulfilled:

a) Permission of Sr. DOM/DOM is obtained.

b) Attachment / detachment, creation of air pressure etc. are completed within the scheduled stoppage of the train.

(G) Haulage of dead electric locomotive on non-electrified section.

(i) When a dead electric locomotive is required to be moved on a non-electrified section, special check shall be made regarding its infringement to the schedule of maximum moving dimensions. If thereby any infringement to be schedule, the dead electric locomotive shall be considered as an ODC and its movement shall be permitted in accordance with the extant rules governing such movement.

Note:- For movement of electric locomotive, conditions laid down in para 1717 and 1718 of the Manual forA.C. Traction maintenance and operation must also be complied with.

4.24 Movement of unbalanced dead locomotive.

(A) In case of despatch to and from shop:-

(i) A Locomotive should normally be worked to and from shop on its own Power. If, however, a locomotive has to be sent dead to and from shops, it may be attached to a goods train provided the conditions enumerated in para 4.23 (C) and 4.23 (E) are complied with.

(ii) A locomotive sent dead to shops must not ordinarily run with the coupling or connecting rod removed. If a locomotive has to be sent to and from shops dead and in unbalanced condition, it shall not be attached to a goods train, but must be hauled by a special light locomotive. The speed in this case is not to exceed 15 KMPH, subject to any other restriction enforce. For running of such unbalanced dead locomotive, a prior sanction of Principal Chief Operations Manager must be obtained and following procedure shall be observed :-

(a) Coupling rods may be removed to enable a train to be taken to destination or for clearing the block section. In such case similar part shall be removed from both the sides of the engine and the speed must be restricted to 15 KMPH subject to any other speed restriction enforce. In the case of engines without side cylinder, where a suitable floating bush is not available to serve as a dummy, it should be ensured to use the dummy crank pin bushes.

(b) In all cases when unbalanced engine is likely to be moved on any section the Power Controller on duty will, immediately on receipt of such information, inform over phone the following officials.-

(i) Sr. Divisional Mechanical Engineer or in his absence the DME,

(ii) Sr. DOM or in his absence the DOM,

(iii) Sr. DEN or in his absence the DEN

(iv) AEN and 'JE (P. Way)' of the section concerned,

(v) Station Masters of the section concerned, giving full particulars, so that the track concerned may be examined and certified immediately after the passage of the engine.

(c) The Engineering official concerned not below the rank of JE(P. Way) shall immediately arrange to inspect personally by trolly the track over which the movement has been allowed. The JE(P. Way), on being satisfied, will issue the certificate to the SM on duty at the end of each block section. The specimen of certificate is given below in Para 4.25.

(d) The SM on duty shall immediately on receipt of the certificate, convey the information recorded in it to the Section Controller and to the Station Master on duty in rear and take further necessary action accordingly.

(e) The section of the track over which the unbalanced dead engine has passed will normally be blocked till such time it has been inspected and certified by the JE(P. Way). In exceptional cases, however, as in the case of breakdown of the trolley etc. which prevent immediate track inspection, traffic may be allowed to move over the section so affected before certification by JE(P. Way) at a speed not exceeding 30 KMPH, subject to any other restrictions enforce on the section. The examination of track must necessarily be, conducted during day light hours.

An all concerned circular should also be issued in advance detailing the programme of running the engine.

(f) The movement of unbalanced dead engine from and to shop shall be restricted to day light hours.

(g) The Loco Pilot of the locomotive hauling the unbalanced dead loco shall be specially warned about the speed restrictions and an

acknowledgement taken at the time of his signing on that he has understood the instructions.

4.25 The form of the certificate to be given by the engineering official shall be as follows.-

"I certify that the track between station's..... and ..... has been examined by me and found to have..... Normal speed between these stations may be resumed. The following ..... after passage of the unbalanced engine No. ..... has been noticed. A speed restriction of..... KMPH is imposed between..... and..... with immediate effect and will continue till further advice.

*Defects .....

Date..... Signature .....

SSE/SE/JE(P.WAY).....

(Score out entry which is not applicable)

4.26 Dead Engine belonging to another Railway travelling over this Railway.-

The engine, before being put on a train, must be passed by the nearest SSE(Loco) / SSE(Electric) as fit to run and a certificate granted accordingly. This certificate should be sent, attached to the Guard's wagon way bill or through the Asstt. Loco Pilot on the engine to the destination of the engine and the certificate given at the station of despatch for the journey over this railway.

The procedure laid down in Rule 4.23 to 4.25 should also be followed for running of such engine.

4.27 Wagon way Bills (Forms OP/T.437).

(a) The Guard in charge of every train must be furnished with a wagon way bill, properly filled in at the station from which the train starts. The wagon way bill at each terminal or startingstation must be prepared direct from the Trains Clerk's hand book in which the Trains Clerk must record the number of each individual vehicle composing the train from the

vehicles themselves. The numbers are not to be copied out from one wagon way bill into another.

(b) The Wagon Way bill must be carefully and legibly prepared in ink or carbon process at the starting station and all the columns of the Wagon Way bill should be filled up by the Trains Clerk at the starting stations. The Wagon Way bill must be signed by the Trains Clerk preparing it.

(c) Wagon Way bill for through Goods Trains must be prepared in duplicate, one copy must be made over to the Station Master of the terminal station of the Division and the original copy should go through as far as the destination of the train. These through wagon way bills are to be transferred from Guard to Guard where trains are not terminated and are pooled through. Guards handing over the through wagon way bills will obtain acknowledgement in their Rough journal Book of having done so; otherwise they will be held responsible if the wagon way bill is lost. In case of the through train passing over more than one Division before reaching the Division in which destination station is situated, a copy of the Wagon way bill must be kept at the terminal station of each Division, the additional copy required for the purpose being made by the Guard working the train upto such terminal station from the original wagon way bill.

(d) Before starting, the Guard shall be responsible for checking the load on the train with the entries on the wagon way bill of wagon numbers, booking and destination stations, type of vehicle open or covered bogies or special types, tare weights, weights of contents and gross weights etc. When vehicles are attached or detached at intermediate stations, the Guard is responsible for seeing them entered on his way bill or signed for, as the case may be and for checking the correctness of all particulars entered, including those of the weight of the wagons.

(e) Only one vehicle is to be entered on each line of the way bill. Vehicles are to be entered in the order in which they are placed from the engine at starting station. Subsequent entries en-route are to be made below those comprising starting load.

(f) Wagon way bills for Passenger trains must be sent through to the destination station on this Railway. It is not necessary to prepare sectional way bills for Passenger trains.

(g) Guards must be particular to see that the description of the vehicles entered on the Way bill is shown; also that the gross weight entered is the sum of the tare weight stenciled on the wagon and the weight of contents shown on the side label in tonnes.

(h) The attention of Guads is drawn to the loads permissible on the different sections of the line, particulars of which are given in the Working Time Table.

(i) On arrival at destination, the Guard of an incoming train will make over the wagon way bill to the Station Master or the Yard Master or other Yard the same in the rough journal book. In case the train is stabled at a station, the Guard should hand over the wagon way bill to the Station Master on duty and obtain his signature on the Rough Journal Book.

(j) (i) When a B.G bogie carriage (i.e Coaching stock) is attached to a Goods train, it should be counted as equivalent to two and a half four-wheeler units for the purpose of calculating the vehicle load of the train.

(ii) Against South East Central Railway Passenger carriages the initials shown in the stock book and painted on the vehicles will be entered.

(iii) The description of other Railway coaching vehicles will be given in full.

4.28 Use of Portable Control Telephones.-

(a) (i) Portable Control Telephone forms a part of brakevan equipment and must be supplied to every Mail, Express and Passenger train, except for EMU locals running.

(ii) The portable control Telephone is be used by the Guard of Passenger train to relay information to control in case of any accident to train, obstruction or other case occurring in the mid-section, so as to arrange prompt

relief measure, by the Control and other concerned.

(iii) Portable Control Telephones should supplied by the staff of S& T department the originating station of passenger train and collected at the destination station the trains. In case of inter-railway Mail Express and Passenger trains, supply a collection of Portable Control Telephones to be made by the respective railways run within their jurisdiction.

(iv) Guard of every Passenger train must make it a point to see before the starting of I train from originating station that Portal Control Telephone is supplied to the brakevan along with other brakevan equipment. In case of non-supply of the same, he should immediately bring it to the notice of Station Master on duty and obtain a memo from him for non-supply with the reasons thereof.

(b) Description of Portable Control Telephone.

A sealed metallic or wooden box containing portable control type telephone is kept in a leather case.

Socket type.-

Sockettype portable control telephone is used for electrified section. A sealed metallic or wooden box containing a portable control telephone is connected with wire and six pin plug to connect with the socket provided on a post with a small iron box fitted with plug points, at every 1 Kilometre In addition every alternative overhead must is stenciled with legend of telephone in the direction where the circuit posts are located.

(c) How to use.-

The flexible wire connected should be inserted on the six pin socket of pressed switch socket of the small post located for the purpose. After connecting the handle of the portable control

telephone and call Traction Power Controller who shall connect the Section Controller if required.

(d) Training to staff for use of portable control telephones:-

(i) Every Guard is imparted training at Zonal Railway Training Institute, Sini or MDZTI/ BSP during initial and refresher course, as to how to use the portable control telephone.

(ii) Loco Pilots are also trained in use of socket type Portable Control Telephone before they are allowed to work in sections by their respective supervisors and during the course of initial and refresher training at the respective system training schools.

(e) Procedure for checking and testing of portable control phones and maintenance of stock.

(i) Every portable control telephone in the division shall be neatly marked with serial number, Name of base station and division, Inspector maintaining the telephone, and the rake link on which a telephone is required to work. Portable control telephones for special train should be supplied from the buffer stock of the signal or Telecom. Inspectorand normal supply for rake links should not be disturbed.

(ii) Sufficient number of Portable Telephones both RE (Cable) and overhead type should be kept in good fettle at the following places:-

(a) Starting stations of trains;

(b) Transfer station from RE to non RE area and vice-versa.

(c) Terminal stations.

(iii) In orderto ensure satisfactory working of Portable control telephone, each telephone must be tested jointly at least once every fortnight by the Electric Signal Maintainer/ Telecom Maintainer and the Station Master at the base station of the portable telephones. The result of the joint test should be recorded in a separate register maintained by the Electrical Signal / Telecom Maintainer at the base station, allotting separate pages for each telephone to contain the following information:-

(a) Date of testing;

(b) Defect noticed;

(c) Action taken to rectify;

(d) Names if Maintainer and SM;

(e) Signatures of Maintainer & Station Master.

(iv) The joint test shall be done in case of non-electrified areas by hooking the telephone in line wire and in the case of electrified areas; the socket type telephone should be tested by plugging into a test socket, ensuring that satisfactory communication is possible both ways from the telephone to the Controller.

(v) In addition the Electrical Signal Maintainer/Telecom Maintainer should also test the portable control telephone every time it is handed over to the Guard of the train and make an entry to that effect in the register to be maintained forthis purpose at the base station. Each time the telephone is loaded or unloaded, the Guards signature should be obtained in the

register in token of verification of intactness of the seal of the telephone box. In case the seal is broken, the outgoing Guard should accept the telephone with suitable remarks. In case the seal is broken when the telephone is received by an incoming train, the Guard must make an entry to this effect while signing the register.

(vi) At every point the Guard/Loco Pilot is changed, the intactness of the seal of the portable control telephone box should be checked by the Guard taking over duty. When a Guard or Loco Pilot is relieved by another Guard/Loco Pilot, the signature of his reliever must be obtained in the Guard's Rough Journal Book/Loco Pilot's Note Book.

(vii) Whenever a portable control telephone fails at the time of emergency use, mention must be made in the Guard's Journal which is to be conveyed to control. This telephone on arrival at the base station shall be subjected to a joint test by the Operating and S&T Supervisors or by the Supervisors of the Loco department and S&T department in the case of electric engine.

(viii) Each Guard shall be trained and examined every three years at the Training Institute, regarding the use of portable Control Telephone in detail and on being satisfied on the proficiency of the Guard in the use of such telephone, the Principal shall issue a certificate of competency to each Guard. In addition to this examination made by the Principal, Training Centre, the Divisional Transportation

Inspectors, Telecommunication Inspectors and Safety Counsellors should check the proficiency of the Guards in the use of portable Control Telephone as frequently as possible and report deficiency, if any to the Divisional Safety Officer for suitable action.

(f) **Portable Telephone for Electric Locomotives:-**

(i) All electric locomotives in use on this Railway are provided with Portable Telephone to be used by the Loco Pilots for connecting the Emergency Control circuits to relay information to control in case of any accident, failure, obstruction or any other cases occurring in the mid-section.

(ii) For this purpose, sufficient number of spare telephones and cells shall be made available in the Loco Shed by the electrical department. Soldering of cells for connecting to the circuit will be done by the S&T staff.

(iii) Periodical examination, testing and repair shall be conducted by the S&T staff so that sufficient number of Telephones in good working order are available at any time. This Periodical examination and testing shall be done at least once in a week. In addition, such periodical test should also be done by the JE/SE (Electrical).

(iv) Each Loco Pilot before taking charge of the Loco as well as the JE/ SE(Electrical) immediately prior to its issue must check the Telephone irrespective of the periodical testing being done by the S&T staff. They shall

ensure before commencement of journey of the locomotive that the Telephone is being proper working order. In case of the Telephone does not confirm to the above standard, a spare tested Telephone shall be handed over to the Loco Pilot and arrangement shall be made by the JE/ SE(Electrical) for rectification of the defective Telephone. All defective phones shall be stacked separately in the Shed under a clear distinguishable indicator lable “Defective”.

(v) A register will be maintained in the office of the JE/SE(Electrical) regarding the test of the portable Telephone allotting separate pages for each Telephone to contain the following information-

(a) Telephone No.

(b) Date of testing

(c) Defect noticed

(d) Action taken to rectify

(e) Names of JE/SE(Electrical)/S&T official

(f) Signature of JE/SE(Electrical)/S&T officials

(vi) Each Loco Pilot shall be trained and examined during the refresher course of training at the Electric Loco Training Centre, Uslapur regarding the use of Portable Control Telephone in detailed and on being satisfied on the proficiency of the Loco Pilot in the use of such Telephone, the Principal shall issue a certificate of competency to each Loco Pilot. In addition to this examination made by the Principal, the Inspectors of Loco department, Telecommunication Inspectors and Safety

Counselors should check the proficiency of the Loco Pilots in the use of Portable Control Telephone as frequently as possible and report deficiency, if any, to the Sr,DEE/DEE or DME as the case may be.

4.29 Weather Warning-

(1) Arrangements exist with the officers of the Meteorological department of the Government of India through Telephone, Fax, e-mail etc. for issuing of weather warning *message,* whenever storms, gales or heavy rainfall are expected.

The conditions under which warnings issued are furnished below:-

(i)	Amount of rainfall considered dangerous	50 milimetres and above in 24 hours.
(ii)	Wind Velocity considered dangerous	72 kilometres per hours and over.
(iii)	Period during which such warnings are issued	Throughout the year.

(2) A list indicating the Divisions and Railway officials to whom weather warning message addressed by offices of the Meteorological department, is appended below:-

Sl. No.	Division	Postal address of official to whom warning telegrams should be addressed	Regional Metrological Centre issuing warning
1	Nagpur	Principal Chief Engineer, SEC Rly., Bilaspur	Bilaspur
		Principal Chief Operations Manager, SEC Rly., Bilaspur.	
		Principal Chief Electrical Engineer, SEC Rly., Bilaspur.	
		Chief Controller, SEC Rly., Nagpur.	
		Chief Traction Power Controller, SEC Rly., Nagpur.	
2	Raipur	Principal Chief Engineer, SEC Rly., Bilaspur.	Bilaspur
		Principal Chief Operations Manager, SEC Rly., Bilaspur.	
		Principal Chief Electrical Engineer, SEC Rly., Bilaspur.	
		Chief Controller, SEC Rly., Raipur.	
		Chief Traction Power Controller, SEC Rly., Raipur.	
3	Bilaspur	Principal Chief Engineer, SEC Rly., Bilaspur.	Bilaspur
		Principal Chief Operations Manager, SEC Rly., Bilaspur.	
		Principal Chief Electrical Engineer, SEC Rly., Bilaspur.	
		Chief Controller, SEC Rly., Bilaspur.	
		Chief Traction Power Controller, SEC Rly., Bilaspur.	

(3) Weather Warning Messages will be classified as "XXW' (Weather Warning) or "000" (Weather Immediate). These messages will be normally delivered by Meteorological department through email, Fax, Telephone directly to the Railway Control Office. If they are delivered into the Railway station, they must immediately be dispatched and conveyed on telephone also to the control office

(4) Action to be taken on receipt of weather warning message.

(A) By the Central Control Office:-

(i) The Chief Controller or in his absence the Dy. Chief Controller must immediately repeat the weather warning message verbatim on the telephone or by a written message to the Secy, to PCE and EAto PCOM for the information of PCE & PCOM, and then circulate the contents of the message to the Officers concerned in the Headquarters Office.

(ii) He should also verify with the Divisional control that such weather/cyclone warning messages received by him, have also been received by the Divisional Chief Controller of the concerned divisions, so that lapses can be remedied then and there.

(B) By the Divisional Control Office:-

(i) The Chief Controller or in his absence Dy. Chief Controller should immediately repeat the weather warning message verbatim on the telephone or by a written message to the Divisional Railway Manager, Sr.DOM/DOM, Sr.DEN(Co)/Sr.DEN(Line)/Sr.DEN & the AEN (if he is headquartered at the divisional headquarters).

(ii) Simultaneously, the Chief Controller or, in his absence the Dy.Chief Controller must immediately arrange for the transmission of the weather warning message verbatim on the control phone to the concerned Station Master/Officials-in-charge of the station/Station Master on duty. The controller repeating the messages should record the initials of the Station Master/Official-in-charge of the station/Station Master on duty to whom the message has been repeated.

(iii) In respect of sections which are not controlled or when the Control Telephone is interrupted, "XXR"(immediate)

message should be issued by the Chief Controller or in his absence by the Dy. Chief Controller, the Station Master/ Officials-in-charge of the stations, through any other available means of communications.

(iv) The preamble of the weather warning message and the text as received from the Metrological Department should be reproduced verbatim in the text of "XXR" message; the text of the message should be worded shown as below:

Regional Metrological Centre.....

....(here enter the name of the Metrological Centre)XXW/OOO (insert whichever class is used by the Metrological department) coded.....

(insert code time of the original message)date..... (date of original message) reads..... (reproduced the text of the Metrological Message verbatim).

(v) A register should be maintained in each control office showing full particulars of the receipt and action taken on the weather warning message showing the date and time of receipt of warning message, the full text of the message, and the date and time of dispatch of telephonic advice to the officials concerned and the initials of the Station Masters/Officials-in-charge of the stations/Station Master on duty to whom the message has been repeated.

(vi) The Chief Traction Power Controller (CTPC) or, in his absence the Traction Power Controller (TPC), must immediately repeat the weather warning message verbatim on the telephone or by a written message to the DRM, Sr.DEE/DEE(Traction Distribution) and the AEE (Traction Distribution) at the headquarters of the division.

(vii) The CTPC or, in his absence, the TPC should also ensure that the contents of the weather

warning message are conveyed to the AEE/ Traction Distribution and the JE(OHE) of the concerned sections.

(C) By the JE(OHE)-in-charge of the Depot:

(i) The JE(OHE) on receipt of the weather warning message should immediately mobilize their resources and alert their staff so that they will be in readiness for any eventualities.

(ii) The JE(OHE) should also make sure that staff/ gang already engaged in maintenance work are specially altered to speed up the work so that availability of staff for contingencies is ensured.

(D) Action by the ASM on duty of Station Master/ Official-in-charge of the station.

(i) The Station Master/Official-in-charge of the station or ASM on duty where AENs/JE/SE/ SSE(Engg.)s are headquartered should immediately handover to the parties a copy of the verbatim message received from the Controller and must obtain and acknowledgement. If the AEN/JE/SE/ SSE(Engg.) is out of headquarters, the Station Master/Official-in-charge of the station should advice the controller on duty, who will then be responsible for ensuring that the contents of the message are communicated verbatim to the Engg. Officers at the stations concerned.

(ii) The Station Master/Official-in-charge of the station should also send for the P.W. Supervisor/Gangmate of the station Yard gang, explain to him the contents of the message and obtain his acknowledgement.

(iii) A registershould be maintained at each station in the proforma given below :-

Date and time of receipt of message	Text of the message in full	Name and Designation of official to whom message was repeated	Date and time of repeating of the message	Signature of the Station Master/Official-in-charge of the station
1	2	3	4	5

(iv) The office copy of the message on which an acknowledgement maintained in the railway stations should be inspected daily by the Station Superintendent/Station Master and in their absence by the General ASM.

(E) Precautions to be taken by the Station Master, Loco Pilot and Guard-regarding controlling of trains.

(i) When a weather warning message has been received forecasting heavy air cyclonic storm and high winds, or floods or heavy rains, and there is reasonable doubt that a severe storm and high winds are going to break out, orfloods and/ or very heavy rains are even imminent, that may endanger the safety of passengers/trains, the Station Master, in consultation with the Guard and the Loco Pilot, shall detain the train until the Strom and high winds, flood, rainfall abate and till it is considered safe for the train to proceed ahead.

(ii) Inspite of the action outlined in (i) above, should the Loco Pilot be still caught on run in a storm and high winds, floods, or very heavy rains of an intensity which, in his opinion, are likely to endanger the safety of the passenger trains, he should bring his train with the least delay to a halt, avoiding such stoppage at places like sharp curves, high embankments, cuttings and bridges. The train may be started again thereafter by the Loco Pilot in consultation with the Guard only after the storm and high winds, flood, rainfall abate and it is considered safe for the train to proceed ahead.

(F) Action to be taken by the SSE(P.Way) SE(P.Way) and JE(P.Way) on receipt of weather/cyclone warning message.

(i) During the Non-Monsoon (fair) season:

(a) They shall advice the gangmates to extra vigilant and to undertake gang patrol as per provision of Indian Railways Way and Works Manual.

(b) They should be out on their section by trolley during the period of warning and for 48 hours thereafter, and ensure that the gangmates are carrying out their prescribed duties.

(ii) During the Monsoon season:

(a) On sections where monsoon patrolling is not in force:

Action should be taken on the same lines as specified for Non-monsoon (fair) season, vide (i) above.

(b) On sections where monsoon patrolling is in force: They should advise monsoon patrollers, Watchmen at vulnerable locations and bridges, and gangmates to be extra vigilant and the gangmates to also undertake gang patrol as per provision of IRPWM.

They should be out on their section by trolley during the period of warning and for 48 hrs. thereafter, and ensure that the monsoon patrollers, watchmen at vulnerable locations and bridges, and gangmates, are carrying out their prescribed duties.

(G) Action by the Gangmate:

(i) During both the monsoon and non- monsoon (fair) seasons.

(a) On receipt of weather/cyclone warning advice from the official-in-charge of the Station, SSE/SE/JE(P.Way) (as the case may be) should be extra vigilant and carry out gangpatrol as per provision of the Indian Railways Permanent Way Manual.

Explanatory Note: Gang patrolling (as per provision of IRPWM shall commence immediately on receipt of the Weather / cyclone warning message. This patrolling shall extend for 48 hours beyond the duration specified in such Weather / Cyclone warning message.

These instructions are applicable all through the year.

Exception: In the monsoon season in sections where regular monsoon patrolling is in force, this patrolling will

commence with the occurrence of rainfall/cyclone and extend for 48 hours beyond "the duration of such rainfall/cyclone / storm.

(b) Should there be a sudden severe storm or hurricane or cyclone or abnormal rainfall or floods, in the day or night, whether or not he has received any advice of weather / cyclone warning from the Official-in-charge of the Station, the SSE/SE/ JE(P.Way) and whether or not monsoon patrolmen/ Stationary watchman at vulnerable locations and bridges are on duty, he should, on his own initiative, organise, patrolling of his ganglength, as per provision of Indian Railways Permanent Way Manual. Such patrolling should be extended for 48 hours, beyond the duration of such severe storm/ hurricane/ cyclone / abnormal rainfall / flood.

(H) Action taken on every weather warning message must be reviewed periodically by the DRM/ Sr. DSO/DSO/ Sr. DEN/DEN of the divisions. Inspecting Officers must call for the registers being maintained at the stations (vide (d)(iii) above) and ensure that the prescribed procedures are being followed.

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CHAPTER - V
PASSENGER TRAIN OPERATING AND TIME TABLING

5.01. Introductory.-

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

5.02. Classification of Passenger Services.-

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

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

(b) ***Local Passenger trains:-*** These trains cover relatively short distances generally stop at every station.

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

(d) ***Suburban trains:-*** These are light trains of greater frequency serving the suburban area of metropolitan cities.

5.03. Time Tables.-

The Time Tables are changed once on 1st July every year. Consequently the following types of Time Tables are published on this Railway and issued once in every year to come into force on the above mentioned dates:

(a) ***Public Time Tables :-*** These are handy volumes for use by the public and are printed in English and in regional

languages. In additions to the time schedules they contain a variety of useful information for passengers including fare tables.

(b) ***Sheet Time Tables*** These are exhibited on the notice boards of stations, platforms and passenger waiting halls. They are printed in English and also in regional languages and contain the schedules of various coaching services, tabulated and brought together on a large sheet for ready public reference.

(c) ***Staff copy of the Time Table*** This is a copy of time table meant for use by Railway staff.

(d) ***Working Time Tables*** These are issued separately for each Division for the information and guidance of all Railway staff, especially the running staff, station and control staff. These Time Tables contain the schedules of all coaching trains as well as of Goods trains, and other valuable information such as load tables of Goods trains, Headquarters of Divisional staff, permanent and Semi-permanent, Engineering restrictions and special working instructions. Along with the Working Time Tables, an Appendix to the working Time Tables is issued for the use of Railway staff. This contains a variety of information and instructions for the staff e.g. composition of trains, rake links, speeds over turn outs, particulars of Relief trains, conversion tables etc.

5.04. Committees associated with the make-up or revision of the Public Time Table.-

Suggestions are invited from M.Ps, M.L.As, Chambers of Commerce and Members of Zonal/ Divisional/Suburban Railway users' Consultative Committee and Members of Time Table Committee, individual suggestion from public are entertained before framing the Time Table.

(a) *Zonal Railway Users' Consultative Committee (Z.R.U.C.C.):-* This Committee functions at the Railway Headquarters office at GM Complex, Bilaspur consisting of members appointed by the Railway Ministry to represent railway users in the territory served by the Railway and includes elected non-official members .of the Divisional Railway Users' Consultative Committees. The General

Manager is the Chairman of the Committee and the Dy. General Manager (G) functions as the Secretary to the Committee.

(b) *Divisional Railway Users' Consultative Committee (D. R.* U. C. C.):- This Committee functions on each Division and consists of members representing the railway users of the area. The Divisional Railway Manager is the Chairman of the Committee and the Sr. Divisional Commercial manager functions as the Secretary. The Committee holds a meeting in advance of the meeting of the lime Table Committee (T. T. C) (See sub-para(d) below).

(c) *Time Table Committee (T.TC.):-* This committee advises the Railway Administration on matters connected with the lime Table and meets about 3 months before the Time Table become due for revision.

The constitution of the committee is as follows:-

(i) *Chairman:-* Principal Chief Operations Manager.

(ii) *Secretary:-* Chief Passenger Traffic Manager/ Deputy Chief Operations Manager (Coaching).

(iii) *Official Members:-* Chief Commercial Manager, Chief Mechanical Engineer, and Chief Electrical Engineer.

(iv) *Non-official Members:-* Chief Representatives of the Zonal Railway Users' Consultative Committee, the Divisional Railway Users' Consultative Committees Passenger Associations & members of the parliament.

(v) *Postal Deptt. Members:-* Representatives of the Postal Department also attend the meeting so that their requirements are presented.

Before the Time Table Committee meeting is held the Divisional Officers meet at Headquarters and discuss various suggestions and difficulties relating to their Divisions for the Time Table.

Before the Time Table is revised in Inter-Railway Time Table co-ordination meeting is held and the Chief Passenger Traffic Manager/Deputy Chief Operations Manager (Coaching) of all the Railway discuss the timings and arrive

at agreement; handing over the inter-railway trains at junction The feasibility of introducing any new trains extending a train is also gone into in consultation with the Railway Board's representatives.

5.05. Speed and running time.-

(a) *Maximum permissible speed:-* The maximum permissible speed over different section is approved by the Commissioner of Railway Safety taking into consideration the condition of the bridges, curvature and gradient. This speed may not be exceed under any circumstances.

Maximum permissible speed for each type of locomotive is also fixed for different sections and notified in the Working lime Table.

(b) *Minimum permissible Running time:-* The minimum permissible running time between stations is fixed on the basis of maximum permissible speed. A Loco Pilot should not cover the run between two stations in less than the minimum running time published in the Working lime Table.

(c) *Normal Running time:-* The normal running time for a particular train between stations is fixed on the basis of maximum permissible speed of the section. While fixing the normal running time due consideration is given to the permissible track speed, load of the train, type of locomotive, acceleration, declaration, restriction over facing points and turn-outs and Engineering restrictions.

(d) *Time allowance for stop and start:-* The time allowances are indicated in the working time table for different types of trains.

(e) *Time allowance to cover Temporary Engineering speed restrictions* :- Time allowance to cover temporary Engineering speed restrictions is provided on each section, based on the work proposed to be carried out by the Engineering department.

(f) *Recovery time:-* This time allowance is provided to compensate for time lost by a train due to unforeseen reasons such as alarm chain pulling, points and signal failures, fog, storms etc. Generally recovery time is provided at the last lap of run of Passenger trains.

(g)Time allowance of Junction station:- Time allowance at junction stations for maintaining connection with other trains and for other public requirements should be judiciously fixed and tedious halts avoided. The authorized permissible detentions to trains at junction stations are shown in the Working Time Table.

5.06. Platform facilities at Terminal and Junction stations.-

When working out the timings for passenger services it is essential to keep in view the platform facilities available at terminal and junction stations.

5.07. Sectional and Through Service Coaches. -

These coaches are run on certain passenger' services for the convenience of passengers.

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

Through Service Coaches are coaches which are transferred from one train to another at a junction station to reach a destination not served by the original train.

5.08. Rake Links.-

Block Rakes are run according to links framed by the Principal Chief Operations Manager Office with the object of optimum utilization of passenger coaches consistent with proper maintenance.

5.09. Engine Links.-

Selected locomotives of prescribed classes of different traction are used for the coaching services. These engines are linked in such a way as to ensure that optimum utilization.

5.10. Overload and Double heading.-

(a) The normal composition and the maximum load of each train is shown in the Appendix to Working Time Table. If it becomes necessary to attach an extra coach by a

Passenger train prior permission of the Principal Chief Operations Manager should be obtained.

(b) (i) The double heading of Passenger train is not allowed without the permission of the Principal Chief Operations Manager.

(ii) The arrangement of -banking and double heading of coaching train is shown in the Appendix to Working time Table.

(iii) On sections where there is no restriction on double heading when the prior permission of the Principal Chief Operations Manager cannot be obtained, the senior most Divisional Operations Manager of the Division concerned may permit double heading.

5.11. Duplication, Diversion and cancellation of train.-

(a) Aduplicate Passenger train may be run if the original train is running abnormal late to the extent of causing serious inconvenience to passengers and up-setting connection with other important trains.

(b) A passenger train may be diverted by another route due to serious accidents or floods or breaches causing dislocation of traffic and blocking of normal route.

(c) No Passenger train shall be cancelled unless there is a serious accident such as flood, breaches and interruption of through communication fora considerably long period or when running of original train is not considered necessary due to duplicate train being run. For cancellation of Passenger train prior permission of the Principalchief Operations Manager must be obtained.

However, in case of emergency when prior permission of the Principal Chief Operations Manager cannot be obtained, the Senior Divisional Operations Manager of the Division concerned shall issue the orders for cancellation of passenger train and report the cancellation to Dy. Chief Operations Manager (Coaching) / Chief Passenger Transportation Manager for Principal Chief Operations Manager's confirmation.

5.12. Punctuality of Passenger trains:-

(a)The efficiency of passenger train operation is judged by the punctuality of passenger services. Endeavour should

be made to achieve 100% punctuality for all trains not only at destination but at intermediate stations also.

(b) Passenger train punctuality is calculated on the basis of:-

(i) Trains arriving destination right time (RT)

(ii) Inter-Railway trains which are received late at the interchange point but do not lose further time. For example if 18238 Dn.Amritsar-Bilaspur Chhattisgarh Exp. is handed over to South East Central Railway at Nagpur by Central Railway 30 minutes late and it reaches Bilaspur 30 minutes or less late, the train will be treated as not losing time (NLT) on South East Central Railway

(iii) Total number of trains run.

The punctuality of Coaching trains is worked out by the following formula:-

$$\frac{\text{(A plus B) multiplied by 100}}{\text{C}}$$

Where 'A stands for the number of trains arriving destination right time.

'B' stand for the number of inter-railway trains not losing time in the system.

'C' stands for the total number of trains run on the system.

(c) Efforts to be made to ensure punctual running of trains:-

(i) Station and Running staff and Control must understand clearly their duty to ensure punctuality in train running. Efforts must be made by all concerned to make up time at stations when a train is running late.

(ii) Loco Pilot must be on the alert and ready to start their trains immediately on receipt of the Guard's signal. They must satisfy themselves that the signal has been taken 'off' and that they are in possession of correct and relevant authority to proceed, if any, before starting.

(iii) In order to ensure punctual running, Station Masters must devote close attention to the prompt loading and unloading of parcels.

(iv) Packages intended for loading should be kept at the spot on the platform where the van usually comes to a stand.

(v) Guard must assist Station Masters to avoid detentions by advising Control in advance when they have a number of bulky parcels for a station. The full complement of Ticket Collectors, Parcel and Luggage Clerks and Hamals booked for duty must be on the platform ready to commence their respective duties immediately the train arrives, and the Station Master concerned is responsible to ensure that this is done.

(d) (i) Stations and running staff connected with the running of trains must realize that it is their duty to encourage and ensure punctuality of trains by every means within their power and every endeavour must be made particularly in case of train that is running late to make up time at station.

(ii) Irrespective of departure time shown in the working time table when a train is running late, efforts must be made to make up time and start the train earlier.

(e) No Passengertrain should be started from, a station earlier than the departure time shown in the Pubic Time Table.

(f) *Advice when Mail trains and other trains carrying passenger are running late* on *section where Train Control has not been installed and in the event of failure of Train Control:-*

(i) When a train is running over an hour late, the Station Master of the first station at which it arrives late must advice all halting stations as well as the next important junction station by sending, message intimating how late the train is actually running.

(ii) If on arrival at the important junction station ahead, the train is still an hour or more late, Station Master of the station will advise Station Master of all halting stations as far as the next important junction station by sending message.

(iii) The same procedure will be followed by each junction station until the train arrives at destination.

Note:- On section having Train Control, the Section Controller on duty will inform all stations and the adjacent Control office about the late running.

(iv) The Station Masters of Refreshment Room stations must advise the Refreshment Room Managers promptly when Mail/other trains carrying Passengers are running late.

(v) The postal officials must also be informed.

(vi) The Late running of trains should also be announced on the public address system where provided.

5.13. Stoppage of Mail, Express and other Passenger Trains out of course.-

(a) No Mail, Express or other Passenger train shall be stopped out of course without prior permission from the Senior Divisional Operation Manager.

(b) Any train maybe stopped out of course by a Station Master on written request from: Magistrate ora police Officer not below the rank of Deputy Superintendent proceeding on duty to attend very serious case of crime or for maintenance of law and order. The Station Master must obtain permission of the Senior Divisional Operation Manager for such stoppage.

(c) This requisition must be forwarded by the Station Master with full particulars of detention, to the Senior Divisional Operations Manager concerned without delay.

5.14. Control of Coaching Stock.-

(a) ***Coaching Movement Section:-*** The Coaching Movement section in the Operating branch of the Headquarters office at Bilaspur exercises control on holding and movement of coaching stock over the entire Railway. For effective control on utilisation and movement of stock, the following information should be supplied by the Divisions daily to the Coaching Control at Headquarters:-

(i) The coaches spare in fit condition type wise, coaches marked sick on Electrical and Mechanical account with the oldest date.

(ii) The position of coaching trains running in the Divisions with the actual composition of the train, the individual number and type of coaches and the marshalling order.

(iii) The coaching stock category wise waiting movement to shops for POH and/or special repairs, indicating the individual number and type of coaches. ,

(iv) The interchange with workshops indicating the types and individual number of coaches handed over to and taken over from the shops.

(v) The daily movement of the trial trains from point to point.

(vi) The movement of coaches to and from other Railways.

5.15. Design of Coaches.-

Broad gauge coaches are divided into two groups as follows:-

(i) LHB coaches,

(ii) ICF coaches.

LHB coaches- these coaches are made of stainless steel and the interiors are made of aluminium which makes them lighter as compared to conventional rakes. Each coach also has an “advanced pneumatic disc brake system” for efficient braking at higher speeds. The improved suspension system of LHB coaches ensures more riding comfort for the passengers compared to ICF coaches.

ICF are conventional passenger coaches used on the majority of main-line trains in India. The frame of the ICF coach is a fabricated structure made up of mild steel.

5.16. Load and marshalling of Coaching trains.-

(a) Composition of Coaching trains:- All coaching trains should run with the composition prescribed in the booklet showing rake link. Trains should not run under load and when due to any unavoidable reason, load of a train has to be reduced below the prescribed composition, immediate action should be taken to restore the load.

(b) *Marshalling of Coaching trains:*- The Marshalling order prescribed in the booklet should be rigidly followed by the person in charge of such work at the base stations, keeping the following instructions in view:-

(i) Ladies' Compartment:- Ladies compartment should as far as possible be in the middle of the train. Ladies Compartment should be provided with a closet.

(ii) SLR;- (a) In case of SLRs which have passenger portion on one side and luggage-cum-brake portion on the other, SLR should be marshalled in such a way that the luggage and brake portion is trailing outer most or next to engine.

(b) In case of new design of SLRs with Passenger portion in the middle, these can be positioned in either way.

(c) In case SLR is marshalled with Passenger Portion next to the engine or rear SLR with the Passenger Portion towards the end of the train the Passenger portion of SLR should be locked.

(d) In case of shortage of SLRs, any other suitable coaching vehicle or a VPU may be provided, and in case a coaching vehicle is attached its doors should be locked to ensure that passengers cannot be occupy it.

(iii) Marshalling is permitted of three coaches in front and rear of the SLR on short train, provided they have working brakes. An Inspection carriage may be attached as fourth trailer coach on such trains.

(iv) Non-passenger Coaches:- VPs, SLRs, WLRRMs and other coaching vehicles, which do not carry passengers may be marshalled as operationally convenient.

(v) *Inspection Carriages:-* Inspection Carriages may be marshalled as operationally convenient.

(vi) *Reserved bogies and saloons occupied by VIPs:-* Reserved bogies occupied by passengers and Inspection Carriages *I* Saloon occupied by VIPs should be treated as passenger coach and may be marshaled as operationally convenient.

(vii) Section/Through service coaches:- Sectional Through service coaches may be marshalled as operationally convenient.

(viii) *POH/Sick coaches returning to shops:- (a)* In the case of POH/Sick coaches which are returned to shops for

major repairs and are attached to passenger trains, such coaches should be properly locked and windows secured, so as to prevent entry of the passenger into these coaches. In that case, it is not necessary to attach these coaches according to safety marshalling instructions and can be attached' next to the train engine or rearmost as convenient. If for any reason it is not possible to lock up these coaches, such coaches should be treated like other passenger coaches in the train formation and should therefore, be marshalled.

(c) It is also desired that the above instruction on safety marshalling of passenger carrying trains should be made known to all the staff and officers concerned and these should be followed strictly.

5.17. Carrying Passengers by goods vehicles.-

No goods stock should be used for carrying Passenger traffic without the previous sanction of the General Manager.

5.18 Running of V.I.P. Special-

Detailed procedure to be observed for running VIP specials is laid down from time to time in Principal Chief Operations Manager secret Circular. In case of running of V.I.P. Specials the specific secret circular to be issued by the Divisional Railway Manager to the staff concerned is to be referred to for guidance.

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CHAPTER -VI

GOODS TRAIN OPERATION

6.01 Importance of Freight Operation:

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

I. Broad Classification of Goods Trains:

1. End to End:

Trains, generally run from the train-originating Terminal to the final destination. This is an express stream of freight trains and does not require any stoppage en route, except for crew change.

Such trains will normally include container trains, air braked block rakes for single destination. These trains are planned to run like non stop Rajdhani trains and may have a fixed timetable and guaranteed transit time. This group may include trains of private freight operators.

Other through trains -are also block rakes or may have two or more destinations on the same or adjacent section. These may have conventional bogie stock

2. Work Trains, Shunting Trains, Pilots etc.:

These train movements are for short distances for clearance of damaged wagons made fit or for supply/removal of rakes to and from the sidings or important terminals served by a yard.

3. Departmental trains:

These include Material Trains, Track maintenance trains, Ballast trains, Relief Trains, Wiring Special, Crane Specials etc. are known as departmental trains.

II. Complexity of Freight operations:

Freight operation is generally more complex than passenger train - operations for the following reasons:

1. The changing pattern and fluctuations in demand for rakes/ wagons due to changes in the level of production, changes

in the pattern of distribution and changed consumption centres.

2.The variety of commodities to be moved, with different characteristics & type of wagons required.

3. Preferential traffic schedules, rationalisation scheme & other public policy regulations.

i) Seasonal variations in demand.

iii) Time taken in loading/unloading-whether manual or mechanical

iiii) Train examination Systems

- End to End/Intensive Examination
- Premium end to end
- C.C. rake

This in turn results in Sick Wagon detachments & attachment of fit wagons for completing the rake composition.

4. Following is the series of operations for empty rakes being offered for loading:-

- Examination
- Supply/placement
- Loading
- Despatch

5. For inward loaded trains which after placement and release have to be back loaded at the same terminal or at other location, withdrawal from loading points may require an outward examination unless the rake is fit for round trip or for a prescribed distance. Once the train is fit in all respects and commercial formalities have been complete a set of activities are initiated these include

- Preparation of train documents
- Train ordering,
- Arranging train crew & locomotive
- Monitoring train movement
- Arrival at the destination

This cyclic operation requires constant monitoring and co-ordination.

III. Ordering of Goods Train:

a) Each freight Train is required to be ordered to run under a unique number /name or Train ID for monitoring its movement through intermediate divisions, zones etc as also to facilitate all processes at control offices, yards, C&W depots, station and Crew/Guard booking Lobby, Power Controller/Traction Loco Controller.

b) The message from Divisional Control that a train is scheduled to leave from a Station or Yard at a certain time is known as the Train Notice. The message is, in turn further conveyed to all concerned. The availability of suitable (i) Load (ii) Locomotive (iii) Crew/Guard and (iv) Path has to be kept in view for ordering of goods trains.

c) Co-ordination between the Traffic Controller/and the Power Controller (the shed, if fresh power is required) ; the Yard/ Station, C&W staff and the Crew/ Guard booking lobby is thus-required.

d) Regular conference with yards, terminals, and the adjoining Division is held by the Control and for exchange of information regarding forecast of trains in yards completion of loading/ unloading at sidings etc. and interchange with adjoining Divisions. This monitoring should be enforced through FOIS so that time of staff spent on phone is reduced and more productive work is done by better planning.

e) Constant monitoring for expediting loading/unloading at major sidings/goods sheds is also done by Control and the Station Staff for ensuring the availability of load.

IV. Planning of Locomotives:

a) Power Plan:

The power plan indicates the daily average number of locos required and planned for freight services section wise for each division. This bare requirement of Locos for Traffic use is calculated on the basis of the traffic turn round and average number of trains run on each section. This represents the average number of locos needed on the Division.

b) Loco Outage and Loco Utilization:

Loco Outage means the average number of locos available to traffic use in a day (24 hours). Since the Diesel and Electric Locos have long extended runs and may cover many divisions in a day, the position maybe maintained graphically for the entire duration (0 to 24 hours) the loco is on line on the Division. Different colour graphic representation on Bar Chart can represent the time spent by each Loco to serve as a good Management Information System, e.g. (a) time taken by running train (b) time taken for Crew Changing (c) time for Fuelling (Diesel Locos) (d) time taken for Loco inspection (e) time for repairs on line (f) time for Light Engine running (g) time taken for Shunting (h) time spent at terminal/ destination (i) enroute detention. Thus, the total hours for which the various Locos were available for Traffic use divided by 24 (number of hours in a day) would give the Loco outage.

$$\text{Loco outage} = \frac{\text{Engine Hours for traffic use}}{24}$$

Loco outage can be prepared service-wise/shed-wise/ railway-wise, traction wise etc. The actual Loco outage should generally be around the target fixed for each Division.

However, it should be appreciated that while the target is based on average, the actual requirement of Locos may fluctuate due to bunching of trains, increase in traffic or due to bottlenecks on account of operational reasons, equipment failure or after effect of interruption to traffic.

c) Control of Operating Department on Loco running:

Electric and Diesel Locos are maintained by the respective Loco Sheds and Locos once turned out of shed are available for utilisation for a number of days till prescribed maintenance/ inspection schedule is due in the shed or the locos require out of course repairs. Thus, while the operating staff has the operational control over utilization of Locos as well as flexibility of using the Locos as per operational requirement, they have to keep in view the maintenance/inspection schedules of the Locos and send the Locos to the Shed well in time. Overdue running of locos should be avoided by suitably planning the train running.

Similarly, all out efforts should be made to send the dead locos or locos requiring attention in the home shed. The hauling capacity of the Locos and special restrictions as jointly agreed to by the officers of operations and loco departments should also be adhered to.

While operating department has to optimise the work done by each Loco i.e. moving maximum traffic with the minimum number of- Locos by adoption of operational strategies and improving the efficiency, the Shed and the Loco organisation should provide optimum number of Locos in good fettle, keeping in view the traffic needs as shortage of Locos.can lead to transport bottlenecks and inability to move the existing and potential traffic.

Along with the availability, reliability, safety and predictability have to be aimed. Loco failures, Loco troubles en-route and ineffective locos should be kept to the bare minimum.

Balancing of Locos is also required to be done i.e. Locos without loads may be sent to other Divisions where they are required.

Reduction in terminal detentions and increasing average speed of goods trains would substantially improve engine utilisation.

d) Availability of Engine Crew and Guard:

Running staff for Goods operations are generally booked on the principle of first in and first out, Balancing of Crews/Guards by sending staff spare is also required to be done in case the running of trains is not even in both directions on a section.

e) Availability of Path:

Theoretically, on a double line section, a Goods Train can always be run when load, power and crew are available and the next block section is clear.

On single line sections despatching a train out of path, will be counterproductive, due to Mail/Express Blocks, Peak timings of Suburban or Commuter traffic.

Readiness of the interchange point or the terminal to accept the trains are to be kept in view before pushing a goods train ahead. It is better to have directional flow if possible.

Master Charts incorporating all Passenger carrying trains and realistic goods train paths are prepared in consultation with Operating Officers, Controllers, Yard Staff, Power Controller, Station Masters of important stations etc. in order to:

i) Find out line capacity of the section.

ii) To highlight the set of suitable paths for guidance of Control, which can be used for, goods train ordering also.

iii) To prepare tentative goods train time table for selected express stream of trains.

f) Lobby System :

A Lobby is like a Control Office in the field. It is established with the twin aim of reducing engine detention and crew detention in a Yard or a Crew or engine changing station by realistic ordering of trains and Crew/Guard booking.

It is advantageous to have a combined Crew and Guard booking loby so that both are available simultaneously. The lobby supervisors/staff can take forecast of a train running from the Deputy Controller/Section Controller along with details regarding the names of Crew, Guard and their signing in time, loco particulars, last C&W examination etc.

They can verify the dates of Loco Schedules from the Chart available with them and keep liaison with the Power Controller/ TLC. They also keep watch on “expect” of train formation, examination, readiness etc. and by constant chasing, planning and updating of information, trains are ordered on realistic expect, Trains may be put back or cancelled, if required and Crew booking and engine allocation changed promptly.

Some overlapping Crew/Guard may also be kept in the Lobby to take care of the last minute absenteeism. Shunters may also be kept in the Lobby of big yards/junctions to attach, detach, and run round locos or to pull the Train from Yards upto the Crew changing points, so as to avoid wastage of main line Loco pilots.

The pre-departure detention to the Crew, Crew hours balancing, rescheduling of Locos and Yard detentions to

Locos can be thoroughly monitored by the Lobby and remedial measures taken.

V. Role of Various Agencies in Freight Operation:

Large number of agencies play important role in freight operation. Marshalling Yards, Train Examination, Locomotives and Lobbies have been discussed elsewhere in this Manual. Role of a few agencies is discussed below with special reference to freight operations.

i) Control Office:

The main function of the Control Office is planning, execution and review with all the three activities going on simultaneously.

ii) Planning is aimed at forecasting and optimising the following:

1. Interchange
2. Trains to be run section-wise
3. Supply of rakes for bulk loading.
4. Release of inward loaded rakes placed for Unloading

Information regarding the following items is generally required for this purpose:

(a) Analysisof divisional wagon holding

(b) Power availability

(c) Availability of loads

(d) Disposal of empty rakes

(e) Demands for loading

The plan is made by Control in the early hours of morning and reviewed by Operating Officers. Changes in the plan, as deemed necessary are made at various stages on the basis of updated information received from the activity centres, adjacent divisions and instructions received from the Head Quarters.

iii) Execution:

The goods operation plan is executed on the basis of actual materialization of the forecast with suitable adjustments made for short falls excesses.

Yards, Loco Sheds, Stations, Terminals, Lobbies and TXR depots are actively involved in execution of the plan.

iv) Review:

The trend of the day's position is reviewed by the Chief Controllers and Officers in the afternoon.

Detailed review of the previous day's performance is carried out early in the morning by the Operating Officers with the following objectives:

1. Analysing shortfalls of previous day to take remedial measuresand pin point weak spots.

2. Provide data for planning forthe current day.

The main features of performance, which can be reviewed, include:

- Interchange failures
- Divisional Wagon Balance (Wagons on Division)
- Train Running
- Disposition of empties
- Loading at important terminals - and in case of shortfall, reason for the same.
- Review of unusual occurrences
- Examination of Control Charts
- Particulars of stabled loads
- Yard performance
- Unloading on Division
- Registrations and Loading
- Power position, utilisation of Locos & Terminal detention
- Sick line working
- Special type of stock
- Clearance of piecemeal wagons (sick or otherwise) from roadside stations.

VI. Head Quarter's Role in Freight Operations:

The Division's Freight Operations generally require close co-ordination and assistance from other Divisions and Railways.

While direct contact is also maintained by the Control and Operating Officers of various. Divisions, the Zonal Head Quarters play a pivotal role in this respect. Some of the functions performed by the Head Quarters are summarized below:

VII. Management Information System:

1. Important information concerning the position of Freight Operations on various Divisions of ailways is obtained through line and stock report daily telephonically or through FOIS or Teleprinter or FAX to the Head Quarters (Central Control) from Divisional Control. Now more and more zones and Railway Board are shifting to FOIS generated reports.

This includes, loading and stock position, particulars of old outstanding and fresh registration of indents, category wise position of unloading, transhipment, Yard balances, important yards and wagons on Divisions, Train Running on each section, average speed, interchange position, Locomotive position and Locomotive utilization etc.

The position is reviewed and analyzed by the PCOM/CFTM/ Dy.COM (Goods), STM (Goods) CMPE(R&L) and CELE. The important position pertaining to various Departments is conveyed to the Departments concerned as well as the General Manager. The Head Quarter Office also obtains the Statements at the end of each month or whenever required and the performance is compared with (i) The Targets (ii) The figures of the previous month (iii) The figures of the corresponding month of the previous year and (iv) the best ever record etc. In addition, the Statistical Branch also provides Data to the General Manager and the Departments concerned with Operations for detailed analysis and review.

2. Head Quarters plays an important part in planning and co-ordinating freight operations. After detailed conference with the Operating Officers, and in terms of Railway Boards current-operating directives Head Quarters issues directions and instructions regarding the following items:

(a) Interchange transactions (category wise)

(b) Loading and Unloading

(c) Traffic insight from other Railways/Divisions. This information is now available on FOIS terminal where a pipe line can be seen from end to end and expected arrival of train at destination is also estimated by FOIS system

(d) Conveying priorities for the day and setting quantified objectives to be achieved.

(e) Reviewing the work done at the important activity-centres like Yards, Terminals etc.

(f) Train and Traffic regulation in case of accidents etc.

(g) Certain items of Goods Operation are directly controlled by Head Quarters e.g. Coordination and directions regarding rake loading of programmed and committed traffic, movement of special type of stock, movement of over dimensioned consignments, out of turn allotments and allotment despite restrictions etc.

VIII Railway Board's Control on Freight Operations:

The Railway Board provides Unity of Control and direction for the freight operations. It also has the important role of supervision and co-ordination, which is very much essential fora big network like Indian Railways. The Railway Board's Control Office also remains in contact with the Head Quarter (Central Controls) of the Zonal Head Quarters and watches loading and movement of important streams of traffic, like coal, raw material for steel plants (iron ore), cement, food grains, fertilisers, POL, sugar, export ores, container traffic etc. It also watches loading, interchange, power position, goods train running on important sections etc. to ensure that each Railway fulfils its obligation and optimises the use of various assets. The items watched are more or less the same as those watched by the Zonal Head Quarters in respect of the Divisions, but the perspective is wider. Railway Board plays an important co-ordinating role between various Railways and other Central Government Departments and vital sectors of Economy connected with Railways. Policy formulation and Planning, which have important bearing on Freight Operations is also the major function of the Railway board.

IX Role of Some Other Departments:

The Commercial Department plays an important role in canvassing for Traffic, improving marketing, customer relations in general, booking of traffic, expediting loading/ unloading of wagons, quick disposal of unconnected wagons and transhipment of Wagon detached "out of course for Hot Axles etc. The various other Departments like Mechanical, Electrical, Civil Engineering and S& T provide and maintain various assets and infrastructure (track, wagons, engines, S&T Network etc.). These departments also ensure sufficient availability, reliability, predictability, safety and reduction in equipment failures; promptness in restoration in case of breakdowns and accidents should also be ensured. They also endeavour for the achievements in technology upgradation along with the operating strategies and determine the level of excellence in Railway Operations to a great extent. In nutshell, all the functionaries have to work as a dedicated team.

X Some Indices of Freight Operation and Efficiency:

The important Operating Statistics, most of which are indices of Operating efficiency, have been discussed in detail later in this Manual (Operating Statistics). Some Indices of Freight Operations and efficiency are highlighted below:

XI Wagon Holding:

Fora given amount of originating loading and receipts of loaded wagons from other Railways and making an allowance for percentage of stock out of commission for repairs, etc., there is an optimum number of wagons that a Railway, and separately its constituent divisions, should hold to maintain the fluidity of transport system. More wagons than the optimum number might lead to increase in the repairs and maintenance percentage, heavier detentions to wagons and trains and transport bottlenecks, i.e. more congestion in sidings, yards and sections without a proportionate increase in the tonnes lifted, or in the efficiency of operations.Similarly, excessive shortage of Wagons may lead to loss of traffic. Proper estimation and projection of requirement, proper planning and working at various stages of freight operations is necessary for keeping wagon holding low. "Ineffective Stock" percentage should also be kept minimum.

i) Interchange Balance:

Maintenance of the interchange target is an indication of a Railway's overall operating performance and its efforts to meet inter railway obligations, hence interchange balance should not be very high, even when maximum trains are interchanged. However, attempts should be made to see that on busy sections, interchange is not only confined to few hours of the day but uniformly distributed.

ii) Load of trains:

A train is a unit of transport. Depending upon the load, suitable loco is provided for its haulage. In order to get the optimum use of motive power and to increase 'the capacity utilisation and throughout, each Locomotive is given a load approximately to the maximum hauling capacity, unless operating necessity requires utilisation of a loco for lesser load. The stations should also ensure that wagons are loaded to the carrying capacity or the minimum weight prescribed for some commodities.

iii) Loading and Unloading:

To optimise the loading is one of the most important items in freight operations because it is through loading that Railway earns the maximum revenue. Similarly, unloading is necessary so that wagon becomes available for next loading. Reducing the time taken for loading/unloading by technology upgradation and other strategies in co-ordination with the customers has to be endeavored.

iv) Empty Running:

Ideally it is waste of transport capacity to run a wagon empty or with light load, but much of empty running is inescapable on account of the unbalanced nature and quantity of outward and inward traffic at terminals and necessity of supplying empty wagons. Certain special type of wagons for POL, Steel, Coal, Natural Gas, Ammonia, LPG etc. have to be generally run empty to the loading points. Operating skill lies in avoiding or reducing the extent of empty haulage and cross movements of similar type of empty stock.

v) Despatch in Block Rakes:

Despatching of wagons in small numbers always means transit delay while a block load can go direct to the farthest destination skipping many yards, thereby eliminating detention that the wagons might have suffered in the intermediate yards. Piecemeal wagons passing through a number of marshalling yards, where they have to be combined with other wagons to form train loads, cause huge amount of work for the staff and result in loss of efficiency, avoidable delay, anxiety and uncertainty regarding their arrival at destination. Unit train movement, i.e. a train load consigned by single consignee to single consignor, is ideal.

Consignees can also be motivated to club their Indents to get trainload and block rakes.

Also two points loading on same engine run can improve wagon usage. Close circuit rake movement can also be resorted to between selected pair of stations or rakes. Maintaining the purity of freight rakes has also to be ensured.

vi) Long Distance Trains:

It is an age-old principle of operations that full train loads should be formed at the earliest point for the longest possible distance. Long distance trains should have least stoppages like long distance passenger trains. Trains can also be run as “crack trains” or Link Train.

A crack train/Link Train is a train when the same crew (and engine if possible) instead of “Signing off” at the intermediate crew changing point works a train to farther junction. Thus, a train running from Ujjain to Godhra or vice versa without Crew/ Guard change at Ratlam can be run as X ‘Crack’. The Crew can also be utilised on ‘Crack’ basis when the same Crew perform a round trip without “Signing off’ at the outstation and is promptly provided a load so that Crew returns to its Head Quarters within normal duty hours.

vii) Wagon Turn Round:

The interval between two successive loadings calculated from the time a wagon is placed for loading till the time it again becomes available for reloading is the actual turn round. As

the calculations for individual wagons in the manner stated above are not practicable, the following statistical formula is generalised:

$$\text{Wagon Turn Round } (T) = \frac{S}{L+R}$$

Where 'S' stands for the effective daily wagon holding or midnight wagon balance of a day (excluding sick, POH wagons in or waiting for shops, like departmental wagons, wagons lent for departmental use, and the wagons used for coaching traffic). 'L' stands for the total number of wagons loaded on the Division/Railways plus the wagons loaded at Transhipment Point, 'R' stands for the total number of loaded wagons received from other Railway/Divisions. Thus, for example, if a Division loads 350 Wagons on BG (including 50 BG Wagons loaded through transhipment of MG Wagons), 150 inward loaded wagons are received from other Divisions and its effective wagon holding at the end of the day (midnight) is 2250 wagons, the Divisional Wagon turn round will be 4.5 days.

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

viii) Detention to Trains and Wagons:

(a) Detention to Trains:

A check on the detention to trains

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

(2) in shunting operations at road side stations and

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

(b) Detention to Wagons:

Close watch should be kept on the areas, e.g. Marshalling Yards, Goods Terminals, Stabling Points etc., where wagons are likely to suffer avoidable detention during various phases. Although this is watched through periodical data, special attention should be paid to pockets, where piecemeal Wagons suffer prolonged detention and often remain out of sight.

ix) Engine Utilisation:

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

(a) Running of the Goods Trains on proper path: For this, the Master Charts have to be properly framed and consolidated.

(b) Proper co-ordination between Control and Line Staff.

(c) Reduction in Terminal detention of Locos by proper monitoring coordination and working of Yard Staff, C&W Staff etc.

(d) Judicious ordering of Trains and Right time starts of Goods Trains.

(e) Proper controlling, judicious crossings and preferences.

(f) Loop Lines on critical block sections should not be generally blocked.

(g) Stabling and picking up of load should be judicious and properly planned.

(h) Loco Pilot should run at maximum permissible speed subject to restrictions.

(i) Light Engines can be coupled or attached to trains in order to save path and energy.

(j) Light Engines (Single or Couple) should run at maximum permissible speed, for which they are fit, subject to speed restrictions.

(k) Signals must be taken off promptly at Stations. Distant/ Warner Signals must always be taken off promptly.

(l) Tangible authority to proceed should be handed over at the appointed place instead of getting the train slowed down in front of the Station for handing over the Authority from the Platform.

(m) Trains should be run through Main Line (as far as possible) since looping results in extra time on run.

(n) Locomotives should be in good working order and staff should be well versed in Loco operations and trouble

shooting.

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

(p) Engineering speed restrictions should be regularly reviewed and reduced by maximizing the output of the Engineering staff and machines. Due care and foresight in offering blocks for track maintenance should be exercised.

(q) Regular foot plating by officers and staff involved in operations, motivates train crew and alerts the line staff.

(r) Effective control over traffic yards to reduce other engine hours, detention to locos at important loading/unloading points and industrial sidings.

(s) The factors adversely affecting the Locomotive utilisation, speed of goods train, terminal detention etc. should be got analysed by suitable multi departmental teams and remedial measures taken.

t) Incentive schemes for motivation of staff connected with Goods Operation, so as to improve Engine utilisation Special watch on Loco pilots loosing time on run and not running on maximum permissible speed.

x) Average Speed of Goods Trains:

The average speed of goods trains is calculated by the following formula

Average No. of Goods Trains X Distance travelled by each train in 24 hrs. Speed = Total time taken by all the Goods Trains run.

The distance and the time taken are calculated from the Control Charts. Thus all detention to Goods Trains enroute enters into calculation and has the effect of bringing down the average speed. Almost all the factors affecting engine utilisation play part in the average speed of goods trains, the difference being that in the calculation of average speed of goods trains, the detention at originating point and terminating point as well as the Light Engine Running are not taken into consideration, while computing average speed of freight trains.

xi) Staff Supervisions:

Excellence in freight operations requires that the staff offer their willing cooperation. To achieve this proper training for constantly developing the knowledge, skills and commitment is essential.

xii) Targets and Statistics:

One of the important means to utilise fully and efficiently the existing carrying capacity of a railway is to set measurable and specific targets for the various performances after taking into consideration all the local conditions. Once the targets are laid down, all possible efforts must be made to attain them.

The targets should be set sufficiently high and reviewed constantly with a view to improving the performance further. Details regarding Statistics pertaining to Railway Operations are given in chapter on Operating Statistics where targets are not attained within a reasonable period, the causes must be traced and effective remedial action taken, if necessary, revised targets should be laid down.

6.02 Marshalling of Goods Trains-

Wagons containing Explosive and other Dangerous goods - Staff must be fully conversant with the rules laid down in the IRCA Red Tariff issued from time to time in regard to storage, loading/unloading sealing, labeling, Shunting, Marshalling and Conveyance of explosives and other dangerous goods. Some salient points, not exhaustive, are however, indicated below for the guidance of the staff:-

(A) Wagons containing Explosive (IRCA Red Tariff Rule No. 132.1) -

(1) The maximum number of carriages/wagons containing explosives which may at any time be attached to or be hauled by a train shall be Ten by a goods train and three by a mixed or parcels train.

(2) Carriage orwagons containing explosives should be placed as far away as practicable from the train locomotive; grouping togetherthose carriages/wagons which are permitted to be so grouped.

(3) Carrages/Wagons containing explosives shall be separated by not less than three carriages/ wagons not containing explosives or other dangerous goods or articles of inflammable nature from:-

(i) the train locomotive, provided that when an electric (traction) or diesel (electric) locomotive is used, only one such carriage/ wagon need intervene between the carriages/wagons containing/explosives and the locomotives;

(ii) the passenger carriages or the brake-van;

(iii) any other carriages / wagons containing other dangerous goods or articles of inflammable nature.

(4) Carriages/wagons containing explosives shall be close-coupled to the adjoining carriages/wagons add to each other.

(B) Wagons containing Petroleum and other Inflammable liquids: (IRCA Red Tariff Rule No.325.1)

(1) There shall be no restriction on the number of Wagons containing petroleum and other inflammable liquids which may at any one time be attached to or be transported by any one train.

(2) Wagons containing petroleum and other inflammable liquids, which may be grouped together shall be placed as far away as practicable from the train locomotive.

(3) Wagons containing petroleum and other inflammable liquids, Class A', shall be separated by not less than three carriages not containing explosives or other dangerous goods or articles of inflammable nature from:

(a) the train locomotive;

Provided that when an electric (traction) or diesel (electric) locomotive is used, one such carriage is needed to be attached between the wagons containing petroleum and other inflammable liquids, Class 'A' and the locomotive;

(b) the passenger carriage;

Provided that when an electric (traction) or diesel (electric) locomotive is used, only one carriage not containing explosives or other dangerous goods or articles of inflammable nature, is needed to be attached between the wagons, containing petroleum and other inflammable liquids, Class 'A' and the passenger carriage;

(c) the brake-van;

Provided that when an electric (traction) or diesel (electric) locomotive is used, only one carriage not containing explosive or other dangerous goods or articles of inflammable nature is needed to be attached between the wagons containing petroleum and other inflammable liquids Class 'A' and the brake van; Provided further that no such carriage is required to be attached between the last tank wagon (8- wheeler) containing petroleum and other inflammable liquids, Class 'A' and the brake-van, if an 8-wheeler brake-van is used;

(d) any other carriages containing explosives or other dangerous goods or articles of inflammable nature;

(4) Wagons containing petroleum and other inflammable liquids, Class 'B' shall be separated by one carriage not containing explosives or other dangerous goods or articles of inflammable nature from the train locomotive of the passenger carriage or the brake-van or any other carriage containing dangerous goods or articles of inflammable;

Provided that no such carriage is required to be attached between the last tank wagon (8- wheeler), containing petroleum and other inflammable liquids, class 'B' and the brake-van, if an 8-wheeler brake-van is used.

(5) (a) Wagons containing petroleum and other inflammable liquids shall be close-couple to the adjoining carriages and to each other.

(b) The provisions relating to precautions to be observed during Marshalling shall also apply to empty tank wagons.

(See also IRCARed Tariff Rule Nos. 119, 213, 314, 414, 514, 614 and 714).

(C) Wagons containing other dangerous or inflammable goods.

For marshalling of wagons containing the following commodities, the relevant rules of IRCA Red Tariff No 20 as indicated below must be observed:-

	Commodity		I.R.C.A.Red Tariff Rule No.
1.	Gases	...	226
2.	Inflammable solids	...	425.1
3.	Oxidizing substances	....	524.1
4.	Acids and other Corrosives	...	826.1
5.	Poisonous (Toxic) substances	...	624.1

6.03 Precautions to be observed in handling Explosives-

(A) (1) Explosives: (see I.R.C.A. Red Tariff Rule No.117).

(i) No. unauthorised person shall be allowed access to any place where explosives are stored or handled or to carriages or wagons in which they are carried.

(ii) No person on, in or near any place where explosives are handled or stored shall have in his possession any match, fuses or other appliances for producing ignition or explosive or any knives or other articles made of iron or steel.

(iii) No person at, or near any place where explosives are handled or stored shall wear boots or other foot wear with iron nails or shed or strengthened with iron, unless such boots or shoes are covered with leather, rubber felt or other material in the form of overshoes or otherwise. Where foot wear of the required Type are not available, the persons concerned shall work bare-footed.

(2) Gases, compressed, liquefied or dissolved under pressure, Petroleum and other inflammable liquids, inflammable solids and Oxidizing substances.

(See I.R.CA.Red Tariff Rule Nos. 212, 313, 413 & 513).

(i) No person shall smoke or take or have any fire, naked light matches or other articles of inflammable nature or empties which have, contained petroleum or other inflammable liquids, or any agency which produces heat or sparks, near any vehicle containing gases, compressed, liquefied or dissolved or near any place where such goods are stored or are loaded, unloaded or handled.

(B) Other precautions to be observed.

(i) The Trains Clerk shall make a special entry in red ink in the wagon way bill if any wagon containg dangerous goods is attached to a train.

(ii) The Guard shall intimate the Loco Pilot about the number and position of wagons containing explosive or other dangerous goods, if any, on the train.

(iii) The Guard shall draw attention of Trains Clerk/ Station Masters about the number and position of such wagons on termination of the train.

(iv) Wagons containing explosives and other dangerous goods shall not be loose, fly or hump shunted. The speed at which such wagons may be shunted shall not exceed 8 KM per hour.

6.04 Stopping of goods trains outside Signals.-

At certain station Goods trains are prohibited from stopping at the Outer/Home signal on account of steep rising gradient. A list of such station shall be notified by the Divisional Railway Manager concerned to the staff of the Loco, Transportation, Engineering and Signal & Tele-com. Departments. In the Station Working Rules of such stations this will be mentioned.

If for any unavoidable reasons it becomes absolutely necessary to stop a train at the Outer/ Home signal of such station the following procedure shall be adopted:-

(i) On approaching such a station, Loco Pilots must bring their trains to a stand at the “STOP BOARD” fixed at the grade and the train will remain there till the signal is taken off or the train is piloted in.

(ii) Should the Loco Pilot be stopped on the up grade on account of signals not being given, the Guard will immediately apply his van brake.

(iii) Before' starting again, the Loco Pilot must decide whether he can safely move his train forward or not.

(iv) If he considers he cannot re-start his train without breaking a coupling ordrawbar, he should back his train intact observing SR 6.04.02 and then if he is unable to proceed, divide this train after having personally seen to the pining down of sufficient number of brake (SR 6.04.02).

(v) If he considers he can safely move foreward on the signal being lowered he must first allow his train to case back on to the brake-van, warn his Guard by sounding one long and one short engine whistle as per SR 4.50.01 (3)(b) and then start very cautiously. It is essential to avoid any jerk.

(vi) In all cases of such stoppage the Guard should make a special note in the Guard Memo Book.

(vii) No backing is allowed on Automatic section and as in SR 3.75.05.

6.05 Stopping Goods trains out of course.-

(a) **To pick up Railway employee on duty - No train may be stopped out of course without the permission of the Section Controller who will give a Control Order, correctly numbered. The Station Masters or the Assistant Station Master concerned will hand over to the Guard a memo giving the names and designations of the staff to be entrained and the Control Order No. The Guard will check the passes and make a suitable endorsement on the Guard Memo Book.**

(b) To attach or detach wagons.- Normally no wagons will be attached or detached by a through train at rode-side stations. In cases of emergency such as breaches, floods, accident etc., however, wagons may be attached by a through train for a station at which there is no scheduled stoppage. In such cases the SM/ASM/ will give a memo to the Guard &

Loco Pilot at the previous stopping station, requesting him to stop at the station named. Before advising the Loco Pilot and Guard, the SM/ASM must obtain order from Controller in this respect.

(c) Between stations for loading and unloading materials of any department during daylight hours only and in case of emergency.-

(i) The departmental Officer who requires the train to be stopped will inform the Divisional .Operations Managerand the Chief Controller of the nature and extent of the work to be done, the place or places, and the probable time that will be occupied. The Divisional Operations Manager or the Chief Controller will then arrange and advise the officer of the date and train fixed, giving at least 24 hours' notice to enable him to provide the necessary labour. Only one such stop which should not normally exceed half an hour, will be provided for each train.

(ii) The Station Masters concerned on receiving the intimation of the arrangement will issue a Caution Order to this effect.

(iii) Guards are required to enter all such stoppages in their train reports and record particulars as to kilometreage and time of detention.

(iv) Through Goods trains shall not be utilised for the purpose.

6.06 Inability of Engine to keep time.-

At any station, when a Loco Pilot finds that his engine through any defect is likely to lose time on the road, he must inform the Station Master and the Guard how much time in his opinion, will be lost in running to the next station. The Station Master will consult the Section Controller and will start the train or detain it as advised by the Section Controller.

6.07 Inability of Engine to take full load.-

(a) **When a Loco Pilot is unable for any reason to take the full load he must give a written statement to that effect to the Station Master of the station where the**

wagons are refused. The Station Master will repeat the Loco Pilot's statement to the Divisional Operations Manager through Section Controller. The Guard must note the occurrence in the Guard Memo Book.

(b) In case of failure of an engine from any cause at station the Loco Pilot shall, if the station is connected with Control phone, report the fact to the Power Controller personally, and inform him about the nature and cause of the failure. In case the station is not connected with Control phone, the Loco Pilot shall hand over the necessary message to the Station Master for despatch to the nearest Crew Controller and Power Controller.

6.08 Assisting Engines.-

Whenever an assisting engine for any reason has to be attached to a train, the following procedure shall be observed:-

(i) On section where double heading of engine is prohibited, an assisting engine shall be attached in the rear of the train. Its hope pipe should also be connected to the hose pipe of the train and BP continuity shall be ensured.

(ii) On sections where double heading of engine is not prohibited:-

(a) An Assisting engine can be attached in the rear of a train for the purpose ofbanking and its hose pipe should also be connected to the hose pipe of the train and BP continuity shall be ensured. If however, the assisting engine has to run on long sections right upto the next engine changing station or upto the destination of the train, it should be attached to the train engine and its hose pipe should also be connected to the hose pipe of the train engine and BP continuity shall be ensured.

(b) All banking pilot engines assisting trains moving over up gradients on specified sections (specified by DRM) covering one or more block sections should be attached in rear of the last vehicle of the train and its hose pipe should

also be connected to the hose pipe of the train and BP continuity shall be ensured. The co-ordination between train Loco Pilot and banking engine Loco Pilot while starting, running or stopping should be maintained by using the walkie-talkie and/or code of whistle specified in SR 4.50.01 and all provisions of G&SR.

Note : *See the concerned chapter of Working Time Table where banking engine is to be attached.*

6.09 Work trains.-

(a) Work trains are trains which run from one nominated station to another for supply and clearance of wagons to and from stations situated on the run of the trains, as well as for loading/ unloading of small consignments.

(b) These trains are formed at the starting stations with loaded and empty wagons booked to intermediate stations on the run. Normally the wagons shall be grouped in station order, these for the nearest station being next to the engine. .If there is room on the train after allowing for clearance en-route, wagons for the next terminal station and beyond may be attached mixed, but in one group, next to the brakevan. Long distance wagons shall not be attached to these trains unless otherwise ordered by Control.

(c) Wagons left behind by trains.- Station Master shall report to the Control, the number of all wagons not cleared by work trains with reasons and also all cases of wagons standing under load for 24 hours. If room is available, Guards shall not refuse to clear wagons even if no entry has been made in the Work Order. Loaded wagons must be cleared if it is necessary to detach surplus empties on the train for making room for loaded wagons and also if it is necessary in so doing to refuse the clearance of empties at some other station.

(d) The Station Masters of the road-side stations shall intimate the Section Controller about clearance of wagons and smalls from their stations. The Section Controller shall intimate the yard to leave room by shunting and van goods

train to effect clearance from road-side stations. The Yard Master or the Station Master on duty shall hand over the Work Order to the Guard and the Guard shall intimate to the Loco Pilot the names of the stations from where clearance is to be done.

(e) At the commencement of the run, the Guard must study the composition of the train and the Sectional Work Order carefully and ensure that the work is properly planned so that there is no avoidable detention to the train and the work is completed within the prescribed time.

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CHAPTER - VII
SHUNTING AND SECURING OF VEHICLES

7.01. Shunting- Miscellaneous rules on.-

(a) Hand *Signals for shunting:*- General Rules 3.56, SR 3.56.01 and SR 3.56.02 should be observed for exhibiting shunting signals.

(i) When two engines or vehicles are approaching the same pair of points from two different lines, or where there is like hood of this occurring, both should be brought to a stand by exhibiting danger signals and after ensuring both have come to a stop, the person in charge of the engine or vehicle, which it is intended to allow over the points first, must be told verbally first and then signalled to move forward; while a danger signal and a verbal order not to move must be given to the other.

(ii) Wagons with end flaps let down, if empty, must have theirflaps put up before being shunted. -

(b) Care must be taken in shunting operations to guard against *screw* couplings hitting the air hose pipe couplings. The couplings of air hose pipes when not in use must be placed on the dummy plugs provided for the purpose. If the couplings are allowed to hang down loose, the plugs are likely to be broken when struck by the screw coupling. The couplings, when not engaged are to be fixed on the hooks provided.

This matter must also receive the special attention of the staff engaged in shunting operations.

(c) On running trains the Guards will be responsible for ensuring that air hose pipes do not hang loose, and when vehicles are being attached to a train the Guard must see that the hose pipes are properly secured in accordance with sub-para (b).

(d) *Electrically fitted vehicles, shunting* of - Vehicles electrically equipped should not be submitted to rough shunting of any description as such shunting may cause damages to glass cells.

(e) *Shunting of entire train or rear portion* of train - Whenever the entire train haste be shunted, and whenever it is necessary to shunt off the rear portion of the train, the brakes of all brake-vans attached to the trains, must be manned by train staff during these operations.

7.02. Shunting and Detention memo.-:-

(i) All shunting done by Loco Pilots will be recorded in his diary.

(ii) For purpose of reference and check, Station Masters will make a note in their station diaries of the shunting done at their stations. The number of the engine and also of the train and the time taken for shunting should be recorded.

(iii) For statistical purposes the shunting hours of train engines shunting during the run, are requires to be divided between coaching and goods in the ratio of the number of coaching and goods vehicles shunted. Guards must fill in the number of coaching and goods vehicles shunted by each train. The number of vehicles (both bogie and four wheelers) should be reckoned in units.

7.03. Shunting done by train engines.-

(i) *Shunting en-route with train engine.- (a)* For shunting performed by train engines before and after working trains at engine changing and terminal stations and at stations en-route, the actual time of shunting performed will be recorded in Loco Pilot's diary & Guard memo Book.

(b) The time occupied in shunting is to count from the time shunting is commenced until shunting operations are completed.

When shunting operations cannot be started immediately on arrival of a train at a roadside station due to crossing of trains the time so spent should be included in "standing".

Examples (i) Train arrives at 4 hrs. and shunting begins at 4.10 hrs. and ends at 4.50 hrs. Shunting time of 40 minutes should be recorded.

(ii) If the shunting operations have to be suspended owing to the reception of another train in the yard, the broken

period between the two periods of shunting is to be included but the cause and the time so lost should be noted in the remark column.

Examples Trains arrives at 4 hrs, shunting commences at 4.1 hrs. stops at 4.30 hrs. and starts again at 4.50 hrs. and ends at 5.20 hrs. The shunting time to be recorded will be as follows:-

Shunting:- 1 hrs. 19 mts. Remarks-20 mts. Shunting suspended for crossing..... Up / Dn train.

(iii) *stopping of through trains out of course for shunting:-*

When a through train is stopped out of course at a roadside station unexpectedly and shunting has to be performed in an emergency, e.g. hot axle, shunting time is to be recorded as detailed in sub- para(i) (a) above.

(iv) When a train has been ordered to run to an intermediate station (not an engine-changing, station or terminal station) for a return load, shunting time for the period the engine is detained at the out station shall be recorded in the same way as in sub-para (i) (b) above.

(v) *Shunting by Diesel and Electric Train locomotives.-*

Except in special circumstances like detaching hot-axle/sick wagons at a station, backing train at a station or purposes of stabling, placing the empty wagons at a station or siding where a shunting engine is not posted etc. shunting by Diesel and Electric Train Locomotives should be avoided.

7.04. Shunting at engine-changing/terminal stations with train engines.-

(i) Train engines may be called upon to do shunting on their own or other trains if required before departure from and after arrival at terminal/ engine-changing stations where shunting engines are provided in special cases. Shunting time must be recorded in accordance with para 7.03.

(ii) Three hours notice must be given to the JE (loco) when goods train engines are required to do shunting before the booked time of starting.

7.05. Shunting at stations with engines specially provided for shunting.-

(i) At stations where shunting engineshave been provided specifically for performing shunting, the time must be given for shunting from the time the engine is in the traffic yard for shunting purposes, to the time the same is handed over to the Loco Shed, subject to a minimum of 3 hrs. for each separate time the engine is ordered out and taken charge of by the Traffic department deducting the time spent on other duties. The scheduled time allowed for loco requirements in traffic yard should not be deducted from shunting time. The time spent on other duties such as on repairs to loco, time spent for placement of loco wagons in Loco Shed and such other duties should be deducted from the shunting time.

For examples:- (a) Shunting engine made over to traffic yard (bahar line) at 6 O' clock and returned to Loco Shed at 18 hrs. Which took 30 mts. time for loco requirement, will get shunting time for 12 hrs.

(b) If the same engine takes one hour for repairing, the shunting time will be given for 11 hrs. 30 mts. after deducting 30 mts. extra for loco requirements.

(c) If the shunting engine takes one hour time for loco requirements and if the same engine is utilised for placement some wagons inside the Loco Shed for 0.5 an hour the shunting time will be given for 11 hrs.

(ii) *Record of shunting engines entering and leaving Traffic yards -*

(a) In order to record the correct time shunting engines arrive at and Traffic Yards a Shunting Engine Journal will be made over by the SSE/SE/JE(loco) to the Loco Pilot of the shunting engine when it leaves shed forthe traffic yard.

(b) On this form the following detailed should be mentioned:-

(i) The time the engine left shed.

(ii) The time the engine arrived the Traffic Yard (Bahar line).

(iii) The time the engine left Traffic Yard (Bahar line).

(iv) The time the engine returned to Shed.

(c) The time of arrival at or departure from the Traffic yard will be the time the engine passes the Loco limit Board on its way to or from the Traffic Yard and Assistant Yard Master/Yard Master on duty will be responsible to see that the timings are accurately recorded in the Shunting Engine Journal.

At large stations Bahar line Time Keepers may be provided, if necessary.

(iii) At stations where shunting engines are provided, the SSEZSE(Loco) or the Crew Controller will send a requisition to the Station Master/Yard Master every morning, showing the shunting memos yet to be received for the work done upto mid-night of the previous day. On receipt of this requisition, any shunting memos that may be due should be sent to the SSE/SE(Loco) at once.

7.06. Shunting engines used by Engineering Departments.-

At stations where special shunting engines are kept for traffic purposes, they can be utilized by the Engineering department under the following conditions:-

(a) Shunting engines may be used by Divisional Engineers when not required for traffic purposes by mutual arrangement between- the Sr. Divisional Operations Managerand the Sr. Divisional Engineer.

(b) The charges per hour will be notified from time to time. Fractions of an hour should be rounded off to the nearest quarter hour e.g. 1 hour 10 mts., 1 hour 35 mts. should be rounded off to 1 hour 15 mts.1 hour 45 mts. respectively.

(c) If a Divisional Engineer orders a shunting engine for his work for, traffic purposes he will have to pay the usual ballast train charges.

7.07. Loose shunting.-

(i) (a) Station Masters and Yard Masters and other staff connected with shunting must see that wagons containing explosives and other dangerous goods and wagons bearing damageable goods label/labels with symbol “Handle with care” are not loose or fly shunted under any circumstances.

(b) While performing shunting with wagons containing explosives or other dangerous goods at least one wagon must intervene between the shunting engine and the wagon / wagons containing such commodities.

(ii) When these loads are attached to a train they should be attached ahead of the Brake-van.

(iii) When a train, to which such wagons are attached, has to be broken up in a flat yard, these wagons shall first be attached and after the rest of the wagons has been sorted, these loads shall be placed last by the shunting engine in rear of the rest of the loads.

(iv) In dealing with a train load with explosive or other dangerous goods wagons in formation, the wagons loaded with explosives or dangerous goods should not be hump shunted but when the rest of the load has been humped, these wagons shall be attached by the shunting engine in rear of the outgoing formation.

7.08. Securing of vehicles at stations.-

(a) (i) Station Masters must ensure that adequate stock of safety chains and padlocks as prescribed by special instruction are available at their stations and must see that all vehicles are properly secured according to GR 5.23 & SRs there to and the wagons do not foul adjacent lines.

(ii) No Safety chain, unless in perfectly good order and seven / fifteen feet or 2/4 metres in length, is to be used for securing vehicles. The Safety chains should be inspected periodically and defective chains should be replaced.

(b) *How to use safety chains on certain types ofvehicles:-* If the wheels have no holes in them the safety chains should be passed through the angle formed between the axle guard and axle guard stay rod:

7.09. Securing of vehicles in siding and on lines handed over to the Engineering department for exclusive use.-

(i) (a) The Engineering department will be held responsible for the securing of vehicles in sidings and on lines which have been handed over to them for their exclusive use.

(b) The Engineering department should also supply their own chains, padlocks, sprags, wedges etc. for the securing of such vehicles.

(ii) When handing over and taking over any siding, lines or portions thereof to and from the Engineering department, a joint message must be issued and to be acknowledged by both the departments.

(iii) (a) No wagon should be placed on the line handed over to the Engineering department except in the presence of a representative of the Engineering department of a rank not lower than Permanent Way Supervisor.

(b) The Engineering representative must test the hand brakes of the wagon / wagons at the time of taking over the wagon/wagons. Should any wagon/ wagons be found to have hand brakes not in good order he must not refuse to take over such wagons for this reason but he must take adequate extra precaution in regard to the securing of such wagons by spragging and chaining.

7.10. Securing of vehicles in industrial sidings, colliery sidings etc.-

(i) Users of assisted and private sidings and outlying railway sidings are responsible for the safety of the vehicles placed at such sidings intended for them (for loading or unloading) and the derailment or damage.

(ii) The responsibility of the user begins from the time the railway locomotive leaves the sidings after placing the vehicles. The user's representative will thereafter take necessary precautions.

(iii) During the season when storms are prevalent the users shall adopt the following special precautions:-

(a) The hand-brake of all wagons must be firmly applied and the levers pinned down.

(b) The end vehicles should be secured by safety chains.

(c) Hand shunting should not be performed during storm.

(d) Doors of covered wagons should not be kept open during a storm.

(e) Before commencing hand shunting the hand brakes of the wagons must be tested to see that they are in good working order. If not, men with wedges should be deputed to prevent any vehicle getting out of control. Before hand shunting it must also be seen that no one is taking shelter under the vehicles. A responsible person must always supervise hand shunting.

(f) Wagons should not be uncoupled unless required to be moved. Before uncoupling wagons the hose pipes must first be uncoupled placed on their dummy plugs.

(g) Particular care must be taken to remove the chains before the wagons are coupled up to the train. The user's representative will remove the chains if any used just before the railway engine enters the siding but the brakes of all the wagons must be kept on. He must also see that there is no one either under the wagons or in any position where he is likely to be injured by the movement of the wagons.

(iv) Procedure for securing of vehicles and precautions against accidental escape as indicated, above should be incorporated in the working procedure of siding as appendix to SWR and copy of the Appendix should be sent to siding authority for taking necessary precaution.

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CHAPTER - VIII

MATERIAL TRAIN

8.01. Application for Material train -

(a) Applications for Material trains working on open line are to be made by Divisional Engineers or Divisional Electrical Engineers (TRD) to the Senior Divisional Operations Manager / Divisional Operations Manager; such applications must contain the following information :-

(i) Date, hour and station at which work is to commence.

(ii) Number and class of wagons, exclusive of brake-van, required.

(iii) Limits between which the train is required to work until further notice.

(iv) Name, etc. of the Engineering/Traction official under whose orders the train will work.

(v) The name the SE/JE (P. Way) orthe SE/JE (OHE) who will examine the train with the SE/JE (C&W) before it commences work.

(b) As far as practicable, a Material train should commence its first trip from and be finally cancelled at a terminal station or at a station having a loco shed.

(c) For each Material train, a suitable programme should be drawn up by the Divisional Engineer/ Divisional Electrical Engineer (TRD) in consultation with the Divisional Mechanical Engineer and this should be supplied to the Senior Divisional Operations Manager at least a week before commencement of work.

(d) The Divisional Engineer or the Divisional Electrical Engineer (TRD) will also furnish to the Senior Divisional Operations manager / Divisional Operations Manager a programme for the following quarter a month in advance of the quarter i.e. on the 1 st December for the period January-March, on the 1st March for the period April-June and so on.

8.02. Ordering and cancellation of Material trains.-

(a) The Senior Divisional Operations Manager/ Divisional Operations Manager will issue orders for the working of the Material trains and will intimate the Divisional Engineer or the Divisional Electrical Engineer (TRD) and those named by him in his application for the train with copies of these orders.

(b)The Senior Divisional Operations Manager/ Divisional Operations Manager will also issue orders for the final cancellation and disposal of Material trains on the requisition of the Divisional Engineerorthe Divisional Electrical Engineer (TRD) only.

(c)The traffic department may utilize the engine, brake or vehicles of Material trains for emergent purpose, but if the Sr. Divisional Manager requires the wagons for public traffic, he must give the Divisional Engineer or the Divisional Electrical Engineer (TRD) 7 days notice of his intention to cancel the train.

(d) When it is necessary to cancel a Material train temporarily on request of Engineering / Electrical department, the Guard at the request of the Material train official-in-charge, will inform the Sr. Divisional Operations Manager, Train Ordering officials, JE(Loco), Divisional Engineer or Divisional Electrical Engineer (TRD) and other officials concerned as follows:-

> "Material train No..... temporarily cancelled on..... (date) and will probably resume work on .....(date)."

(e) When Material train is cancelled for 48 hours and under, at a station nearer to an engine- changing station than its headquarters, the engine should be run light to the nearest engine-changing station, the Engineering department or Electrical department as the case may be, being debited, with the kilometreage.

(f) When a Material train is cancelled for more than 48 hours the engine should be run light to its own headquarters station and run back light when required again, both trips being

debited to the Engineering or the Electrical department as the case may be.

(g) Guard's report:- Guards of all Material trains must submit a Train Report to the Senior Divisional Operations Manager/Divisional Operations Manager daily, giving the number of the wagons. Each trip must be shown separately.

(h) The Material train Guard must, at the close of the day's work, programme for the next day's work in consultation with control and the Material Train Controller where there is one. Such programme shall not be cancelled excepting in emergency, so that labour may not be wasted.

The working hours of the Material train shall be so arranged that the train can complete the work and return before night fall to the station at which it is to be stabled in accordance with Material train programme.

Statistics of the daily work done shall be maintained by the Material train Controller so that a watch can be kept on the utilisation of Material train.

(i) Material train- Contents of vehicles.- Guards working Material trains should note in the remarks column of their reports the description of the materials carried in the train. The note should be made thus:-

1. Trucks sand.
2. Wagons wooden sleepers.
3. Trucks moorum ballast.
4. Wagon bricks.
5. Trucks bridge girders and so on.

(j) The Senior Divisional Operations Manager / Divisional Operations Manager office while preparing the Material train bill should reproduce these particulars in the remarks column against each entry in the bills.

8.03. Loco requirement and carriage examination.-

Unless it becomes absolutely necessary a Material engine shall not be allowed to go to shed for loco requirement before completing a fortnight's work. This interval however is not rigid and has to be fixed with other considerations in view

also like the examination of rolling stock and the periodic rest of labour. The date should be so fixed that all these items do fall into each other thus preventing idling of the loco or wastage of labour.

8.04. Working of Material train.-

(a) A Material train shall have sufficient vehicles fitted with hand brakes to control the train, taking into consideration the ruling grade on the section it is working on. Each brake-van or hand braked vehicle shall be attended by a person competent to apply the hand brake in case of train parting. A brake-van shall always be attached to the rear of the train except in emergent circumstances and in such cases SR 4.62.06(d) shall be followed.

(b) The Material train Guard shall be responsible for seeing that the brakes of all vehicles on his train are applied as necessary. When working on sections of the line where the gradient is steeper than 1 in 150, the Loco Pilot before moving his train shall see that sufficient number of hand brakes have been applied to enable him to control his train.

(c) A Material train containing labourers shall not be allowed to run or work on line or after sunset except for the purpose of proceeding to the first station where stabling accommodation is available or when proceeding to attend an accident. Night working of a Material train with labourers may be permitted as per provision of SR 4.62.03.

8.05 Joint Inspection of Vehicles.-

(a) Before a train commences work, and after completing work when finally cancelled, a joint examination of all wagons will be made by the SE/ JE(C&W) and the SE/ JE(P.Way) or the SEZJE(OHE) concerned; both of them will sign the report which is to be submitted to the Divisional Mechanical Engineer orto the Divisional Electrical Engineer as the case may be. .

(b) (i) Whenever a Material train happens to be or is stabled at a Train Examining station it will be examined daily in the same manner as any other train arriving there. The examination will be made by the SE/JE(C&W) in conjunction

with the authorised representative of the Engineering branch or the Electrical branch and the SE/JE(C&W) will enter any damages discovered in the joint Register memo, the duplicate copy of which will be forwarded to the Sr. Divisional Mechanical Engineer's office or the Sr. Divisional Electrical Engineer's office. The examination and adjustment of brakes must be made at least once in a week.

(ii) In addition to the above examination, all material trains will be worked to a train examining station once in every month, as far as possible for through examination and repair.

While the responsibility for this purpose will devolve on Sr, DEN (Line)ZDEN or Sr. DEE/DEE concerned who will arrange to get it done regularly in conjunction with the Sr. DME/DME, it is the responsibility of the Sr. DOM/DOM to see that the train is moved within the quickest possible time and it is the responsibility of the Sr. DME/DME to see that the detention for train examination does not exceed 24 hours. The same procedure as laid down in paragraph (b) (i) above will be adopted for recording damages.

c) Whenever there is an interchange of a vehicle or vehicles between the Engineering or Electrical and Traffic departments, the SE/JE(P.Way) or the SE/JE(OHE) shall advise the SE/JE(C&W) concerned to enable the latter to jointly survey the vehicles before the interchange takes place.

(d) After the usual joint examination by the Train Examiner and the SE/JE(P. Way) or the SE/ JE(OHE) of a Material Train, when the material train is no longer required, the SE/JE(C&W) will enter any damages discovered in the Joint Register memo and label and mark the wagons requiring repairs, giving intimation of the same to the Station Master concerned, who will then arrange to work the wagons into Carriage and Wagon Depots in groups as room on trains permit.

(e) The cost of repairs to Material wagons should be charged to Abstract 'C'-Carriage and Wagon expenses.

(f) The charges to be billed against the Engineering branch or the Electrical branch for a Material Train should include the cost of repairs based on estimates in Abstract

Note When the brake -van of a Material train is being examined as required by the above rule, the Material train Guard must be present at the examination and sign the report as to the condition of the brake-van.

8.06 Charge for damages.-

The Engineering or Electrical branch will accept all charges raised by the Mechanical branch (carriage & wagon) for damages done to wagons which have been in commission on Material trains and will recover the cost of damages accepted from the Material train contractor concerned.

8.07 Charges for supply of rolling stock.-

The rate to be charged for supply of rolling stock will be as laid down in I.R.C.A. Goods Tariff.

8.08 Material train running through.-

A Material train running from one station to anotherwithout stopping in the Block Section or at intermediate stations en-route runs in respect as a Goods train.

8.09 Material trains working on Ghat section and on other sections on which heavy gradient of 1 in 400 and steeper exist.-

Material trains when working on such sections are to have their engines below them i.e. at the end of the train in the direction in which grade falls.

8.10 Combining the different works by the same Material train.-

To get maximum use out of a Material train working on a section and to avoid movement of Multiple Material trains on the same section, the Senior Divisional Operations Manager/ Divisional Operations Manager shall in consultation with the Divisional Engineer and the Divisional Electrical Engineer (TRD) plan out the different works to be undertaken in the same section by one Material train, to the extent possible. The Guard of the Material train shall in such case record specifically in theirTrain Report the particulars of work done on account of different department and, the time spent on each. The Divisional Railway Manager's office shall allocate to the different departments the Material train charges

on the basis of the time spent on the different works, any residue being debited to the department at whose instance the Material train is commissioned.

8.11 Provision of First Aid Box on Material train.-

Material train which programmed to work with labour should be provided with First Aid Box with approved contents, Train Inspector will ensure that it carries the First Aid Box; and the Guard of the Train will also see that the First Aid Box is carried on Train.

8.12 In addition to the rules of this Chapter, the General Rules 4.62, 4.63, 4.64 and SR thereto shall also be observed for working and running of Material train.

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CHAPTER - IX

NON INTERLOCKED WORKING OF STATION

9. 01 Non Interlocking

General:

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

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

In both the cases the safeguards ingrained through normal functioning of various signaling equipment are missing and as such responsibility of the part of staff increases manifold. N.I. working puts staff under severe strain and hence prone for lapses. Unflagging attention - from every quarter is the need of the hour so that safety is ensured.

Non -Interlocked working entails not only slowing down of train operations; it is also a less safe system as compared to interlocked working. Since it is desirable to avoid Nl altogether both from safety as also customer convenience point of view, attempt must be made at the project proposal stage itself to dispense with Nl altogether and undertake the work by means of traffic blocks. Instructions given below are in addition to existing rules for Non -Interlocked working such as issue of Green Notice etc. They must be read together with existing provisions in G&SR, Block Working Manual etc.

9.02 Insertion of new points/turn-outs:

(i) Before insertion of the points, temporary working instructions shall be issued to all concerned. Acopy of the same shall be submitted to CRS along with the application.

(ii) The insertion of the turnouts to be done just before the non-interlocked working and not too much in advance. Non-interlocked working should be done within a fortnight after the insertion of turnouts. Once a point is inserted on the running line, Pre-NI phase of the work commences. Suitable speed restrictions as deemed fit shall be imposed by the concerned departments.

(iii) The insertion of the turnouts to be done during a period of sanctioned traffic block over the line. The points once inserted have to be spiked in "Normal" position by the Engg. Branch and then to be handed overto Traffic for movement of trains keeping the point in same (normal) condition. In order to facilitate the spiking of such point the hole on the tongue rail should be drilled in such a way that this hole will be used for fixing the switch extension piece of the point machine later on and no additional hole will be required. Thereafter, this point shall be clamped/cotter bolted and pad- locked by Traffic. The padlock keys shall be in personal custody of the SM on duty before he releases the block over the line. If any work is to be done on such turnout, SM on receiving the requisition to this effect from the concerned PWI/SI in writing shall first ensure that no movement is going on or has been planned over the point and then only block the line and hand over the key (s) to the PWI/SI. Block will be released only after PWI/SI returns the key and confirm in writing that the switch portion is clamped/ cotter bolted and padlocked in normal position.

(iv) As there is no interlocking between the newly laid points and the existing signals speed restriction of 15 kmph shall remain in force in the yard irrespective of the fact whether the newly laid points are facing or trailing, due to non- detected conditions prevailing. Necessary caution orders shall be issued to the Loco Pilots of all UP & Dn trains to observe 15 KMPH speed restriction in the station yard and be prepared to stop short of any obstruction.

(v) Before permitting any train movement leading towards the newly laid such points, SM on duty shall depute a

points-man to personally verify and confirm on the telephone provided near these points that the newly laid points are lying in normal position and are not damaged/ gapping anyway by any hanging part of the earlier train. This points-man shall then only shows proceed hand signals to the approaching trains in consonance with spirit of GR 3.39 & SR 3.39.03.

(vi) Operating staff responsible for taking off signals leading to such newly laid points shall not take off the signals unless he has assured himself by exchange of private numbers with the field duty SM in token of the confirmation that the newly laid points are clamped/ cotter bolted and padlocked in normal position and are not damaged in any way and the keys of these points are in his personal custody.

(vii) Where ever such work is to be done in track circuited areas sanctity of the original track circuit should be maintained. It will always not be possible to provide the track circuit of the newly laid turn outs. Thus physical verification of the track clearance through field duty points-man should be ensured by field duty SM.

(viii) After removal of any existing turn-out it shall also be ensured that signals leading to the reverse position of the cross over are made in-operative and only normal indications remains permanently lit.

(ix) Green aspect of distant and home in multi aspect signaling territory shall also be disconnected and Warner in two aspect signaling territory shall not be taken off.

(x) Sectional Traffic Inspector & other inspection officials shall monitor that all the train passing staff of the station observe the above instructions scrupulously.

9.03 Requirement of Non - Interlocked Working:

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

a. Nl working should not be resorted to as far as possible, in case of installation of new S&T gears. Nl is unavoidable only if modifications are to be made to existing S&T gears. This should be certified by PCSTE.

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

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

d. For physical modification work in any part of a yard, Nl working should not be resorted to for the entire movement in the yard. Effort should be made to isolate the portion of the yard where modification work will be done and signaled movement should be allowed on the remaining portion of the yard by resorting to careful “bridging” wherever required. The objective should be to cause minimum disruption to interlocked working of the yard and allow through trains to run on signals under block working.

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

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

g. This traffic cost of Nl should be communicated to S& T, who will evaluate if new gears can be installed without resorting to Nl for less than the expected cost of

proposed NI, if necessary by constructing a new building etc. as the case may be.

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

i. This entire exercise must be carried out under the personal supervision of DRM, who will ensure that all estimates are reasonable and no figures are unrealistic both with regard to duration of Nl orthe anticipated traffic cost.

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

9.04 Minor and Major Works:

1. Guidelines given below should be followed for deciding whether Nl working is required or not. Nl working is not required and the work can be managed by traffic block in following cases:

(i) Replacement of Mechanical lever frame by another Mechanical lever frame.

(ii) Replacement of Mechanical lever frame by panel.

(iii) Replacement of Panel by RRI.

(iv) Replacement of RRI by RRI.

(v) Commissioning of new SSI/RRI.

(vi) Amalgamation of newly constructed double line portion into existing conventional double line.

2. Nl working is required only for following cases:

(i) Overhauling of cabins.

(ii) Replacement of Panel by Panel at road side stations.

(iii) Meggering of cables.

(Iv) Changes in yard layouts

3. Nl working can be divided into 2 distinct categories, namely minor and major works.

(i) Minor works - Overhauling of cabins at road side stations.

(ii) Major works - Changes in yard layouts, overhauling of cabins etc. at comparatively bigger terminals and junction stations.

9.05 MINOR WORKS

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

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

(A) Duration of Nl working for Minor Works:

1. A road side station would normally have about 21 lever in each end cabin (including spare levers).
2. S& T department must suitably augment the strength of their Nl gang so that each cabin can be completed in one day.
3. Nl working at the 1st cabin should start at 8/- hrs. in the morning and by 18/hrs. the same must be interlocked and handed back to traffic.
4. The same procedure should be repeated the next day for the 2nd cabin.

(B) General Instructions for Train Operation:

1. Speed restriction of 15 kmph. shall be imposed over all facing point except Main line where 30 Kmph speed restriction shall be imposed.
2. No train/wagon should be stabled on any running line of the Nl station.
3. The common line should not be used for reception of trains coming from opposite directions.
4. Emergency and other crossovers including sidings taking off from the station should be set for normal position and clamped/cotter bolted and padlocked. The keys of all padlocked points must be kept in the personal custody of the overall in-charge of Nl working to prevent their being used even by mistake.

(C) Train Running on double line section during NI working:

1. Twin single line should be suspended during the duration of NI working and section worked as conventional double line only.
2. No temporary single line working should be introduced during NI period, except in case of an accident or blockade of through communication.
3. At road side stations on double line, route must be set for platform line in each direction and clamped/cotter bolted and padlocked.
4. In case there is more than one platform in each direction, route must be set for one nominated platform.
5. At all such stations no precedence should be arranged.
6. During the NI period station should basically function as a halt station.

(D) Train Running on single line section during NI working:

1. Ideally, if possible, only one platform line should be nominated fortrain running.
2. The route must be set for this platform line in each direction and clamped/cotter bolted and padlocked.
3. No precedence or crossing should be arranged at this station.
4. In case it is not possible to nominate only one line, then 2 specific lines should be nominated for Up and Down movement.
5. In that case, while crossings would have to take place, no precedence should be arranged at this station.

(E) Staff requirement:

1. Sectional TI and SI will be overall in-charge of NI working at the station.
2. Additional staff if required should be managed locally.

9.06 MAJOR WORKS

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

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

(A) Duration of Non Interlocked Working:

1. Nl working must not be simultaneously introduced at more than one station in a Division.
2. Nl must be planned during temperate weather, to avoid wrong actions on account of harsh and inclement weather.
3. Period of Non - interlocked working must be kept to the bare minimum as it is a potential safety hazard.
4. Staff of all departments must work round the clock in three shifts so that the work can be completed at the earliest.
5. For Nl working of up to 3 days, plans will be finalized in consultation with DRM, Branch Officers and concerned HOD of Construction/RE Organization.
6. For Nl working of more than 3 days, plans will be finalized in consultation with CTPM, CPTM and HOD of RE/ Construction Organization at Zonal level to assess the duration and arrangements of Nl working.
7. For more than 3 days Nl, plans should be worked out for cancellation, diversion, rescheduling, short termination or even extension of trains as the case maybe.
8. For Nl working of more than 7 days personal approval of the General Manager must be obtained.
9. No Nl working should last for more than 14 days.

(B) Sanctions, clearances and preparatory works:

1. Signal Plan must be finalized in Hdqrts. at least 45 days in advance.
2. All plans and clearances including CRS sanctions that are required for Nl working must be available at least 1 month before commencement of Nl working.
3. Under no circumstances should this period of 1 month be relaxed.
4. Nl working must be postponed in order to provide for 1 clear month before start of Nl either in case of :

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

(ii) Last minute modifications to Signal Plan.

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

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

7. Lessons learnt during previous NIs must be gone through in detail so that short comings of earlier occasions are avoided.

(C) Level of Supervision/Responsibility:

1. Responsibility to ensure availability of proper arrangement for NI working shall be of Construction/RE/Project organization.

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

3. PERT chart should be made out detailing various activities to be completed on a day-to-day basis.

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

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

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

7. Overall in charge for NI working will be ADRM of the division, in case of more than one ADRM is posted, then nominate by DRM.

8. ADRM shall be present at the station during Nl working & will be responsible for both Safety and Operations.

(D) Green Notice:

1. Construction officials responsible for carrying out the work should send a 'circular notice' to the Sr. DOM/Sr. DOM(G)/ DOM at least two months in advance.
2. They will advise as to when the work will be undertaken with a request to issue special instructions. Acopy of the notice shall also to be sent to SM of the station concerned.
3. Sr. DOM/Sr. DOM(G)/DOM on receiving such 'circular notice' get special instructions prepared forthat station. These are then issued to all concerned.
4. Green notice is to be issued by Sr. DOM.It should incorporate the following:

(i) Details of existing yard layout and its various provisions.

(ii) List of all works to be completed by Civil Engg./S&T/Elec. before start of Nl.

(iii) List of all works to be undertaken by Civil Engg./S&T/Elect. during Nl period.

(iv) Additional facilities to be made available after commissioning of new works.

(v) Existing facilities that are to be dismantled.

(vi) Details of yard layout to be made available after completion of Nl.

5. Signalling Plan must indicate permissible routings and simultaneous movement facilities to be made available.
6. Signaling plan must invariably indicate whether any of existing facilities for train movement are to be (i) either curtailed, (ii) modified or (iii) restricted.

(E) Time Tabling changes:

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

1. During the course of Nl working changing of points manually after passage of a train and after completing all formalities takes about 10 minutes time.

2. The capacity of the junction station to handle maximum number of trains during a particular time period has to be worked out keeping in mind the above constraints.
3. Every possible train movement of reception and dispatch must be clearly documented.

(i) Along with time of movement.

(ii) With exact sequence of points, whether in normal or reverse.

4. For time-tabled moves, trains demanding same point either at the same time or within 10 minutes must be identified since this is the time required before an existing setting of points can be changed. In case of conflicting moves, the less important moves have to be cancelled, rescheduled or diverted.
5. Crossing and precedence must be restricted to the bare minimum with few specific routes being selected for most movements.
6. As a thumb rule, only 80% of the reduced capacity as worked out should be utilized since unforeseen failures such asACP, equipment failures etc. are likely to take up the remaining 20% of the available capacity.
7. In all such planning it is betterto keep adequate cushion in train operations and initially cancel, reschedule or divert number of trains than what may be required. In case NI working progresses smoothly without major detentions and it is felt that some of the cancelled trains can be restored, the same may be done after a week or so.
8. Clear corridor for freight must be charted out, with exact number of moves possible, and extra freight trains that cannot be handled should be planned to be diverted to other routes. In case diversion is not possible then operating restrictions must be imposed.
9. More time must be spent in precise planning of each move during NI period, such that the station is not brought under pressure at any time.
10. Changes in PRS reservation system for cancellation, diversion, rescheduling etc. must be done in advance as

per advance period of reservation, along with adequate publicity for the passenger by Commercial Department and CPRO.

(F) Advance preparation for Train Running:

Stoppages on Platform:

1. Duration of stoppages of Mail/Express trains must be reduced to the extent feasible.
2. loading/unloading of parcels should be reduced to the bare minimum. If possible handling of parcels should be suspended giving due publicity in the Press and other media.
3. Running of trains with single SLR must be prohibited.
4. Shunting operations must be restricted to the bare minimum and preferably avoided altogether as far as possible.
5. Booking of through carriages, inspection carriages, etc. to the Nl station must be restricted.
6. Quick watering of coaches must be ensured by deputing additional staff as required.
7. Nominated stations for watering of coaches may also be changed if alternate stations are available.
8. Extra TXR staff on platforms for attending to defects in rolling stock and promptly attending to complaints.
9. Extra train lighting staff must also be deputed on platform duty for promptly attending to complaints.
10. Special squads of commercial and RPF staff must be deputed on platform duty for checking ACP etc., along with escorting of trains passing through the Nl station.
11. All efforts must be made to minimize detentions.

(G) Crew Changing:

1. Loco Supervisor must be kept on round the clock duty on the platform for quick change over of crews.
2. If possible crew changing for through passing trains may be planned at adjoining stations.

3. If necessary, Lis may be deputed to accompany the loco pilot from one station before Nl station till one station after Nl station.
4. Traffic Supervisor must be kept on round the clock duty on the platform for quick change over of guards.
5. At notice stations, computerized print out of caution orders must be used for saving time.
6. Similarly, extra porters should be deputed for delivering these caution orders to loco pilot and guard.

(H) Locomotives:

1. Engine changing for through trains must be curtailed.
2. Locomotives must be freely extendable beyond territorial jurisdiction.
3. If it is unavoidable, then changing of locos may be done at either side of Nl station.
4. For avoiding changing of locos from Diesel to Electric and vice versa, train routings may be changed during the duration of Nl working.
5. For traction changing, half shunt of locos may be freely resorted to.
6. Attaching of locos in rear should be resorted to in case of stations where trains reverse.
7. Sending of light engines to sheds must be restricted. For this purpose, an out pit may be opened, if necessary.

(I) Controlling of Trains:

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

(J) Goomty Arrangements:

Location and number of goomties is an extremely important aspect of advance planning for Nl. Sr. DOM/Sr.DOM(G)/DOM should personally approve final arrangements regarding goomties.

1. Cabins should not be used as goomties.
2. For a group of maximum of three sets of points operated from the ground one goomty should be made.
3. Ideally, only 2 sets of points should be controlled from a single goomty.
4. Each goomty should be provided close to the group of points that it controls. This will ensure that physical movement of staff is reduced to the bare minimum.
5. A group of 3 - 4 goomties at one end of the yard should be put in one zone.
6. Under no circumstances should 2 ends of the same points/crossings be with different goomties. This must be specially ensured for diamonds with single slips and also with double slips. Each such diamond must be under the same zonal in-charge.
7. Location of each goomty as also number of points that are controlled from it should be tentatively marked out in yard diagram. This should then be physically cross checked at site by visiting the station yard.
8. At site it must be ensured that staff are not required to walk long distances for setting of points.
9. Both ends of each point must be clearly visible from the goomty itself.
10. A goomty must be provided near the first stop signal for prompt issue of OPT forms etc. as required. Another goomty must be provided at the last stop signal to ensure correct dispatch of trains.

(K) Staff Arrangements:

Staff Requirement:

1. Each goomty should have one ASM and two Pointsman in each shift. These extra ASMs posted in goomties shall

be called goomtyASMs. ASM posted with indoor ASM will be termed as co-ordinating ASM.

2. For cabin operated points, extra commensurate staff as required (ASM/ cabinman/ pointsman) should be provided. However, cabins should not be used as goomties as far as possible.
3. GoomtyASMs during their duty hours shall be fully in-charge of working of points/levers under their charge. They shall discharge all obligations of the cabinman/ pointsman working at the station/cabin. They shall work under the direct supervision and instructions of the coordinating ASM on duty.
4. A group of four goomties or more at each end of the station should be put in one zone. Each zone should be under the charge of a TI in each shift. TI will periodically keep moving about amongst the goomties within his zone. He will check up and monitor the working of group of goomties under his charge.
5. For non-interlocking work at major terminal stations, necessary arrangement for additional staff should be made, if necessary, from adjoining divisions, before undertaking NI working.
6. Under no circumstances should NI working be started unless full complement of staff is available at the station as per above norm and adequate training has been imparted to them.
7. Preferably those staff should be drawn from outstation who have

(i) Adequate knowledge of NI working.

(ii) Previous experience of the same.

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

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

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

11. At each non-interlocked station one Asst. Scale officer of operating department will be nominated for over all supervision.

(L) HOER:

1. Under no circumstances HOER violation should be permitted during Nl working. As far as possible duty hours of staff should be restricted to 8 hrs. duty per shift in continuous roster.

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

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

(M) Duty Rosters shift wise:

(i) Meticulous detailed planning must be carried out for drawing up roster of staff to be deputed for Nl working. While drawing up roster of staff for various shift duties, following guidelines must be followed:

1. Duty rosters must be drawn up as per guidelines given below.

2. These should be drawn up for the entire duration of Nl period.

3. Duty rosters drawn up should be openly displayed and given wide publicity.

4. No staff shall be permitted to mutually exchange his duty roster with any other staff, without prior permission of his departmental officer at site.

5. Level 'N + I' shall be responsible for ensuring that level 'N' has followed all instructions, etc. as laid down above.

(ii) Last Night Shift Duty :

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

(iii) First Night Shift Duty:

1. Regular staff permanently posted at the NI station, if still available for deployment after covering last night shift, should be rostered for first night shift duty.
2. Second preference should be for staff who have previously worked at that station.
3. Amongst outstation staff preference should be as follows:

(i) Senior staff having previous experience of NI working.

(ii) Staff who are presently posted at major junctions.

(iv) Day Shift Duty:

1. Comparatively junior inexperienced staff from outstation should be deputed for day shift working.
2. Teams for different goomties should be so formed as to include at least one staff having previous experience of NI working.
3. For day shift working, more number of staff may be deputed pergoomty, if required, to cater for comparatively inexperienced staff.

9.07 Transportation official on duty (to be ensured by Sr.DOM/DOM):

1. The sectional DTI or the supervising SM of the station should be made overall in- charge of the NI working. His name designation and CUG No. should be mentioned on the TWI. He shall be responsible for smooth and efficient train operation and will co-ordinate with other agencies to ensure strict observance of these instructions.

2. In addition to normal complement of Optg. Staff one Spl. Duty SM with sufficient traffic staff will be posted in each location goomty.
3. One Spl. Duty SM will also be provided at the station to assist the on duty SM, who will be responsible for line clear transactions and preparation of various documents to be handed over to LP & Guard of trains. Other works, such as coordinating with control and goomties for movement of trains etc. shall be performed by on duty SM.
4. The SM's jurisdiction on each location goomty will be clearly spelt-out.
5. Each Spl. Duty SM shall be responsible for setting, clamping/cotter bolting and padlocking of points under his specified jurisdiction and will exchange private number with on duty SM/In-charge of Block Working. They shall work under the direct supervision and instructions of the coordinating ASM on duty.
6. A group of four goomties or more at each end of the station should be put in one zone. Each Zone should be under the charge of a TI in each shift. TI will periodically keep moving about amongst the goomties within his zone. He will check up and monitor the working of group of goomties under his charge.
7. Each goomty shall be provided with a signaling diagram for each of the day's NI working as planned.
8. Pull-charts for each goomty should be prepared according to each day's work.
9. Boards should be provided at each point marking the point number, its normal and reverse positions for easy identification by the NI staff.
10. The duty of Spl. Duty SM regarding issue of written authorities if any and also ensuring complete arrival of the train where required should be clearly spelt out.

9.08 Temporary Working Instructions (TWI) :

1. When NI is undertaken, inter- locking provisions stipulated in SWR are no longer available. So the SWR in its existing form becomes invalid.

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

3. Static information of SWR will continue to be valid. These include:

   (i) Inter - station distances.

   (ii) Description of yard layout.

   (iii) Level crossing gates.

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

5. Portions of SWR that will get replaced pertain to:

(i) Ensuring clearance of running lines.

(ii) Granting of line clear.

(iii) Reception/despatch of trains.

(iv) Working of level crossing gates.

(v) All checks that are done by means of :

(a) Slots.

(b) Lock bars.

(c) Point locks.

(d) Signals.

All these checks have to be taken care of manually.

6. Sr. DEN/DEN/Sr. DSTE/DSTE/Sr.DEE/DEE will jointly prepare the TWI to include their portion of work and send the draft TWI to Sr. DOM/DOM who will include instructions for regulation of traffic during the execution of work and will prepare the final TWI with detailed instructions including the safety precautions to be observed. This should be issued underjoint signature of Sr. DEN/DEN, Sr. DSTE/DSTE, Sr. DEE/DEE & Sr. DOM/DOM. Sr. DOM/DOM of the concerned division shall be the nodal officer for issue of TWI. Any issue or discrepancy

related with TWI to be reported to Sr.DOM/DOM by all departments including Safety.

7. TWI should list out:

(i) Number of goomties.

(ii) Portions of yard that each goomty would control.

(iii) Which goomties are to be involved for reception/departure of a train on/from different lines.

8. TWI should list out different conditions required to be fulfilled for reception/despatch of train:

(i) How line clear is to be granted/obtained.

(ii) How clearance of nominated line is to be ensured.

(iii) Procedure for closure of level crossing gates, if any.

(iv) How the route is to be set.

(v) What are the series of points involved?

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

(vii) How signals are to be lowered.

(viii) Which staff would do what?

9.09 Field level Advance Preparation:

1. Detailed working instructions clearly specifying the zone of responsibility of each and every staff and supervisor along with temporary working instructions must be issued well in advance of the Nl working. In any case these should be ready at least 15 days in advance of Nl working.
2. Station Manager/Traffic Inspectorwho is overall in-charge should be fully aware of their responsibilities/duties. Temporary working instructions should clearly stipulate these unambiguously.
3. Each Station Masters/Assist. Station Master, Cabin Man and points man deployed on shift duty should be supplied with copies of temporary working instructions. In addition SM/ASM and Cabin Man shall be supplied with yard layout diagrams and pull charts for their guidance.
4. The temporary working instruction shall be supplied to SM/ASM/Cabinman and Pointsman in advance for study by them and for explaining to illiterate staff

5. The instruction should be prepared in Hindi, English and Vernacular language and assurance to the fact that they have understood shall be obtained.
6. Ready made pull charts indicating normal and reverse position of points for specific routes must be prepared goomty wise. All such pull charts should be prepared at least 15 days in advance.
7. Tl should be entrusted with the job of personally checking each and every pull chart. Compliance report must be submitted by Tl at least 10 days in advance.
8. These pull charts must be printed, laminated and displayed in goomties as also given to each staff concerned.
9. Draft instructions and pull sheets must be computerized and prepared in advance. Thereafter these should be revised on a day to day basis. Actual revision should take into account the progress of work as per the original time schedule.
10. A checklist of items to be inspected jointly by Traffic, Signal and Permanent Way Inspector should be drawn and controlling officers should monitor that instructions in the checklist are complied with.
11. The exact location on the stock rail where clamps are to be fixed must be marked with white paint and clamps should actually be fitted to check that there are no obstructions.
12. It may not be possible to fix clamps on motor operated points provided with second leading stretcher bar. In all such cases provision must be made for cotter bolting of points.
13. In any case, cotter bolting of points must always be preferred as compared to clamping and padlocking since it is a much faster method.
14. Normal/reverse position of points should be painted on tongue rail to indicate position of the road.

9.10 Mock Drill and Staff Assurance:

1. Before the SM/ASM/Cabinman/Pointsman and other staff connected with train passing work are allowed

independent duty, the Station Manager shall obtain their verbal assurance that they have understood the same.

2. With regard to semi -literate and illiterate staff:

(i) SM/TI should explain detailed working.

(ii) Test their knowledge.

(iii) Satisfy himself that they can work independently.

3. Before starting actual non-interlocked working, a “mock drill” or “hands-on” demonstration/training should be given to all staff for at least 1 to 3 days in advance (depending on the size of the station) to familiarize them thoroughly with the type of work they have to handle.

4. This should be carried out in all the 3 shifts to ascertain difficulties, if any, which may be encountered during Nl working.

5. Teams already formed for different shifts should be deputed as per roster.

6. “Mock drills” should be carried out without actually disconnecting signal gears, points etc.

7. Whatever deficiencies are noticed during this period should be rectified before introduction of actual Nl. This experience should also be used to accurately estimate capacity to be available during N.I. and the number of trains planned to handled should be accordingly revised.

8. Written assurances are required to be obtained before staff connected with train passing duties are allowed to work independently.

9. This written assurance should be taken from the staff only after:

(i) They have participated in the “mock drill”.

(ii) Worked independently as per their laid down roster.

(iii) Successfully carried out all responsibilities entrusted to them during the “mock drill”.

10. No staff should be deployed unless proper entries are made in the “Assurance Register” and relevant signatures obtained.

9.11 Dissemination of information:

1. All aspects of working during NI, and changes post-NI should be clearly documented and explained at all Loco pilot/Guard lobbies, whose staff pass through that yard.
2. For this purpose loco/traffic inspectors, senior subordinates will be nominated to visit these lobbies, with yard plans and camp at these lobbies.
3. Assurance of each and every running staff regarding these changes should be recorded in respective lobby assurance registers, and complete report submitted to Sr. DOM/ Sr. DOM(G)/DOM/ Sr.DME/Sr.DEE on return.
4. Adjoining divisions/railways including notice stations and inter-change points should also be intimated of the detailed program pertaining to NI working.
5. All control staff including CHC, Dy. CHC, Section controllers, Power controllers, TLCs, TXR control etc. should be appropriately briefed.
6. The section controllers working on control boards must be fully conversant with the proposed changes pre-NI, restricted movement during the course of NI working and post-NI facilities to be made available.
7. Adequate publicity must be given through newspaper advertisements, electronic media, announcements at stations etc. informing the public of the likely repercussions on train running.

9.12 Telecommunication, Lighting and Medical:

1. Absolutely foolproof arrangements must be made regarding communication between the station and two adjoining stations on either side so that under no circumstances should there be a situation of total failure of communication between these stations.
2. Satisfactory arrangements for telephonic communication between station (indoor), Cabins, Goomty and Level Crossing Gates should be made to ensure efficient functioning of telephones provided at various locations.
3. Additional fail safe communication between control office and the NI station must be provided as a backup to existing section control channels.

4. Arrangements for public address system should also be made so that the same can be used for warning the public etc.
5. Loud speakers must be provided on each goomty for making announcements regarding train movement.
6. Walki - Talkie sets must be provided to all supervisors working at site.
7. Gangmen, Keymen and Patrolmen in 2 block sections on either side of the Nl station must be provided with walkie - talkie sets, electronic hand signal lamps etc.
8. Arrangements of staff and recharging facilities should be available for charging of batteries of telecom equipment including walkie - talkies.
9. General lighting in yard should be adequate.
10. Separate lighting should be provided in each point zone. Lighting should be adequate so as to ensure that each point controlled from a goomty is clearly visible to the ASM/ Cabinman in charge of that goomty.
11. Adequate generator backup should be provided. Spare bulbs should also be provided at each location.
12. Round-the-clock medical post with doctor and para-medical staff must be provided. They should be equipped for handling first aid and crush injuries. Anti- snake venom (Covalent) should be available. Road ambulance should be permanently stationed for quick transportation if needed.

9.13 Safety Equipment :

1. Safety equipment required for each location such as goomty, cabin, level crossing gate etc. must be spelt out in detail and full complement arranged.
2. Adequate spares must be arranged for safety equipment such as hand signal flags, detonators, Clamps, Cotter bolts, cotter Pins and pad locks etc.
3. LED based flashing Hand Signal Lamp must be provided to each such location for better visibility.
4. Cotter bolts, cotter pins and clamps & padlocks must be thoroughly tested to be in proper working condition.

5. Spare numbered crank handles must be provided in goomties where point machines are predominantly working.
6. Each goomty must be provided with the following safety equipment:

(i) Clamps, cotter bolt, cotter pin, padlocks, detonators.

(ii) Flags, hand signal lamps etc.

(iii) Relevant pull sheets, yard diagrams etc. duly laminated.

(iv) Torches, emergency light, in addition to normal lighting.

(v) Umbrellas, caps, raincoats as required.

(vi) Cotton Gloves for staff handling points etc.

(vii) Table, chairs in tent or covered area.

(viii) Containers and glasses for drinking water.

(ix) Thermos for tea/coffee and provision of snacksand meals for staff deployed from other station or /headquarters.

(x) Mosquito/insect repellant creams.

(xi) Magnetto, and VHF walkie talkies, Public Address Equipment.

(xii) Private number books, paper, pens.

9.14 Security arrangements:

Adequate RPF security staff round the clock must be arranged at following locations:

(i) ASM's office.

(ii) Central place at the station.

(iii) Level crossing gates.

(iv) Outer most goomties on either end.

9.15 Introduction of Nl working:

1. Before permitting introduction of Nl working DRM/ADRM will satisfy himself regarding arrangement of staff, safety equipment, lighting, telecommunication and ground position.
2. On the day of commencement of Nl working, branch officers concerned from Operating/Safety, Engineering, Signal, Electrical and Mechanical along with DRM/ADRM

will visit the place of work. They shall satisfy themselves of availability of necessary arrangement as per standard before permitting introduction of non-interlocking.

3. On the notified day, for introduction of Nl working, Signal Inspector concerned shall give a general disconnection memo for gears proposed for Nl working.

9.16 Block Working:-

1 Trains will be worked under the prevailing System of working.

2. Last stop signal should not be disconnected throughout Nl working except beginning and at the fag end of Nl working. Movement of trains to and from the block sections should be controlled by taking off the first stop signal and last stop signal. Normally, no Paper Line Clear Tickets should be issued to the Loco Pilots as authority to proceed in the block section. Adisconnection of 2-3 hours should be taken for disconnecting the last stop signal and block instrument and reconnecting the new last stop signal and new block instrument at the end of the Nl working. During this period of disconnection trains may be worked under proper authority.

3. Line clear shall not be granted for an UP ora Down Train unless:

(a) The SM on duty in-charge of Block working has ensured that the last preceding train has arrived complete and in well within the fouling mark.

(b) Complete arrival private number has been obtained from the special duty SM at the location concerned.

(c) Block Section is closed by normalizing the Operating Handle to Line Closed Position.

(d) Private number has been exchanged with the concerned SM/GK for ensuring closure of LC Gates.

9.17 Train Operation during Nl period:

Working of Signals:

1. Speed restriction board of 30 and 15 kmph must be exhibited at concerned free Home signal for main line and

loop line movement respectively subject to other speed restriction, as well as stipulations in Para 2.9 and 2.10 of para no.9.25.

2. The following signals should be provided with caution aspect:

(i) In case of colour light signals, a common Nl Home signal without route indicator

(ii) In case of MAUQ/TALQ, single arm Nl Home signal.

(iii) Warner signals, if any are to be put out of commission by putting 2 cross bars.

3. Nl Home/Starter signal can betaken off only after ensuring that:

(i) All points on the route are correctly set, both facing and trailing points clamped/cotter bolted and padlocked.

(ii) In addition to correct setting, clamping/cotter bolting and padlocking of facing points, they must also be manned.

(iii) Level crossing gates on the route have been closed against road traffic.

4. Last stop signal should not be disconnected throughout Nl working except at the fag end.

5. Movement of trains to and from the block sections should be controlled by taking off the last stop signal.

6. Normally, no Paper Line Clear should be issued to the loco pilots as authority to proceed in the block section.

7. A traffic block of 2 - 3 hrs. should be taken for disconnecting the last stop signal and block Instrument and reconnecting the new last stop signal and new block instrument.

9.18 Train Running:

1. Each train movement must be announced well in advance on the loudspeaker:

(i) Along with the number of the goomty involved.

(ii) Sequence of points required to be set and locked in normal or reverse condition.

2. Trains must be allowed to enter cautiously at 30 and 15 kmph on main line and loop line respectively.

3. Loco pilot of an incoming train must not under any circumstances pass the outermost facing points even though signals have been taken off:

(i) Unless he also sees that the points are manned.

(ii) A proceed hand signal is exhibited towards him from the points.

9.19 Working of points:-

1. All points in the yard will be disconnected from electrical operations and will remain as non interlocked during this period and will be operated manually by means of crank handle, lever or crow bar.
2. Separate point crank handles where required for setting of points to the required position are to be made available with special duty SM at the respective locations. The special duty SMs at the respective locations shall ensure that both facing and trailing end points under his jurisdiction over which the train will pass are correctly set, facing points clamped/cotter bolted & padlocked and padlock keys are retained in his personal custody. Setting of points to the required position for reception and dispatch of trains or shunting movements shall be done by the concerned special duty SM at locations under exchange of private numbers with SM on duty/in-charge of Block Working.
3. The train movements shall be dealt according to the layout certified by Engineering Officials and Electrical (OHE) Official, as the case may be.
4. If the clamps/cotter bolts provided at newly inserted points have to be removed for any reason like testing purpose, the concerned official (the inspector in charge of P.Way/ Signal/OHE department) shall give a written request to special duty SM at concerned location who in turn, shall consult and obtain the permission of the SM on duty/in charge of Block Working under exchange of PN and shall then hand over the relevant keys to the requesting official. After completion of work, the official who has taken the point clamp/cotter keys, shall set these new points correctly to the “Normal” position, clamp/cotter bolt and

pad lock them and hand over the relevant pad lock keys to special duty SM at the location from whom these have been taken and make necessary entries in the register maintained to that effect. The special duty SM at location shall then keep the pad lock keys in his personal custody and after ensuring that the new points are correctly set, clamped/cotter bolted and padlocked to the normal position, shall advise the SM on duty/in charge of Block Working accordingly under exchange of PN.

5. Points-man manning the facing points shall exhibit 'Proceed Hand Signal' to the Loco Pilot of all approaching trains.

9.20 Level Crossing Gates:-

1. The Gates which will be worked as interlocked and which will be worked as non-interlocked should be clearly mentioned. All interlocked gates with station signals will work as non-Interlocked during period of NI.
2. The procedure of working of all the manned LC gates connected with the station in case an interlocked gate in worked as non-interlocked gate should be specified.

9.21 Failures:

1. All indicative accidents during the period of NI working must be immediately reported to the site in charge in order to ensure prompt corrective action and avoidance in future.
2. Details regarding such cases must be promptly intimated to DRM and Sr.DOM/Sr.DOM(G)/DOM.
3. A register must be opened at each goomty in which before handing overcharge, staff will enter details of whatever difficulties they have faced during their shift. The person in charge of NI working at that station must scrutinize this register daily.
4. Cases of bursting of NI target should be appropriately dealt with and individual responsibility should be fixed up.

9.22 Revised Station Working Rules:

1. After completion of NI working, new works are to be commissioned.

2. Since the yard layout, facilities etc. have changed, the previous SWR is no longer valid.
3. A new SWR duly approved by CRS is to be brought into effect after completion of Nl
4. Staff assurances for the revised SWR must be taken afresh.

9.23 Completion of Nl Working:

1. Nl working must not be terminated unless and until each and every item originally scheduled for completion has been successfully complied with.
2. Designated operating officer must visit the Nl station and verify the following:

(i) Completion of work as per program.

(ii) Correspondence of yard layout as per SWR.

(iii) Correspondence of movements permitted as per SWR.

3. The installation shall jointly be tested by Traffic, S&T and Engg. Officials and fortheir correct functioning.

(i) The lever/knobs, signals, points and connections work freely and properly and that the installation fulfils its objective.

(ii) Signals are properly focused, the indications on the panel correspond with the signal aspect and point position at site.

(iii) Engineering officials shall check the proper housing of points gauge level etc.

(iv) On completion of work the official in-charge of S&T/Civil Engineering department will hand over the relevant portion of the 'Re-connection Notice/memo to the Station Master/ Cabin Master and obtain his signature on the record foil of the Re-connection Notice/memo.

4. Before issue of Safety certificate and taking over of stations, the Transportation Safety Officer shall instruct the station staff responsible or working the interlocking installation and test them in their knowledge of the signalling arrangement.

5. Engineering and S&T officers shall give a certificate stating that all works as per the approved plan are completed.
6. Staff concerned shall be notified through Station Order Book, Control Order Book and their acknowledgement obtained. All inspectors and other supervisors shall ensure strict compliance and report any deviation or violation with prompt to notify then and there.
7. On the day of completion of work, branch officers concerned shall visit the work site to ensure completion of work as per program.

9.24 Post NI analysis:

1. Within 7 days of completion of NI, a brain storming session should be held with all the senior supervisors involved for taking stock of lessons learnt.
2. These lessons learnt should be compiled at one place for successive NIs, so that they are available for future reference.
3. A copy of the same may also be sent to other divisions for reference purposes.

9.25 Background:

1.1 Gazette Notification of amendments of Indian Railways General Rules 4.10 for increasing the speed of train to 30 kmph during NI working has been notified by Govt, of India Press and published under G.S.R 198(E) dated 12.03.2020. As per Gazette Notification, the speed of trains over non interlocked facing points shall not exceed 30 Kmph in any circumstances.

1.2 One of the precautionary conditions is that the integrity of point shall be checked by operating staff.

1.3 During Pre NI & NI period, electric point machines are fully wired and being tested through VDU/Panel in order to ensure the integrity of points in commissioning of signaling installations. It is, therefore, practically not feasible to prove normal detection of facing points in concerned free signal. If normal detection of electric point machines is used in free signal, it will not be possible to check the integrity of points during NI which may cause unsafe working.

2. Methodology to be adopted in Nl working at speed of 30 Kmph

In view of above, following methodology should be adopted to carry out Nl working at speed of 30 Kmph.

2.1 30kmph Nl working should be permitted only if the station yard is straight & there is clear visibility of both approaches from yard.

2.2 Necessary arrangements are to be made to give Free Home, Starter and Advance Starter signals.

2.3 Auto replacement of Free Home, Starter and Advance Starter signals shall be provided.

2.4 Advance Starter signal shall be controlled by Block Instrument/BPAC/MSDAC.

2.5 All the points should be properly set, clamped and locked in Normal position by operating staff so as to permit movement of trains on main line. This shall be ensured by minimum ASM level.

2.6 Private number shall be exchanged to ensure proper setting, clamping and padlocking of point in required position by each Zone (Goomtie) ASM to Indoor ASM to ensure integrity of points before movement of each train.

2.7 Free signals shall be cleared by indoor ASM only after ensuring proper setting, clamping & padlocking of points in normal position after exchange of private number with outdoor ASMs of Zones (Goomties) that the points are set & locked in normal position and rout is clear.

2.8 Outdoor ASM of Zone (Goomtie) shall verify and ensure the clearance/vacancy of track physically before permitting movement of train.

2.9 Crossing/Precedence of trains should be avoided as far as possible at Nl station.

2.10 Movement of train via loop line should be avoided as far as possible during Nl working connected to main line. Any movement on loop line including shunting shall be done in traffic block with restricted speed not more than 15 Kmph.

2.11 Complete yard should be well illuminated so as to ensure clear visibility of traffic movement taking place in yard, specially point zone so that setting & locking of points should be clearly visible.

2.12 There should be planning of adequate no. of Zones (Goomties) with sufficient nos. of operating staff so that train operation may be handled smoothly and swiftly without any disruption.

2.13 The points & required arrangements shall be certified fit for train operation at speed of 30 Kmph before taking up Nl working jointly at officers level of concerned executing departments (Construction/RVNL/IRCON etc.) and Open line (division) of Engineering, S&T, Electric & Operating.

2.14 Approved reliable communications should be provided from each Zone (Goomtie) to indoor ASM with stand by communication facility.

2.15 Public announcement system should be provided to alert all staff working in yard during Nl before lowering the concerned signal.

2.16 Loco Pilot should be given a caution for look out and continuous whistling to alert staff in yard while passing through the yard.

2.17 30 and 15 kmph speed restrictions board shall be provided at concerned free Home Signals for main line and loop line movement respectively subject to other speed restrictions.

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CHAPTER - X

MARSHALLING YARD

10.01. Introductory.-

A marshalling yard consists of a net works of tracks divided into several grids for receiving, sorting, forming and despatching of trains. Facilities fortranshipment, repairs to wagons marked sick, lines for stabling of brakevans; special type stock, etc are also provided. Certain yards where trains are only received and despatched without much sorting or marshalling are called mid-terminal yards as distinct from marshalling yards. On the other hand terminal yards are yards where trains originate or terminate and are generally provided near terminal goods shed, where a large number of wagons are loaded or unloaded. Terminal yards may be marshalling yards also.

10.02. Functions.-

(a) The function of a marshalling yard is to form duly marshalled trains to the farthest point. The unit of loading is a wagon, while the unit of transport is a train. In order to despatch the wagons to their final destinations they are to be collected and formed into trains. Therefore, a marshalling yard is necessary to receive trains, sort them out and despatch them onwards to reach their destination by the quickest possible means. Broadly speaking the primary and subsidiary functions of a marshalling yard can be defined as follows:-

(b) Primary functions:-

(1) To form Goods trains to the farthest points according to the scheduled laid down.

(2) To form Shunting and Van Goods trains according to the prescribed marshalling orders.

(3) To keep wagon detention to the minimum while planning item No. (1) and (2).

(c) Subsidiary functions:-

(1) Placement and removal of inward loaded wagons for the goods depots, Loco Shed, Private Sidings, etc. served by the marshalling yard.

(2) Placement and removal of wagons in and from the repacking Shed attached to the yard.

(3) Placement and removal of the sick wagons from the nominated sidings.

(4) Assessment of room by shunting for road- side stations and to arrange room accordingly by the nominated shunting trains.

(5) Arrangements for supply of stock as required by the road-side stations in accordance with the orders received from the Stock Controller.

(6) Weighment of wagons if the yard concerned is also nominated a weigh-bridge station and adjustment of loads.

(7) Maintenance of a correct tally of the daily output of the yard.

(8) Maintenance of record of detentions to the through loaded stock in transit across the yard.

(9) Maintenance of record of detention to other kinds of stock such as local loaded, sick wagons, empties special stock etc

(10) Economy in operation.

(d) The wagons are said to be dealt within a yard if they are actually marshalled and do not include wagons on through passing trains.

(e) The traffic dealt within a yard may originate in its vicinity or may be received from other yard in the form of trains may be received from important loading centres having no yard facilities to form trains.

10.03. ***Marshalling yard:-*** A yard is designated as a 'Marshalling yard' on the basis of work done and the volume of traffic dealt with. General yards which deal with more than 20000 wagons in a month are termed as marshalling yards. Marshalling yards can be classified under three groups on the basis of the method of sorting out trains:-

(a) ***Flat yards:-*** Flat yards are generally laid on flat or level land where shunting operations are carried on with the help of engine power by push and pull method and as such

the working of flat yards is slow. Flat yards may serve the purpose if the number of trains to be received, sorted and formed is few.

(b) *Gravity yard:* - Gravity yards are constructed where the natural contour of land permits a suitable falling gradient stretched over a sufficient length. The falling gradient is made use of to the fullest extent in marshalling wagons/trains, thus minimising the use of engine power. Therefore, gravity yards are more economical than flat yards but the layout of a gravity yard is dependent on the availability of plenty of land .with the required topography which is seldom possible.

(c) *Hump yards:-* Hump yards are similar to gravity yards in nature excepting that the gradient is created by constructing an artificial hump suitable for the purpose. The gradient of the hump is constructed in such a manner that the wagons roll down of their own to specified classification lines from the summit of the hump. The wagons are pushed up to the hump summit by engine power where from they are allowed to roll down. The apex of the hump is constructed between the reception and the classification yards. The starting gradient falls steeply towards the classification grids gradually easing up and finally getting absorbed into classification lines.

In hump shunting, the use of engine power is minimized and the number of wagons dealt with is more than that in other kinds of yards, Hump yards have been considered to be the most economical and practical where sufficiently large number of trains have to be sorted out. Such yards can be designed and laid out as required and are no primarily dependent on topographical conditions of the line.

10.04. Components of Marshalling Yard.-

A marshalling yard comprises of reception classification, sorting and despatch facilities for the purpose of sorting, formation and despatching trains.

(i) ***Reception Yard: -*** *Reception* yard is yard where incoming trains are received Incoming trains may be composed of wagons which are to go through after changing of power, crew and Guard or of wagons required sorting and marshalling. Two separate grids may be provided in the

reception yard- one for through trains and the other for terminating trains. Separate reception yards may be provided for up and down trains. In yards where no separate hump for up and down trains are provided, the reception yards for both up and down trains are laid behind the common hump, so that the hump is utilized more economically, the grid for through trains by pass the hump.

(ii) ***Classification yard:-*** In the classification yard the incoming trains are broken upon lines specified for different directions or destinations of loads or types of wagons.

(iii) ***Departure yard:-*** In departure yard, loads are kept formed and ready for onward despatch. Separate departure yards for up down trains are provided in large yards.

(iv) ***Special sidings:-*** Special sidings are provided for keeping brake-vans, special type stock, cattle wagons or wagons containing commodities like explosive which cannot be humped.

(v) ***Sick lines:-*** Sick lines are provided near the classification yard for repairs to sick , wagons which are marked for repairs either on the in-coming or out-going trains.

(vi) ***Bypass lines:-*** By-pass or avoiding line is a line which skirts the hump. Its objective is to avoid the hump engine having to move over the hump and is also used for vehicles which cannot be passed over the hump into the classification yard.

(vii)***Transfer lines:-*** Transfer lines are provided for transferring wagons where two yards exist side by side or also for transferring wagons from one sphere to another in the said yard.

(viii) ***Engine run-round lines:-*** Separate lines are earmarked for movement of in-coming and out-going engines between the loco Shed and the Yard.

(ix) ***King points: -*** The first pair of points a wagon meets after passing over the hump are called 'King points'. They divide the classification yard into two portions.

(x) ***Queen points:-*** The second pair of points a wagon meets on its way downwards are called 'Queen points', which further divide the classification yard into four portions.

(xi) ***Jack points:-*** The third pair of points a wagon meets are called the 'Jack points' and these serve to divert the rolling wagons into the different grides of the classification yard.

Note:- In a hump yard there are usually a pair of 'King points two pairs of 'Queen points' and four pairs of 'Jack points'.

(xii)***Retarders:-*** One of the main problems in the working of a hump yard is to adjust suitably the speed of the humped wagons rolling down the hump so that they may not cause damage by humping violently against wagons already standing on the same line. The speed of the humped vehicles varies according to the force of the push given by the engine, the height of the hump the weight, the nature of the axle box (viz. roller bearing or plain bearing), as also on the weather prevailing.

In mechanized yards retarders or rail- brakes are installed to reduce and keep the speed of humped vehicles under control. The retarders may be automatic or manually operated.

(xiii) ***Skids:-*** At yards where mechanical retarders are not provided skids are placed on the classification lines to control the speed of the humped wagons. These skids are placed by skid porters and the skids are removed after the wagon has come to a stop.

10.05. Equipment of Marshalling Yards.-

A marshalling yard should necessarily have the following equipment and arrangements for proper functioning and efficient supervision of work:-

(i) Telecommunication arrangement:- Since a marshalling yard covers a considerably big area, the distance between its different points and portions becomes naturally long. Therefore, telecommunication facilities between all important points in the yard are imperative so that instructions to the supervisory staff can be conveyed quickly over telephone to the person or persons concerned.

Yard officials concerned with control circuit as well as with various officials, Sheds, offices etc. on telephones.

(ii) Paging and talk-back arrangement:- Major marshalling yards on this Railway have been provided with

paging and talk-back sets through which orders and instructions are issued to staff concerned working in different spheres in the yard from one central point. Similarly the staff can also convey any information to the central point. This help co-ordination between different spheres of the yard.

(iii) Loud speakers are also provided at convenient points so that order and instructions can be conveyed to the staff working in the same sphere. For example, loudspeakers are provided in the classification yard so that the person-in-charge of the hump can convey instructions relating to the skid porters regarding the line on to which wagons are being humped.

10.06. Yard working instructions.-

For proper and efficient working of each yard, general directions for working in each shift should be laid down in the yard working instructions. The instructions should deal with all aspects of working in detail other than the procedure for reception and despatch of trains, etc. which are given in the Station Working Rules. These instructions will be useful for the general guidance of staff working in the yard as well as relieving staff and new-comers. The yard working instructions should be prepared generally under the following heads:-

(1) Full description of the yard. It is preferable to attach sketch also showing the whole yard indicating therein the cabins the nomenclature of the lines, etc.

(2) Strength of the yard staff in each shift.

(3) Marshalling orders in force.

(4) Shunting engines available in each shift and the purpose for which they are to be utilised.

(5) Procedure of work to be carried out generally in each shift.

(6) Directions to Shunting Jamadars, Yard Masters and Assistant Yard Masters on duty, in regard to advance planning of the work etc. during their shift.

(7) Miscellaneous instructions:-

CYM /DYCYM/YM /AYM should see that the yard working instructions are properly followed by all concerned staff.

10.07. Yard Records. -

Charts and records will be maintained in each yard in accordance with the local orders in force. The following are the principal records which shall be maintained in each yard:-

(a) *Running Balance Register:-* This will be maintained by the Head Trains Clerk a- Trains Clerk-in-charge personally. All stock entering into the yard i.e. received by incoming trains orfrom shed, tranship shed, sidings including departmental sidings, should be posted with blue or blue black pencil showing date, train No. time, loads or empties against different columns direction wise as directed by the Divisional Operations manager or the Chief Controller of the Division, While this will be done by the red pencil for the out-going trains or when stock will be leaving the traffic yard for placement in shed, sidings departmental siding and trainship shed etc. The posting will be done from time to time commencing from 00-00 hours and every 4 hours the balance will be closed after adding the incoming stock while the departing stock is subtracted and the balance repeated to the control for the purpose of train ordering and controlling of incoming trains as necessary. This register forms the basic record to show at any time the condition of the yard controlling the loads and empties offering for ordering out trains, the trend of traffic and loads held up as well as to prepare certain statements and statistical figures.

(b) Wagon Link Cards:-Wagon link cards contain particulars of each wagon dealt with in a yard namely, owning railway, wagon number, and load empty and type wagon, from and to station, including its arrival and despatch timings and total detention. Link cards should be maintained in 10 groups digit wise as follows:-

Wagons whose numbers end in '0' will be one group.

" " " '1' " 2nd group

" " " '2' " 3rd group

and so on.

Example: Suppose wagon Nos. SE 34970, ER 25311 and NR 32932 have been detached at a station/yard from a

train. The wagon SE 34970 will be entered in the link card for digit ‘o’ ER 253331 in the link card for digit 1 and NR 32932 in the link card for digit 2.

Separate link cards should be maintained for loaded and empty wagons, as well as for special type stock. In orders to keep a watch on loaded wagons detained in the yard, separate link cards are also maintained for:-

Wagon detained over 24 hours

Wagon detained over 48 hours

Wagon detained over 72 hours

(c) *Trains Clerks’s Hand* Boo/c-Particulars of all wagons entering or leaving the marshalling yard area must be recorded in the Trains Clerk’s hand Book directly from the trains by which they are received or despatched. Wagons work into or out of the yard and to outlying shed and sidings by pilots are to be treated in the same way as wagons arriving or leaving by trains. Separate Trains Clerk’s Hand Books must be maintained for incoming and outgoing trains, each book being earmarked fora particular direction. These Hand Books from the basic records from which the Running Balance Register and the Wagon Link Cards are posted.

(d) *Register showing receipt and despatch of wagons:-* A register is maintained in form OPT/442 to show, the detention at different stages i.e. from arrival to placement, release and despatch of all wagons dealt with at a station. From this register detail of detention to goods stock in goods sheds, sidings, tranship sheds, sick lines and departmental sidings can be checked. The register is jointly maintained by the Operating / Commercial, Carriage & Wagon staff as the case may be.

(e) *Loaded wagons Detention Register* This register is maintained direction-wise to watch the detention to through loaded wagons. The register is provided with the following columns:

Date	Direction	Standard Detention	Total no. of loads dispatched	Total detention in hours Hrs. Min.	Average detention Hrs. Min.	Excess detention Hrs. Min.	Remarks
1	2	3	4	5	6	7	8

From this registerthe Y.D. (Yard detention) return is submitted to the Divisional Operations Manager with a copy to the Chief Operations Manager at the end of each ten day period ending viz. periods ending on the 10th, 20th and the last day of the month.

(f) *Shunting Engine Log Book:-* A Log book for each shunting engine should be maintained by the Yard Master or the Shunting Jamadar in charge of each engine. In this book the daily performance of the shunting engine should be recorded with timings from the time it arrives into the traffic yard till the time it leaves the traffic yard for the Loco Shed with the detentions in the yard on Loco account e.g. temporary repairs, defective brakes etc.

(g) *Yard performances Register:-* Yard Performance Registers must be maintained at all marshalling yards. The columns of this register are shown below:-

Date	Number of wagons at 0-0 hrs.	Number of wagons detached from trains.	Number of wagons worked into yard by pilots from outlying sheds and sidings etc.	Number of wagons detached by trains.	Number of wagons placed from yard in outlying sheds and siding etc.	Number of wagons detached.	Number of wagons remaining at 24 hrs.	Number of wagons dealt with.	Number of trains received.	Number wagons despatched	Number of shunting engine hours of regular shunting engines.	Number of shunting hours of train engines	Remarks
1	2	3	4	5	6	7	8	9	10	11	12	13	14

In entering up the various columns the instruction given in para 10.08 below in respect of monthly marshalling yard statistics should be followed.

(h) Graphs:-A graphical record of the following items should be maintained:-

(i) Daily average wagon holding at 0-0 hour.

(ii) Average number of wagons dealt with monthly.

(iii) Average number of wagons dealt with per shunting engine hour.

(iv) Daily average number of wagons received and average number of wagons despatched.

(v) Daily percentage of right time starts to trains originating from the yard.

(vi) Average number of wagons marked sick daily.

(vii) Daily average detention to through loaded wagons.

(viii) Average detention to all wagons.

10.08. Monthly Marshalling Yard Statistics:-

(A) These are required to be compiled by selected marshalling yards in the following proforma:-

Item (1)	Name of Marshalling Yard *(2)*	Remarks (3)
1. Wagon despatched. 1.01. Number of wagons despatched by train during the month. 1.02 Number of wagons placed from the Marshalling Yard outside the yards by pilots in goods sheds, military sidings, assisted sidings etc. 1.03 Number of wagons dealt with during the month. 2. Daily average sidings number of wagons despatched. 3. Number of Trains received- 3.01 (a) Number of "by passing trains". (b) Number of Terminating trains. (c) Total (a) + (b) = 3.02. Average detention to "by passing Trains" Target :- Actual :- 3.03. Number of wagons carried by-passing trains included in item 3.01 (a)... 4. Number of trains despatched. 4.01 Number of by-passing trains. 4.02 Number of originating trains. 4.03 TOTAL : 5. Number of wagons dealt with per shunting engine hour. 5.01 Number of pilots working in the station. (i) Number of pilots. (ii) Number of shifts per day. 5.02. Total shunting engine hours outside marshalling yards. 5.03. Total shunting engine hours of regular shunting engine employed for work inside marshalling yards. 5.04. Total time taken for locomotive duties and minor repairs 5.05. Number of wagons dealt with per shunting engine hour. 6. Average detenation per wagons:- 6.01 All wagons - Target Actual. 6.02 Through loaded wagons- Target Actual 6.03 Through empties 6.04 Outward Local 6.05 Inward Local 6.06 Sick Wagons.		

(B) The following instructions should be followed rigidly in compiling the Marshalling Yard statistics as per prescribed proforma:-

General Instructions:-

(i) The marshalling yard statistics should be prepared for selected yards generally dealing with 20,000 four-wheelers wagons and over per month in respect of broad gauge yards. Prior approval of the Railway Board should however, be obtained for addition or deletion of any yard.

(ii) For the purpose of compilation of data for this statement wagons should be counted in terms of four-wheelers and not as unit unless otherwise specified.

(iii) Brake-vans are to be included.

(iv) The area of each marshalling yard is to be carefully defined and no, extra allowance is to be made for any work done within that area. A diagram showing the marshalling yard area clearly demarcated should be prepared for the yards for which statistics are required to be compiled by the Railways for the Board. This diagram should be readily available at the stations to enable any inspecting officer to obtain a clear indication of the extent of the marshalling yard.

Sick lines and repacking sheds, transshipment points, goods sheds, departmental sidings and other industrial sidings etc. may, as a general rule, be treated as lying outside Marshalling yards for purpose of calculation of marshalling yard statistics.

(v) At places, where there are points like the Goods Terminal Station and */* or Break of gauge transhipment point, etc. contiguous to the Marshalling Yard, and the detention statistics for each of these yards are compiled separately either for submission to the Railway Board orfor inclusion in the Railway's own Domestic statistics the sum total of detention in each yard should accord with the total detention from arrival of a wagon till its final despatch from that station. To ensure this, the supervisory staff in-charge should exercise a check, at least once a month, on a random sampling basis. This check should be broad-based covering not only the important categories of wagons e.g. four wheeler, box wagons,

oil tanks etc., but also the main stream of movement of wagons to and from different directions. This exercise should cover at least 10% of the total number of local wagons dealt with in the marshalling yard during the previous month and the records of such checks should be properly maintained to be available for scrutiny by inspecting personnel.

(vi) In the case of wagons whose detention or despatch particulars are not available, their detention should not be omitted but reckoned on the basis of the average detention during the month for similar type of stock while working out the average detention per wagon. The number of such wagons should be indicated separately under 'Through loaded' and 'All wagons' for each yard in a foot-note, to the statement.

(vii) Yards provided with humps are to be denoted by an asterick and terminal yards should be specified by a note to that effect.

(viii) Except where otherwise stated, all results are to be worked out correct to one place of decimal, but those which are less than 10 should be worked out correct to two places of decimal.

1. Wagons despatched.

Item 1.01 and 1.02 - Self explanatory. A wagon should be included under item No. 1.02 as many times as it leaves the marshalling yard.

Wagons on 'by passing' trains (i.e. through goods trains, as defined in note under item 1 of Statement 2) will not be included under 1.01.

Item 1.03 -Items 1.01 +1.02.

2. Daily average number of wagons despatched:-

$$\text{Item 2} = \frac{\text{Item 1.03}}{\text{Number of days in the month.}}$$

3 & 4 - Number of trains received and despatched:-

(a) A train for this purpose is a set of wagons or vehicles worked by locomotive, or any other self- propelled unit, or rail-motor vehicles, empty or converying traffic when running,

under a particular number or a distinct name, from a fixed point or departure to a fixed destination.

(b) All trains, both terminating and by-passing (i.e. through goods trains) are to be included. “By passing trains” should be accounted both under the number received and despatched.

5. Number of wagons dealt with per shunting engine hour.

Item 5.05 = Item 1.03 + Item 5.03 + 5.04.

Note:- *(i) While compiling shunting hours under item 5.03 and 5.04 the following instructions should be kept in view:-*

(a) Shunting hours are to include the shunting hours of regular shunting engines and train engines before and after working a train or during its run when employed in shunting goods wagons only, in the marshalling yard area. The shunting time within the marshalling yard area should only be taken into account and not the time spent outside its limits.

(b) Shunting engine hours are to be reckoned from the time of arrival of the shunting engines in the marshalling yard up to the time of their departure from the yard on the basis of shunting vouchers. The time spent on locomotive duties whether in the yard itself or outside the yard is to be included. However, any extra time taken over the normal time prescribed for carrying out legitimate locomotive duties should be excluded; the normal time will be determined by the DOMs of the Divisions taking into account the local conditions.

If a shunting engine is required to be repaired in the yard itself the extra time beyond 30 minutes spent on such repairs in a shift should also be excluded.

(c) The time spent in the marshalling yard for change of crew and / or fuelling should be accounted for.

(d) Since shunting engines shunt both coaching and goods vehicles, the allocation of shunting engine hours to goods and coaching stock may be fixed for each yard on a percentage basis after an examination of the work done. This percentage is to be re-checked at least once a year and also when any change occurs in the type of traffic passing through

that yard. Where daily records are kept of the working of shunting engines according to hours spent (i) inside the marshalling yard, (ii) outside the marshalling yard and (iii) in shunting coaching vehicles, it will not be necessary to fix a percentage, as the actual hours spent in the marshalling yard in shunting goods vehicles will be available. Time taken by shunting engine in placing wagons in such lines is to be included in shunting hours when such lines forms part of the marshalling yard' area.

Note:- (ii) Time spent for locomotive duties record separately under item 5.05 should be included under item 5.03 also Item 5.05 will include the time taken by shunting locomotives for locomotive duties and minor repairs upto 30 minutes per shift as per note (i) (b) under item 5.

6. *Average detention per wagon: - (a)* The detention time should have reference only to the detention within the marshalling yard territory as defined in para (iv) of general instructions and the incoming and outgoing wagons from and local outlying[1] sheds, sidings etc. should be counted as many times as they enter the yard. This will include detention to sick wagons in the Marshalling Yard although their detention is separately shown, against item 6.06.

(b) The average detention is to be obtained by recording in the wagon exchange register or similar record, the hour of detention to each wagon, that is, the interval between its arrival and departure. At the end of the month the hours of detention to wagons despatched during the month under different types must be totaled, and both detentions and number of wagons for each type must be multiplied by the factor of equivalent to four-wheeler and then consolidated to workout the average detentions per wagon. The following example will illustrate the method of calculation of the average detention per wagon.

Example

Suppose Yard A has despatched 100 four- wheelers with a total detention of 400 hours, 20 bogie wagons (equivalent to 40 four-wheelers) with a total detention of 200 Hours and 10 BOX wagons (equivalent to 25 four-wheelers) with a total detention of 150 Hours.

Average detention per = $\frac{400x1+200x2+150x2.5}{100x1 +20x2+ 10x2.5}$

per wagon will be

= 7.1 Hours

The detention of wagons arriving in one month and despatched in the next will be shown in the month in which they are despatched, but the time must be reckoned from the date of arrival. Stations which maintain a wagon card index may obtain the figures there from instead of from the wagon exchange register. The number and detention of brakevans will be excluded for the purpose of this item.

(c) The 'target' detention hours will be fixed by the Railway Board from time to time having regard to the past performance of each yard and also materialization of different streams of traffic, marshalling commitments and the facilities available. A pointer to the correct level of a target would be the best result achieved, in the past one or two years, assuming that there has been no noticeable improvement or deterioration in the operating conditions and methods. The target should be some what better than the actual recorded performance so that it may call for better effort on the part of the staff concerned to achieve the margin if improvement remaining between the actual and the target.

6.01 All wagons, the term "all wagons" includes through loaded, through empty, local loaded, local empty and departmental wagons. Wagons on' through trains' (as defined in item 1.01 & 1.02) not receiving marshalling, will be excluded. Sick and damaged wagons will be included wherever the sick lines from part of the marshalling yard area.

In respect of the yards which may as well as be depots for holding empties, such empties should notbe included for the purpose of this item. These yards should, however, be denoted by a suitable foot note specifying there-in the average daily holding of the depot.

The 'exit' and're-entrance' timings may be fixed on the basis of sample observations made once a year. These fixed timings may be re-checked annually and also when any major change occurs in the working of the marshalling yard.

6.02 *Through loaded wagons:-The* term “through loaded wagons” means loaded wagons which neither originate nor terminate at the station, but which are dealt within the yard and are not on ‘by passing’ trains (as defined in the item 1.01 and 1.02).

6.03 *Through Empty* wagons:- The term through empty wagons means empty wagons which neither originate nor terminate at the station, but which are dealt within the yard and are not on ‘by passing’ trains (as defined in iteml .01 and 1.02).

6.04 This item will include detention to local wagons despatched by trains from the Marshalling yard i.e. from the time of their entry into the Marshalling yard from the outlying sheds and sidings till their despatch by trains.

6.05 This will include the detention to local wagons from time of their arrival in the Marshalling yard till their placement into the local sidings.

6.06 Detention to sick wagons in the Marshalling yard will be included under this item as also under “all wagons”. In case the sick lines from part of the marshalling yard the detention in the sick lines will also be included underthis item. If the sick lines are outside the yard, such detention will be excluded.

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CHAPTER - XI

REGISTRATION, ALLOTMENT AND LOADING OF GOODS

(Detailed instructions regarding Registration and Booking of Goods traffic are contained in the LR.C.A. Goods Tariff Part I).

I. REGISTRATION

11.01. Preferential and non-preferential traffic.-

(a) Movement of goods traffic in wagon loads is regulated by the Preferential Traffic schedule; notified by the Railway Board every six months under Section 27 A of the Indian Railway Act 1890 (IX of 1890) and circulated by the Principal Chief Operations Manager. The Preferential Traffic Schedule which is otherwise known as the Priority Schedule is designed to ensure that certain essential commodities and urgent movement are accorded, necessary preference when transport facilities available are not adequate to meet all the demands in full.

(b) Under the Preferential traffic Schedule, traffic is classified underfive heads or item viz. 'A, 'B', 'C', 'D', and 'E'. This alphabetical sequence of items also represents their respective order of preference between the different categories of traffic' mentioned therein. Commodities registered in the lower head/item cannot get preference over those registered in the higher classification although the former may have been registered much earlier.

(C) Special preference to any particular consignment or commodity otherwise than in accordance with sub-paras (a) & (b) above can only be accorded under orders from the Railway Board.

11.02. Sponsored movements.-

(a) A list of Officers authorised to sponsor movement is circulated from time to time by the Principal Chief Operations Manager indicating their names and official designations. Movement of consignments will become entitled under a higher class of priority only when the letter sponsoring the movement is signed by the official notified under his own signature.

(b) When an indent is placed by a Station Master relating to a sponsored programme notified by the Principal Chief Operations Manager, the serial number and the programme number shall be clearly quoted in the records maintained at that station and also in the invoice as well as wagon and bracket labels.

11.03. Registration of Goods -

(a) The Station Master at a Station unless some other representative is nominated by the Divisional Operations Manager shall accept indents from the indentors.

(b) All requests for wagons should be made on Form T. 193. The number of wagons required, the commodity, the weight of each consignment, the destination station and the route by which the consignment is to be booked are to be recorded by the indentor is governed by quota limitations in force.

(c) Station will copy the indents serially into a register on form T. 191. Indents for free destinations can be accepted without any ceiling limit.

(d) Except where otherwise specially notified, registrations will continue to be accepted even when temporary operational restrictions are in force.

(e) Registration shall not be accepted in contravention of:-

(i) Rationalisation schemes.

(ii) Civil or any other bans.

(i) In excess of prescribed limits for vegetable, oil tanks and Petroleum and other oil tanks and such like.

II ALLOTMENT

11.04. Submission of indents and allotment of wagons.-

(A) The Station Masters will allot wagons for free destinations in accordance with the procedure detailed below: -

(i) The Station Master or Goods Clerk-in- charge at the end of each day will tabulate the indent registered at his station in the following manner:-

Indents for- (a) free destinations.

(b) quota limitations, and

(c) restricted destinations.

(ii) The Station Master will also tabulate the indents under three different heads, viz ore traffic, bamboo and other general goods. The applications in Form T.-193 and the T-191 Register will remain in the custody of the Station Master.

(iii) The Station Master will advise the Section Controller or the Deputy Wagon Check everyday at 14.00 hours or at any other convenient time that may be fixed by the Divisional Operations Manager, (a) the number of indents outstanding, (b) the number of indents that have been received and (c) the total number indents for ore, bamboos and general goods via JSG, IB, NKJ, LAE, BQR, NGP, CWA, KAV (chord) & KEQ. These particulars furnished to the Control should be given to the Deputy Wagon check who will issue instructions for supply of wagons after obtaining orders from the Sr. Divisional Operations Manager/Divisional Operations Manager or in his absence the Assistant Operations Manager. The Station Master shall send a confirmation copy of this advice by dak the next day to the Divisional office.

(iv) Indents will be treated as having been met only after the wagons have been supplied. Allotment will be given by the Station Master depending on the instructions issued by the Control in regard to the number of empties or inward loads that would be worked into the station for unloading. The Station Master shall not allot wagons when he has not been given any indication of what empties are being worked to the Station.

B) In case of destinations governed by quota, indents accepted by the Station Master in form T 191 will be submitted daily for allotment of wagons to the Senior Divisional Operations Manager/ Divisional Operations Manageron form T. 570 (OP/T419, 'A Foil).

On receipt of daily report from stations, the Allotment Section of the Sr. Divisional Operations Manager's office will copy these indents in a register and will then put up to the Officer who makes allotment every day. On receipt of the allotment, the stationswill be advised accordingly.

The allotment given by the Divisional Office shall have precedence over the allotment given by the Station Master in regard to supply of wagons as mentioned in (A) (iv) above but maintaining the priority.

11.05. Advice of daily allotment and restriction.-

The Station Master shall post the daily allotment and the restrictions that are inforce on the day, on the Notice Board at his station or Goods Shed.

III LOADING

11.06. Supply and loading of wagons.-

(a) The first call on the Railways in the matter of Supply of wagons is for all movement under item 'A'. After meeting demands under 'A to 'D' available empties are distributed to traffic falling under item 'E', For the significance of items 'A, 'B', 'C', 'D' & 'E' (see para 11.01).

(b) Covered wagons should normally not be supplied for traffic which should normally move in open. If, however, the operating conditions permit, covered wagons may be supplied for traffic which would normally move in opens, provided the indents indicate that either covered or open, whichever is available, would be loaded.

(c) *Submission of loading report.*- Wagons loaded at stations are recorded in the daily loading reports (in T. 570 'C') submitted, by station giving full particulars of wagons loaded to each destination, commodity and weight of the consignment and the allotment order number and date against which such loading is done.

(d) Station Masters will submit daily loading statements on form T. 570 'C' on the next day of loading so as to reach the Divisional Office not later than the third day from the date of loading the wagon (s). Such loading statements will also be submitted for wagons allotted by the Station Masters themselves. In addition, they will submit a ten-day loading report on form T. 267 to the Divisional office for each ten-day period, i.e. 10th, 20th and the last day of the month. This loading report should reach the Divisional office by the third day after the close of the period.

(e) *Checking of goods loading.*- Regular systematic checks are to be exercised in the wagon Analysis Branch of the Allotment Section in the Divisional Office on the loading on the loading at station with a view to detecting irregularities mentioned below:-

Stringent and deterrent action should be taken against the staff responsible for such irregularities as:-

(i) Loading without allotment orders.

(ii) Not loading in accordance with allotment orders.

(iii) loading a commodity other than that allotted.

(iv) Change of destination or commodity.

(v) Loading of wagon (s) in excess of allotment.

(vi) Loading in contravention of the restriction orders.

(vii) Supply of wagons in violation of seniority in registration under respective items of priority in accordance with the preference schedule vide paras 11.01 & 11.06.

(viii) Splitting up of consignments to circumvent class and other restrictions.

11.07. Cancellation of indents.-

If a consignor fails to commence loading of a wagon or wagons placed in position for loading, within the free time permissible on the wagon or wagons in accordance with the rules contained in the Goods Tariff and lor other extant rules, the indents should be cancelled by the Station Master unless the consignor requests the Station Master in writing to detain the wagon beyond the free time as may be admissible in accordance with the rules. The Station Master in such cases, i.e. when the indent is cancelled, will allot such wagon or wagons against the next indent in turn of priority at his station. The free time permissible on different types of wagons is notified from time to time through special circulars.

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CHAPTER - XII

PREFERENTIAL SCHEDULE & RATIONALIZATION ORDER

12.01 Movement of wagon load traffic, is regulated by what is known as the Schedule of Preferential Traffic, laid down by the Central Government (Railway Board) under Section 71 of the Railways Act, 1989 and is designed to ensure that certain essential commodities and urgent movements are accorded necessary preference at a time when the available transport is not adequate to meet with all the demands. Traffic is classified into 4 categories viz., A, B, C, and D. Commodities registered in the lower categories cannot have preference over those registered in the higher categories although the former may have been registered much earlier.

(a) This Priority Schedule is decided by Traffic Transportation Directorate of Railway Board.

(b) It lists the Sponsoring Authority and Accepting Authority for programmed traffic.

(Copy of Priority Schedule can be obtained from Indian Railways website)

12.02 Rationalization Order

Under section 71 of Indian Railways Act 1989, Railway Board has been empowered to charge freight over route, which may not be the shortest between alighting point and destination. The Rationalization order indicating the route through which the freight is to be charged is issued by traffic transportation branch, Railway Board.

Revised rule 125 of IRCA Goods Tariff Part I(Volume-I) vide Board's letter No. ECR 1125/ 94/3 dated 6/10/94 through which it has been that directed unless there is specific instruction in writing from the center or his authorized agent to the contrary, goods will be dispatched by the route optionally feasible and freight charges will be levied by the shortest route. However, charging of freight by shortest route is subject to any instructions issued under rationalities order issued from time to time.

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CHAPTER - XIII

CONTAINER TRAIN OPERATION

13.01 With a view to increasing Railway's share of container traffic and introducing competition in railway, container transport services in India, Ministry of Railways decided to grant eligible parties the right to require the Railway Administration to haul their Container trains on Indian Railway network for movement of both Export and Import Traffic as well as Domestic Traffic subject to various terms and conditions contained in an Agreement. This Agreement sets out in detail their mutual relationship and the terms and conditions, which shall govern the right of the Concessionaires to offer their Container trains for movement to Railway Administration and the obligation of Railway Administration to move the trains.

13.02 The salient features of this Agreement as well as of related instructions with respect to train operations are given below. The salient features of the Concession Agreement with Container Train Operatorsand of other related instructions are indicative in nature and for guidance only. For actual provisions, the Concession Agreement and the Circulars and Railway Board's letters mentioned above should be referred to.

1. Concessionaires have a non-exclusive right to require the Railway Administration to haul the Concessionaire's Trains subject to the Concessionaire establishing/ ensuring access to Rail Terminals and acquiring a minimum number of Wagons including brake vans to form a Block Rake for the commencement of operations and for transportation of containers.

2. The term of this Agreement shall be for a period of 20 years starting from the Commercial Operations Date.

3. In the event the Concessionaire fails to operate its Container Trains in accordance with the requirements of this Agreement within three (3) years from the date of award of the In Principle Approval, Railway Administration shall have the right to terminate the Agreement.

4. The rights of the Concessionaire shall include the following:

i) The right to undertake the business at collecting, storing and loading onto. Wagons, consignments of goods from any third party;

ii) The right to determine, charge, collect, retain and appropriate all the fees that it charges from the consigners;

iii) The right to obtain access to Rail Terminals and develop, own, operate and maintain Rail Terminals, including inland container depots;

iv) The right to procure and own/lease Wagons and containers.

5. The concessionaire will be responsible for loading and unloading operations at both the origin and destination Rail Terminals.

6. The Railway Administration shall haul the Concessionaire Trains on the payment of prevalent haulage charges as notified from time to time. The present haulage charges are contained in Board's letter no. 2008/TT/I11/73/8 dated 1-7-2008.

7. The Central Government (Ministry of Railways) shall have the right to specify certain commodities, which ordinarily move in railway wagons in trainload as notified commodities, which may be subjected to different tariff and conditions for haulage. At present as per Board's letter no. 2008 /TTI11/73/8 dated 1-7- 2008, carriage of coal, coke, minerals and ores in containers is prohibited.

8. The existing incentives/schemes extended to rail customers or that may be introduced in future shall not ipso facto apply to the Concessionaires. Upon request of the Concessionaire(s), Railway administration may consider extending such schemes to the Concessionaire to the extent possible in a non-discriminatory manner.

9. All commercial rules like that contained in Commercial Manual, as amended from time to time and as applicable to other freight traffic moving on Indian Railways shall apply to the Container traffic, except rules specially covered in this

Agreement in a non-discriminatory manner amongst similarly placed entities.

10. It shall be the Concessionaire's sole responsibility to procure the requisite approval/ authority for the Concessionaire's Train and/or a Railway Administration locomotive to enter into and utilize the origin and destination Rail Terminal(s).

11. Each concessionaire is required to set up two rail linked inland container terminals within three years of obtaining the license to operate or have access to inland container terminals.

12. Use of Railway freight terminals (Goods sheds) as Container Rail Terminals (CRT) has been permitted by the Railways in terms of Rates Circular 10 of 2008.

13. Each Rail Terminal, other than a Railway owned Terminal, that is used by the Concessionaire shall conform to the following:

(i) Each Rail Terminal shall have rail facilities for handling Concessionaire Trains along with locomotive in conformity with siding rules prescribed by Railway Administration from time to time.

(ii) Be equipped with a RDSO approved in-motion weigh bridge of prescribed standards for weighing of Wagons with and without containers of the Concessionaire's Train.

(iii) Be equipped with TMS and such other facilities as may be required to interface with, and ensure transfer of data online to, FOIS of Railway Administration.

14. The Concessionaire shall declare the weight of each Wagon/container prior to departure of the Concessionaire's Train.

15. The Concessionaire shall procure by way of purchase, lease or hire, Wagons including Brake Vans and Containers required for the purposes of operating the Concessionaire's Trains. However, till such time as the Concessionaire procures the required Brake Vans, Railway Administration may provide its own Brake Vans (provided they are available), on non-discriminatory basis, at a reasonable charge, notified by the Railway Administration from time to time.

16. In the event any of the Wagons of the Concessionaire are lying idle ("Idle Wagons"), the Concessionaire may offer to the Railway Administration or other Concessionaires, use of any such Idle Wagons. However, Railway Administration shall be under no obligation to accept such an offer of the Concessionaire for use of any Idle Wagons and may levy a Stabling Charge as specified.

17. In the event of an Emergency, Railway Administration shall have the right, to temporarily assume control and make use of the Wagons of the Concessionaire. For any such Emergency Use, Railway Administration shall pay to the Concessionaire, a reasonable rent/charge to cover the cost of provisions, maintenance and operation of the Wagon.

18. The Concessionaire shall at all times conform to the maintenance standards specified by the Railway Administration in accordance with Good Industry Practice for the Concessionaire's Containers, rail related equipment and tracks.

19. The Concessionaire's Wagons shall be maintained by the Railway Administration in accordance with the maintenance schedule notified by the Railway Administration. Such maintenance shall, inter alia, include intensive examination, routine overhaul ("ROH") and periodic overhaul ("POH"). The Concessionaire will provide and maintain the requisite Wagon examination facilities(as specified by railway Administration) inside the Rail Terminal and bear a onetime capital cost for tools and plants as specified by Railway Administration and approved by RDSO.

20. Wagon maintenance charges for maintenance by Railway administration of the Concessionaire's Wagons shall be included in the Haulage Charges. The present Haulage Charges include 5% thereof by way of maintenance charges.

21. Railway Administration shall normally complete the intensive train examination within a period of 6 hours from the time the Concessionaire's Wagons (in empty Rake formation) are handed over by the Concessionaire for such examination. Provided however, that the minimum interval

between two successive Rakes offered for intensive train examination shall be at least 6 hours. Alternatively, the Railway Administration may examine the Concessionaire's Wagons at suitable point en-route its destination where the facilities for such examination exists. The time stipulated for maintenance shall not be applicable vis-a-vis such Concessionaire's Wagons that are declared —sick during the course of examination and are required to be detached from the Concessionaire's Train for sick line/ workshop attention.

22. In the event of the Railway Administration's inability to conform to the time schedule specified for intensive train examination, it shall pay to the Concessionaire for every 24 hours of delay (inclusive of initial 6 hours) so caused, an amount equal to the Stabling Charges payable for such period of delay.

23. The Concessionaire may undertake maintenance of the Concessionaire's Wagons through any other entity including the Concessionaire on such terms and conditions as specified by the Railway Administration from time to time provided however, that the maintenance is carried out as per maintenance schedules and various stages of inspection as may be notified by Railway Administration and pre departure certification of such Wagons shall be issued by the Railway Administration for which the prescribed charges shall be paid by the Concessionaire.

24. The Concessionaire shall hand over empty Concessionaire's Wagons, in rake formation, to Railway Administration for carrying out maintenance as per the schedule specified by the Railway Administration.

25. The haulage charges for moving the Wagons, in rake formation, from a Rail Terminal to the workshop/maintenance depot/train examination point of the Railway Administration and back shall be borne by the Railway Administration, provided however, that the scheduled haulage charges shall be payable by the Concessionaire in the event maintenance is carried out by an entity other than the Railway Administration and inspection is carried out by the Railway Administration at the location of maintenance.

26. In the event wagon maintenance is undertaken by the Concessionaire, or any other party (other than Railway Administration in accordance with the provisions of this Agreement) a proportionate rebate in haulage charges (equivalent to the built in maintenance charges) shall be given to the Concessionaire.

27. Subject to any operational constraints, Railway administration will provide locomotives to haul the Concessionaire's Trains on a non-discriminatory and non exclusive basis vis-a-vis other Concessionaires only.

28. At least four (4) hours prior to the planned departure of Concessionaire's Train, the Concessionaire shall submit an indent ("Indent for Locomotive") for supply of locomotive. The existing incentive schemes if any or incentive schemes that may be introduced in future for supply of locomotives may be extended to the Concessionaire's Trains with suitable modifications such that it is applied in a non discriminatory manner among different concessionaires.

29. The Concessionaire may, anytime prior to arrival of a locomotive cancel its Indent provided however, the Concessionaire shall be liable to pay to Railway Administration indent cancellation charges equivalent to one (1) hour Locomotive Detention Charges. In the event, indent for cancellation of locomotive is received by Railway Administration after the loco is dispatched for the Rail Terminal, the Concessionaire in addition to indent cancellation charges, shall also be liable to pay to Railway Administration such charges as may be prescribed by Railway Administration for the in fructuous movement of locomotive both ways. Such charges, however, shall not exceed the charges levied for the movement of the locomotive for the distance from the nearest locomotive shed. '

30. If after arrival of the locomotive at the Rail Terminal from where the train is required to depart, or the Rail Terminal where the train is required to terminate, as the case may be, the Concessionaire's Train, for whatsoever reason not attributable to Railway Administration, is not attached or detached and released (as the case may be), prior to expiry

of the Free Waiting Time of two hours (entry to exit), the Concessionaire shall be liable to pay to Railway Administration, Locomotive Detention Charges for every hour (or part thereof) for which the locomotive is detained beyond the Free Waiting Time. Provided however, if a locomotive is detained for a period of more than eight (8) hours at any Rail Terminal (either the Rail Terminal of origin or of termination, as the case may be), then, without prejudice to the Concessionaire's liability to pay to Railway Administration the Locomotive Detention Charges, Railway Administration shall have the right, but not the obligation, to withdraw and/remove the locomotive from such Rail Terminal. In case Railway Administration withdraws and/or remove the locomotive from the Rail Terminal after detention of 8 hours, the detention along with movement charges shall be levied without granting any free time. In the event Railway Administration withdraws the locomotive then, the Indent for locomotive shall deemed to have lapsed, with no further effect. These provisions shall also apply to the situation where the locomotive arrives at a Rail Terminal where the train is scheduled to terminate, but is denied entry into such Rail Terminal for reasons attributable to the Concessionaire and/or the Rail Terminal operator.

31. Locomotive Detention Charges payable by the Concessionaire for detention of a locomotive beyond the Free Waiting Time shall be at the rates as prescribed for Diesel/ Electric Train Engines by the Railway Administration from time to time. The current Locomotive Detention Charges are contained in Rates Circular No. 18 of 2008.

32. Railway Administration shall, in the event of delayed supply of locomotive beyond 12 hours from the indented schedule time of departure of the Concessionaire's Train, be liable to give to the Concessionaire a onetime rebate equal to two (2) percent of the haulage charges payable by the Concessionaire for the Booked Route. This rebate shall, however, not be admissible in contingencies such as interruption of traffic due to accidents or any other similar unavoidable reasons beyond the control of Railway Administration.

33. Transportation of the Concessionaire's trains shall be in Block Rakes. In the event a Concessionaire's Train operates with lesser number of Wagons/Containers than those prescribed in the Block Rakes ("Non-Block Rake Trains"), the haulage charges for such Non-Block Rake Trains shall be recovered on the basis of the minimum composition of Block Rake as specified by Railway Administration. Provided, however, in the event a Concessionaire's Train has less than half the Wagons required to constitute a Block Rake, the Railway Administration shall have the right to refuse to haul the Concessionaire's train comprising less than half a Block Rake. The Railway Administration may however, at its sole discretion extend the facility of two point rakes for Container Trains during specified perioas and on specified routes.

34. The Concessionaire's Trains to be hauled by Railway Administration pursuant to this Agreement shall be booked by the shortest route possible (the "Booked Route") and the haulage charges shall be determined with reference to such Booked Route. Provided however, in case of any accident or other operational exigencies on, or affecting, the Booked Routes, Railway Administration shall, in its sole discretion, be entitled to transport the Concessionaire's Train by an alternative route ("Alternate Route"). The Concessionaire shall be liable to pay haulage charges only for the Booked Route even when Concessionaire's Train is transported by an Alternate Route. Provided that in case the Concessionaire's Trains are carried by a longer route in pursuance of the Rationalization Scheme of MOR (under section 71 of the Railway Act 1989), the Concessionaire shall be liable to pay charges accordingly.

35. The Concessionaire shall, at least 7 (seven) days prior to any calendar week in which it proposes to operate any Concessionaire's Train, inform ("Weekly Advance Scheduling Notice') Railway Administration of the number of Concessionaire's Trains, it requires to be moved, the proposed routes and the likely departure dates ("Weekly Advance Schedule").

36. Notwithstanding anything to the contrary, the Concessionaire shall, at least twenty four (24) hours prior to

the day of programmed loading (excluding the day of loading itself) of a Concessionaire's Train, confirm to Railway Administration the departure schedule of such Concessionaire's Train, provided that such notices shall not in any way be binding and shall be only indicative of the Concessionaire's operations schedule for the following week /day.

37. Railway Administration shall maintain a level playing field among all Concessionaires and shall devise and implement a transparent and non-discriminatory system for dispatch of Concessionaire's Trains on a first come first served basis.

38. Notwithstanding anything to the contrary contained in the Agreement, dispatch of locomotives and Concessionaire's Train(s) shall be subject to any operational exigencies and/or system restrictions.

39. Railway Administration shall make all efforts to ensure minimum en-route detention of the Concessionaire's Trains.

40. Subject to any operational and capacity restrictions of Railway Administration, there shall be no restriction on the number and frequency of Concessionaire's Trains that the Concessionaire may require Railway Administration to haul pursuant to this Agreement.

41. The Concessionaire may request the Railway Administration to accept, at any time after the departure of a Concessionaire's Train, the diversion/re-diversion of such Concessionaire's Train to any other Rail Terminal, in accordance with the various terms and conditions (including but not limited to payment of haulage charges and other charges) and procedures specified by Railway Administration from time to time subject to its operational exigencies and/or for system restrictions. It is clarified that the Railway Administration shall not be under a legal obligation to comply with such request.

42. The Concessionaire shall be liable to pay to Railway Administration Stabling Charges in the following events:

(i) In case the Concessionaire's Train suffers detention at the serving station for reasons attributable to the

Concessionaire or when the Concessionaire either declines to accept Wagons inside the Rail Terminal, scheduled to be the terminating Rail Terminal or is not in a position to receive placement of subsequent Wagons; or

(ii) In case of non acceptance of trains inside any port by the port authority concerned;

or .

(iii) At any of the stations en route due to any reason attributable to the Concessionaire.

(iv) Provided however that Stabling Charges shall be levied only where the detention of the Concessionaire's Train is for a period in excess of 4 hours.

Stabling Charges shall be payable at the rates notified by Railway Administration from time to time and the Railway Administration shall have the right to revise the Stabling Charges on an annual basis; provided that any increase in charges in any Financial Year during the term of this Agreement, shall not exceed 10% (ten percent) of the charges payable in the preceding year. The current Stabling Charges are contained in Railway Board's letter no. TC-I/98/201/4 dated 17.1.2008.

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CHAPTER - XIV

OPERATING STATISTICS

14.01 Railway Statistics: Essential for planning prioritizing and exceeding activities connected with operation.

The railway statistics are based on four factors -

Quantity

Distance

Duration and

Service.

In Railway environment these relate to-

1. Primary Units:

(a) Quantity - Expressed as tonnes and number of passenger carried and earnings derived.

(b) Distance - Expressed in kilometres.

(c) Duration- Expressed in minutes, hours & days

(d) Service performed - Expressed in terms of trains, vehicles, wagons Engines.

2. Fundamental Units: Relationship between primary units, expressed in composite terms is called 'Fundamental units'. The fundamental units express two primary ideas in their relationship to one another viz.

Tonne-kms,

Passenger kilometres,

Train-kilometres,

Wagon-kilometres,

Engine hours,

Wagon days etc.

3. Derived Units:

Expresses the relationship that exists between two sets of primary or fundamental units and the results thus arrived is termed 'Derived Units'. The process by which this relationship is ascertained is as illustrated in the following examples.

(a) Passenger earning (Primary): Passenger carried (Primary) = Earning per passenger

(b) Passenger earning (Primary): Passenger kilometres (fundamental) = Earning per passenger kilometre.

(c) Passenger kilometer (fundamental): Number of passenger (Primary) = Average distance travelled by a passenger also called lead of passenger traffic.

(d) Wagon kilometres (fundamental): Wagon days (fundamental) = Wagon kilometres per wagon day.

These 'Derived Units' highlight special features of transportation output and are useful in evolving suitable management strategies.

14.02 Classification of Railway Statistics:

The principal heads under which the railway statistics are generally grouped are indicated below :

14.03 Economic and financial statistics:

Under this head are to be included detailed statistics relating to the advance statement of gross earning and traffic handled i.e. the number of passenger booked and tonnage lifted and wagons loaded for current information and the statistics of revenue and expenditure as booked in monthly and yearly accounts.

14.04 Operating statistics:

Operating statistics are broadly be divided into

(i)Traffic (ii) Power (iii) Rolling Stock

(i)The traffic statistics include statistics of wagons loaded, wagon mobility, wagon usage, train loads, train mobility, productive and unproductive services, wagon detention, marshalling yard, terminal goods station and punctuality

(ii)The power statistics include engine usage, fuel and energy consumption, and engine failure statistics etc.

(iii) Rolling stock holding & availability, repairs & maintenance %age

14.05 Commercial Statistics: Coaching and freight revenue and volumes and earnings by class of passengers, for different commodities, claims paid for compensation of goods

and parcels lost or damaged Rolling stock and workshop repair statistics:

Under this head are grouped statistics dealing with POH of coaches, wagons, locomotives and other information relating to work Shop activity.

14.06 Administrative statistics:

These statistics relating the staff matters, numbers by categories and classes of staff.

14.07 Other statistics

Number of stations by

Class, halt stations

Standard of interlocking.

Medical statistics relate to sickness of staff etc

14.08 Engineering statistics give details of track and bridges requiring attention - ultra sonic tests done or overdue track renewals, distress bridges etc.

14.09 Compilation of Railway Statistics:

1. Compilation of statistics of Indian Railways falls broadly under two categories, namely (i)the statistics required to be compiled by the railways for submission to the Railway Board in order to keep the Board generally informed about the different activities of the Indian Railwaysand (ii) further detailed Railway statistics which individual railway may undertake for their own respective domestic requirements.

2. The statistical compilation work on the zonal Railways is in the charge of a Statistical Officer working under Finance deptt. The format and the methods of compilation of the monthly Statistical statements and the Annual Statistics required to be submitted to the Board are detailed in the Manual Statistical Instructions, Volumes I and II respectively.

14.10 Operating Statistics :

1. Operating Statistics for the various Indian Railways are issued in the form of various pamphlets published periodically by the Railway Board. Detailed Statistics relating to each division and gauge are contained in various parts of the 'Domestic' statistics issued quarterly (Parts, I, II and IIB & C).

2. Some of the important statistics include.

14.11 Operating ratio: The ratio of workings expense (excluding suspense but including appropriation to Depreciation Reserve Fund and Pension Fund) to Gross Earnings.

(Expenditure incurred in connection with Administration, Operation, Maintenance and repairs of line open for traffic)

14.12 Passenger Train Performance.

Punctuality:

Punctuality is the main criterion forjudging passenger train performance, some of the statistics compiled separately for 'Mail and Express trains', 'Other Passenger Trains', and 'Mixed' trains are:

$$\text{Punctuality} = \frac{RT + NLT}{\text{Total no. of Mail/Express trains}} \times 100$$

RT = Trains arriving Right Time

NL T = Trains not loosing time

14.13 Vehicle Kilometres per Vehicles Day:

1. This figure indicates by the vehicle days which are the product of average number of coaching vehicles on line/in use and the number of days in the period under reference.

This figure indicates the extent to which coaching vehicles are kept 'on the move'.

The main factors affecting its value are:

(a) The average speed of trains

(b) The average length of train run (average load)

(c) The idle periods provided for in rake links.

2. Since in the short run, train composition is not susceptible to change, it is only by increasing the speeds of trains and tightening up rake links that an improved performance can be achieved.

3. This result is calculated by dividing the coaching vehicles kilometres by the vehicles days which is the product of average number of coaching vehicles on line and the number of days in the period under reference.

$$\text{Vehicle km. Per Vehicle day} = \frac{\text{Coaching Vehicle Km}}{\text{Vehicle day}}$$

Average Speeds:

This figure represents the average time tabled speeds of passenger trains. The higher this figure, the better the service to the passengers

14.14 Shunting Kilometres per 100 Train Kilometres (Passenger including proportion of Mixed):

1. This figure indicates the amount of unproductive service that has to be performed per 100 train kilometres (Passenger including proportion of mixed). Since the amount of shunting to be done on a passenger train depends upon various local factors, the figure will vary from Division to Division and from Railway to Railway, traffic conditions remaining constant, is indicative of wasteful shunting.

2. The figure is arrived at by multiplying by 100 the quotient of shunting kilometres divided by train kilometres (passenger including proportion of mixed). It can be depicted by formula given below:-

$$\frac{\text{Shunting Kms} \times 100}{\text{Train kms.}}$$

14.15 Wagon Usage

(A) Average Starting Wagon Load:

1. This figure is compiled separately for coal and coke, heavy merchandise and light merchandise, thus affording an indication of the extent to which wagon space is utilised by stations from which traffic originates. It is extremely important that wagons be given as full a load as possible because this means economy, in wagon usage and hence engine power and less strain on line and yard capacity. Even a slight improvement in the starting wagon load can mean a tremendous saving to the Railway.

2.The result is calculated by dividing the number of tonnes loaded by the number of wagons loaded (in terms of four wheelers), CR and TR vans as also wagons used for live stock and departmental purposes, however, are excluded.

$$\text{Average Starting Wagon Load} = \frac{\text{Tonnes Loaded}}{\text{No. of Wagons Loaded}}$$

(B) Wagon Kilometres per Wagon Day:

1. This figure is a measure of wagon mobility and indicates the average number of kilometers moved by a wagon, on the average, per day, both loaded and empty journeys being included. Delays in marshalling yards, delays at stations when loading or unloading, delays in clearance from roadside stations, decrease in average speed of goodstrains, increase in the number of wagons awaiting repairs, and shorter loads of trains are some of the factors normally responsible for poor mobility.

2. This result is obtained by dividing wagon kilometres by wagon days which is the product of daily average number of wagons on line and number of days in period.

$$\text{Wagon Km. Per Wagon day} = \frac{\text{Wagon Kms.}}{\text{Wagon Days}}$$

(C) Net Tonne Kilometres per Wagon Day:

1. This unit is a measure of the revenue earning work done by the wagons and reflects both mobility and loading. A decrease in this figure may be due interalia to any of the causes which effectthe figure of wagon kilometres per wagon day. The proportion of loaded to total wagon kilometer age, the average loaded wagon and the relative amount of heavy and light merchandise carried, are some of the otherfactors which may effect this figure.

2. The numerator in this case is the net tonne kilometres (excluding departmental) and the denominator wagon days.

$$\text{Net Tonne km. Per wagon day} = \frac{\text{Net Tonne kms.}}{\text{Wagon days}}$$

(D) Wagon Turn Round:

This figure expresses the ratio between the total number of serviceable wagons on a Railway and the number of wagons required daily for effective use on the railway for its outward,

inward and transhipment traffic. Stated in a different way, wagon turn round represents the average period of time in which a particular wagon completes its average loaded trip and after which it again becomes available for loading.

$$\text{Wagon Turn Round} = \frac{\text{No. of effective wagon holding}}{\text{Loaded Wagons + Loaded received wagons}}$$

E) Average Wagon Load during the Run:

1. This unit is a good index of wagon utilisation as it refers to the average load of all loaded wagons carried. It suffers from the drawback that it does not directly reflect the performance of the division, gauge or railway to which it applies, as only a proportion of the loaded wagons carried is loaded locally and the balance consists of both received traffic and cross traffic.

2. For obtaining this figure net tonne kilometres are divided by loaded wagon kilometres, (the figure relating to departmental trains are excluded).

$$\text{Average Wagon Load during the run} = \frac{\text{Net Tonnes Kms.}}{\text{Loaded Wagon kms.}}$$

14.16 Goods Trains Performance

(A) Average Speed of Goods Trains:

1. This result is calculated separately for 'through goods trains' and all goods trains and is arrived at by dividing the total train kilo metres by total train engine hours of the concerned service.

Detentions to goods trains at roadside stations enter into the calculations and have therefore the effect of bringing down average speeds.

$$\text{Average Speed of Goods Trains} = \frac{\text{Train kms.}}{\text{Train Engine hours.}}$$

2. Some of the factors on which the average speed of goods trains depends are:

(a) The proportion of the density of trains to the sectional capacity. The nearer a section is worked to its sectional capacity, the proper the speeds obtained.

(b) Hauling power of the engines used, quality of coal and quality and adequacy of water supply, standard of maintenance of engines and time taken by loco pilots for loco requirements.

(c) Loads of trains.

(d) Condition of rolling stock, particularly the brake power available.

(e) Standards and maintenance of signalling and interlocking.

(f) Facilities at watering stations, facilities at roadside stations to complete shunting in the minimum time and shorter block sections which will increase the sectional capacity.

(g) Engineering restrictions - permanent and temporary gradients and curves.

(B) Average Net Train Loads (in tonnes):

This figure refers to the average freight load carried in tonnes, i.e., to that portion of load which earns revenue for the railway.

$$\text{Average Net Train Loads} = \frac{\text{Net Tonne kms.}}{\text{Train kms.}}$$

(C) Average Gross Train Loads (in tonnes):

This figure represents the average overall load of goods trains 1.e. the freight load plus the weight of the rolling stock.

$$\text{Average Gross Train Loads} = \frac{\text{Gross Tonne kms.}}{\text{Train kms.}}$$

The principal factors affecting this figure are:

1.The tractive capacity of engines on goods train services.

2.The gradients on various sections of the line.

3.The nature of goods carried.

14.17 Shunting Engine Kilometres per 100 Train Kilometres :

1. This figure indicates the amount of non-revenue earning work done per 100 train kilometers (Goods and proportion of

mixed). Its value is affected mainly by the load of goods trains, and the amount of terminal work involved.

$$\text{Shunting Engine kms. per 100 Train kms.} = \frac{\text{Shunting kms.} \times 100}{\text{Train kms.}}$$

2. However, for the same division or/railway, the pattern of traffic remaining the same, rise in this figure is indicative of wasteful shunting.

14.18 Net Tonne Kilometres per Engine Hour:

The figure of net tonne kilometres per Engine hour is a very useful index of the efficiency of freight working on a division. Net tonne kilometres indicate the amount of revenue earning work done while engine hour measure the cost of if doing it.

$$\text{Net Tonne Kilometers per Engine hours} = \frac{\text{Net Tonne kms.}}{\text{Engine hours}}$$

A decrease in net tonne Kilometres per engine hour may be due to factors such as:

1. Shunting engine hours not using cut down in proportion to the decrease in traffic offering.

2. Increase in departmental, assistance required, assisting hot required and light engine running.

3. Decreasing in the average train and or the average speed of goods train.

4. Decrease in the average starting wagon load or in the wagon loads of wagons received from other divisions.

5. Increase in the proportion of unbalanced traffic.

6. The type of traffic carried heavy or light.

14.19 Average Detention per Wagon:

1.All wagons

2. Through loaded wagons:

Detention suffered by stock in a yard depends, interalia, on the layout of the yard and on the number of trains per day that can be despatched in various directions.

Target figures have been laid down for each yard for detentions to all wagons and through loaded wagons. Such targets take into consideration the condition of work and facilities available in the yard concerned. Detentions in excess of this figure indicate inefficient yard work. Lesser detentions mean lesser cost of handling wagons in yards.

$$\text{Average Detention per Wagon} = \frac{\text{Total Detention Hours}}{\text{No. of Wagons dispatched}}$$

14.20 Number of Wagons Dealt with per Shunting Engine Hour:

The number of wagons that a given yard can deal with per shunting hour depends, interalia, on its layout.

Accordingly a target figure has been prescribed for each yard to enable the efficiency of yard work to be gauged. As shunting involves cost, the higher this result, greater the efficiency of the yard.

$$\text{No of wagons dealt with per Shunting engine hours} = \frac{\text{No. of Wagons dealt with shunting engine hours}}{}$$

14.21 Locomotive Performance

(A) Engine Kilometres perday per Engine in Use:

This figure is compiled separately for passenger, mixed and goods train services as well as for all services refers to 'engines in use'. This is affected by such factors as:

1. The average run of trains.
2. The average speed of trains.
3. The engine links
4. The location of engine shed with respects to the stations which they serve.

$$\text{Engine kms. perday per engine in use} = \frac{\text{Engine kms.}}{\text{Engine days in use}}$$

(B) Engine Kilometres per Day per Engine on Line:

This figure is also compiled by services and for all services put together. The proportion that this figure bears to the

corresponding figure of 'engine kilometres per engine day per engine in use' indicates the proportion of available engines 'on line' that were put to effective use during the period in question.

$$\text{Engine kms. per day per eigine on line} = \frac{\text{Engine kms.}}{\text{Engine days on line}}$$

(C) Quantity of Fuel Consumed per Engine Kilometre by Service:

This figure indicates the fuel consumption in relation to engine kilo metres only and does not reflect the tonnes hauled.

$$\text{Quantity of Fuel Consumed per engine km by service} = \frac{\text{Quantity of Fuel Consumed}}{\text{Engine kms.}}$$

(D) Quantity of Fuel Consumed per 1 000 Gross Tonne Kilometres by Services:

This figure indicates the fuel consumption in relation to the work done and is, therefore, a better index of fuel consumption than the quantity of fuel consumed per engine kilometer figure. The main factor that influences this result is the gross load of the train. It is derived by the formula given below:

$$\frac{\text{Quantity of Fuel Consumed} \times 1000}{\text{Gross Tonne kms.}}$$

Traction Energy consumption per engine km and per 1000 gross tonne kms is worked out exactly in the same way, replacing 1000 litres of diesel by kwhs.

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CHAPTER - XV

MOVEMENT OF ODC AND OTHER BULKY CONSIGNMENTS

15.01 Definition:

Consignments, which when loaded upon a wagon, would infringe the maximum standard moving dimension, at any point, on the entire route, from the booking station to the destination, including via break of gauge is called an Over Dimensional Consignment (ODC).

Therefore, any consignment exceeding the dimension quoted below shall not be registered for booking unless prior sanction for its acceptance has been obtained from the Zonal headquarters.

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

Description	Gauge BG(MM)
Height at Centre	4115
Height at sides	3505
Maximum Width	3050 for Bogie Wagon 3200 for 4 Wheeled Wagon

Note:

(i) Above mentioned dimensions includes lashing and packing.

(ii)When a dummy truck is used, the maximum weight that may be loaded, in any wagon or truck is distinctly marked on each vehicle and must not be exceeded.

15.02 Classification of ODC consignment:

ODCs are divided into 3 classes according to the minimum clearance available between the consignment and minimum fixed structure profile asfollows:-

Class 'A : (Permitted out of Gauge Loads): Those ODC loads, which have gross clearance of 228.6 mm (9") and above.

Class 'B' : (Exception out of Guage Loads):Those ODC loads, which have gross clearance of 152.4 mm (6") and above but less than 228.6 mm (9"),

Class 'C' : (Extra ordinary out of Guage Loads):Those ODC

loads, which have gross clearance of less than 152.4 mm (6 3) but not less than 101.6 mm (4").

When a consignment is offered for booking and the dimensions are such that they exceed standard Moving Dimensions then the Station Master will apply to the Senior Divisional Operations Manager for permission to move the consignment. Depending on the dimensions of the consignment will fall under category 'A', B' or 'C'. The sanctioning authority, maximum permissible sanctioned speed, movement during day or night & staff required to be escorted are as follows:-

Class	Sanction Authority	Maximum Permissible Sanctioned Speed	Movement during Day or Night	Required to be escorted by
A	Within Division: DRM Inter Division of the same Zone : PCOM Inter Railway: PCOM of the Zone and PCOM of concerned Railway	Sectional Speed	Day & Night	-
B	Local: DRM Inter DMsion/Foreign Rly.: PCOM	BG-40 kmph	Day & Night	TXR
C	CRS	BG-25 kmph	Day	SE(C&W) SE(P.Way) TI

15.03 Net Clearance:

The net clearance shall be worked out as under:

The net clearance between the consignment as loaded in the train and any fixed structure should be calculated after making an allowance of 75 mm (3 inches) for lurch (horizontal) and 7.62 cm (3 inches) bounce (vertical) on the straight together with following additional factors applicable only when the structure in question is situated on a curve.

15.04 Horizontal Clearance:

(a) Allowance for lean due to super-elevation and over hang due to curvature.

The lean should be calculated forthat point on the profile of the load which is likely to have the smallest clearance from fixed structure the formula being :-

$$\frac{HC}{G}$$

Where H = height in feet to the point being considered.

C = Super elevation

G = gauge.

For the central overhang due to curvature, the formula will be:- B2/8R

Where B = distance between bogie centre

R = Radius of curve.

In Cases where the overhang at the end of a vehicle may have to be calculated by the formula will be: -

$$\frac{L2-B2}{8\,R}$$

Where L is the length of the vehicle.

(b) Additional lurch on curves may be taken 38 mm.

15.05 Vertical clearance:

In case where the top width of the consignment exceeds the gauge of the track the vertical tilt should be added to the height of consignment to work out the vertical clearance from the fixed structure.

15.06 Procedure for sanctioning movement of ODC:

When ODC consignment is offered at a station for booking SS/SM will verify if the consignment exceeds the maximum moving dimension from originating station to destination station including via. and break of gauge, if involved. He should apply to the Sr.DOM, who will obtain the necessary sanction of the competent authority.

An application must show the length, width, height, and weight of the load accompanied by a sketch in duplicate of the consignment.

In communicating sanction for the movement of ODC, specific route, through which the particular consignment will move, should be indicated, and it will be the responsibility of the SS/SM of the station from which the load originates.

In addition to strictly adhering to the specific route, the restrictions (eg. speed restrictions, night running restrictions, platform restrictions etc.) notified for conveyance of the consignment over the route, must be adhered to, and no relaxation in this regard is permitted.

15.07 Loading:

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

While examining the wagon loaded, the SE(C&W) must pay attention on the following: Load is well secured;

Load is within the C.C. of the wagon;

Weight on any pair of wheels does not exceed; Axle load restriction, if any;

Under gear of the wagon.

After loading the consignment, Sr. SE(C& W) will register the measurement and advise the SS/SM concerned of the various overall dimensions, including the packing and lashing etc., as loaded in truck.

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

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

The Operating Branch will arrange to advise the PCOM of the other Rlys. concerned, with full dimensions of the consignment, as loaded in the truck for issue of necessary final sanction for movement.

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

SS/SM/YS/YM concerned must furnish full particulars of the wagon to the Control, such as Wagon No., Owning Rly., Type of Wagon, Station from and to, route over which it is required to move etc. After this, Control/Divisional office will give necessary permission to the concerned staff to despatch the

wagon by a particular train on date advise and obtain their acknowledgement.

A Caution Order will be given to the Guard and Loco pilot of the train carrying ODC to restrict the speed and observe any other speed restriction at any other point or other precautions as laid down.

15.08 On Electrified Sections :

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

(b) In all cases, where oversize consignment is moving, it should be remembered by all staff accompanying the ODC, that the overhead electrical equipment is always 'LIVE', except when a particular power block has been obtained from the Traction Power Controller. Even when a power block has been obtained, it should be remembered that all the lines, other than those for which the power block has been granted, are 'LIVE' at 25000 Volts.

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

(d) The following are the prescribed clearance from contact wire for the passage of ODCs through electrified sections and the special restrictions required:

(e) A special speed restriction is not required when the gross clearance is more than 250 mm.

(f) Speed must be restricted to 15 kmph when the clearance is between 250 mm and 200 mm. (ODCs would not be stopped under critical locations i.e. where clearance is between 250 mm to 200 mm.)

(g) Speed must be restricted to 15 kmph and power to OHE must be switched off when the clearance from the contact wire is less than 200 mm.

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

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

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

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

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

15.09 Despatch of ODCs :

1. At the originating station the ODC wagon will be moved when final approval has been obtained from the competent authority.

2. At the originating point the number of wagon/wagons carrying ODC should be entered by the Train Clerk/SM in the vehicle guidance in red ink to be handed over to Guard of the train.

3. SS/SM should advise the Section Controller on duty, before starting the train while asking line clear, describe the train number with letter 'X' suffixed on it.

4. It will be the duty of the Dy. Chief Controller to keep adjoining Control Office informed about the movement of such ODC, till such time, it is handed overto the adjoining division by specified train. Also ensure that the consignment is moved strictly by authorised route.

5. Shunting of train with an ODC should be avoided. Loose and rough shunting of ODC wagon and against such wagon is prohibited.

6. When any ODC wagon is detached from the train at any station, SM and Guard are responsible to ensure safe placement and securing of wagon/load.

7. Facility for accompanying staff for extra wagon/brake van should be provided if so required.

8. When a load is so long that it cannot be accommodated in two trucks i.e. two 8 wheelers), it must be loaded in three trucks so that the entire weight is carried on the centre vehicle and the end trucks are idlers. The load must be placed on packing the centre truck, so that it is clear of the floor of the end trucks by not less 152 mm and there must not be less than 304 mm up side clearance in the end trucks between each of load and side of truck.

If the weight of the load is such that it cannot be carried on the centre truck, then the load must be carried as equally as possible on the trucks and the centre vehicle must be an idler.

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CHAPTER - XVI

CRANE

16.01. Introductory.-

(a) The following types of cranes are in use on this Railway:-

(i) Diesel (Rail) cranes;

(ii) Diesel (Road) cranes;

(iii) MFD/Lucas equipment; and

(iv) Hand cranes.

(b) The cranes are under the control of different departments as follows :-

(i) Cranes operating inside the Workshop at Motibagh underthe Mechanical Department;

(ii) Cranes working in sick lines and carriage and wagon depots underthe Mechanical Department;

(iii) Cranes working in Traffic Yards such as Transhipment points, Transit Sheds etc. under the Traffic Department.

(iv) Cranes working in Store Depots, scrap yard and Reclamation Yard underthe Stores Department.

Note:-The instructions contained in this Operating Manual do apply to Workshop Cranes underthe Mechanical and Civil Engineering Departments working within the limits of Workshops and Cranes under the Stores Department save when such cranes are in use on the open line. The Working of Cranes within the Workshops or Stores Yards or depots etc., will be governed by local instructions issued by the head of Department concerned.

16.02. Competency Certificates.-

(a) Competency certificates are necessary both for supervising and conducting Operations for- (i) Crane Supervisors (ii) Crane Driver/Operator and (iii) Crane Maccadums.

(b) Normally the operation of diesel crane is entrusted to Crane Loco Pilots. However, in case of heavy consignments or in course of break-down operations on running lines or for operations in sick lines, a Supervisor is also provided to look

after crane- operations and observance of the different Safety rules.

(c) Hand cranes are of lower lifting capacity and are operated manually. Overall charge of operating a hand crane is entrusted to a Maccadum who also directs and supervises the work of the gang attached to him for slinging and unslinging operations.

(d) The competency certificates referred to hereunder relate to both road and rail cranes in use.

(e) Competency certificates for supervising crane-operation or for operating cranes should be granted in prescribed proforma appended below, after due testing by the authorised officials, The officials authorised to issue competency certificates indicated below :-

Description of Cranes	Authorised official
(i) 140 TBD Crane	Dy CME (Crane)/Jamalpur
(ii) For break-down cranes with working capacity of 40.0 tonnes and above	Works Manager (General) / Kharagpur
(iii) For crane with working Capacity of less than 40 tonnes utilised in traffic yard, carriage and wagon depots, sick lines, Loco sheds, goods sheds, stores depots etc.	Senior Divisional Mechanical Engineer/Divisional Mechanical Engineer of the Division.
(iv) *Road cranes	Sr. Divisional Meeh. Enginer /Divisional Mechaincal Engineer of the Division.
(v) Hand cranes	Sr. Divi. Mechanical Engineer /Divisional Mechanical Engineer of the Division.
(vi) 'Rhinoceros' crane under the Civil Engineer Department used for bridge work exclusively and under the control ofthe Bridge section of the Chief Engineer's office.	Principal Chief Engineer

*** Note:-** If the Road crane is to go on the public road, for whatever short period / length it may be, the Crane Loco Pilot must in possession of the license for driving the crane issued by Motor Vehicles Section of the State.

(Proforma of competency certificate)

Name .....

Designation .....

The above mentioned has been tested by me and is certified competent to take charge of and be responsible for the corfect and safe working operations of a Diesel crane of..... tonnes capacity.

Date.....

Sr. Divisional Meeh.Engineer/ Divisional Mechanical Engineer / Works Manager/ Chief Engineer.

(f) Competency Certificates for supervising crane operation are granted to SSE(Loco), SSE(C&W), SE(Loco), SE(C&W), JE(C&W), Head Fitter, Asst. Head Fitters Mistries, Chargemen, Transportation Inspectors and such other Supervisory staff of other than Mechanical Department as may be permitted to supervise crane operations. In all cases of crane operations on the Open line, SSE (Loco), SSE(C&W), SE (Loco), Mistries, Chargemen, SE/JE(C&W) possessing competency certificate will alone be competent to supervise crane operations on running lines. The operation of Traffic Crane on running lines i or adjacent to the same in such a way as may foul the running line shall be under the supervision of a Transportation Inspector.

(g) In the case of the diesel cranes of 20 tonnes- capacity and below belonging to Operating or Commercial Department, Crane Loco Pilots who have the necessary competency certificates are allowed to supervise crane operations provided such operations are confined to sidings only.

(h) Competency certificates for supervising crane operations are valid for a period of 3 years only and have to be renewed from time to time. The knowledge and proficiency of the staff concerned are to be tested before renewal of competency certificate.

(i) The Crane Loco Pilots or Muccadums prior to the issue of Competency Certificates must undergo at least one week's training under the guidance of the Loco Foremen of the nearest Loco Shed where such crane are available, in the matter of technical knowledge in operation, upkeep of the crane, rules to be observed and the precautions to be taken for such operations. On completion of this training, these staff must be examined by the authorised official concerned and competency certificate as per sub- para (e) above issued, if found fit.

(j) In addition to the Competency Certificate referred to in sub-para (e) above, the Divisional officers are responsible for seeing that Crane Loco Pilots! Muccadums working in their departments are annually examined and are also in possession of a certificate of fitness from the SSE (Loco) of the Division to be deputed forthe purpose by the senior most Divisional Mechanical Engineer. For this purpose SSE (loco) must annually test all Loco Pilots/ Muccadums in charge of cranes and see that they have full knowledge of their work and responsibilities and are able to operate the crane correctly, before issuing a certificate of fitness.

(k) The department using a crane will ensure that the crane is worked by a Loco Pilot or Muccadum as the case may be, holding a valid competency certificate and a certificate of Fitness. For supervision on operation of crane, it is necessary that the supervisor also possesses a valid competency certificate. It will be the duty of the Supervisor/ Loco Pilot/ Muccadum to satisfy himself as to the competency of the other men of the gang.

16.03. Maintenance.-

(a) All Rail cranes, (Diesel or Hand operated), are classified as rolling stock. For repairs and up-keep, they are under the charge of the Chief Mechanical Engineer, and no repairs or adjustments, must be made to them except in the manner laid down by him. Girder crane Rhinoceros belonging to the Bridge section of the Engineering Department will, however, be maintained by the Engineering Department, Rail (Diesel or Hand) Cranes inside the store Depot of Nagpur is under the works Manager of the Shop for maintenance.

In the Divisions, the Senior most Divisional Mechanical Engineer will be responsible for arranging maintenance of the cranes through the SSE (Loco) or JE(C&W) as mentioned in clause (b) below.

(b) SSE/SE (Loco) shall be responsible for the maintenance in proper working order of the Diesel and Hand Cranes under their charge and also the Diesl cranes belonging to or used by other departments. SSE/SE/JE(C&W) shall be responsible for the maintenance in proper working order of all hand cranes used in sick sidings as also hand and fixed Cranes used by other departments. Attention to running/lifting gear of all Cranes including those in sick line will be arranged by SSE/ SE (Loco) of the loco shed concerned.

(c) SSE/SE/Loco) and SSE/SE/JE(C&W) should examine the chains of the Cranes under their charge every three months, and see that they are in safe .working order. Chains used in accidents must be examined immediately afterwards and if any chain is found to be defective, it should be sent at once to Workshop for repairs.

(d) SSE/SE/(Loco) and SSE/SE/JE(C&W) must send the Crane chains to Kharagpur Workshop every 12 months for the purpose of examination and annealing and a certificate in form L. M. 36 by Charter Engineer must be obtained with each chain before it is brought back into use.

Note:- In the case of Cranes belonging to other departments the duties and responsibilities in respect of the periodical inspection, the annual examination, testing and annealing of chain will also devolve upon the SSE/SE(Loco) concerned.

(e) The lifting capacity must be painted conspicuously on the jib of the each crane and the lifting capacity of the chain stamped on the hook.

(f) When a Travelling Hand Crane is required to run on open line the Train Examining staff at the starting station will see that it is in a safe running condition and that the axle boxes are correctly packed and oiled.

16.04. Periodical Overhaul.-

Periodical overhaul of all cranes will be undertaken by the Shopsand the time interval between periodical overhauls will be as under:-

Diesel cranes	5 “
Hand-operated cranes	7 “

Note:- Extension of 6 months at a time may be granted by the Dy. Chief Mechanical Engineer (Loco), if the Crane is sparingly used and if its condition is certified by the SSE/SE-in- charge of the maintenance. Life extension for the boiler will be sanctioned only by the Chief Mechanical Engineer.

16.05. Use of Cranes under Mechanical Department by the other Departments.-

(a) 140 T BD Cranes must always be kept in readiness to be turned out a moment’s notice in the event of accidents, and stabled in such a position having proper exit as least shunting required to get them into the traffic yard. BD Cranes should invariably be worked by their own trained gangs earmarked forthem.

(b) Except in cases of accidents, demand for use of Breakdown Cranes for traffic or engineering purpose must be made on the senior most Divisional Mechanical Engineer, if the Crane is to be used within the Division and to the Dy. Chief Mechanical Engineer (Loco) if the Crane is required to leave the Division and work in another Division.

(c) In all cases except accidents, the date and time at which the Crane is required to be at work, the probable length of time for which the Crane will be required and the purpose for which the crane is required, must be stated.

(d) Requisitions for Cranes should be made by letters, and a week’s notice being given except in cases of emergency, to enable the Dy. Chief Mechanical Engineer (Loco) or the Divisional Mechanical Engineer to decide the order of preference, in case more than one demand is pending. The Divisional Operations Manager will make the necessary arrangements for despatch of the Crane to and from Headquarters on receipt of the sanction from Dy. Chief Mechanical Engineer (Loco)/ Divisional Mechanical Engineer.

(e) Working away or Break-down Crane for other purposes is to be discouraged. Divisional Officers should see that the

Break-down Crane is not requisitioned, unless it is absolutely necessary. If the Relief Van is also required, it should be mentioned in the indent.

(f) Diesel/Cranes will be sent out in charge of the Loco Pilots of the Crane and Hand Cranes in charge of a certified Crane Muccadum. The Divisional Mechanical Engineer will decide whether a Crane Supervisor will also be required depending on the job to be undertaken.

(g) The Diesel Cranes of 40-tonne capacity or above are not permitted to pass over weighbridges.

16.06. Operation.-

(a) All instructions for the proper operation of Crane at the site of accidents and for its subsequent arrangements shall be given to the SSE/SE (Loco) by the Sr. DME/ DME/ AME.

The SSE/SE (Loco) shall give the necessary order to the Loco Pilot who is in-charge of the Crane and its staff. In the absence of the SSE/SE(Loco), the necessary orders shall be given to the Loco Pilot in-charge by the Sr. DME/ DME/ AME.

(b) No person other than the Sr. DME/ DME/ AME/ SSE/ SE (Loco) will issue any order to the Loco Pilot in-charge of the Crane at site of accident.

(c) However, in case of Crane attached to OHE Relief train, necessary orders for working the same may be issued to the Loco Pilot in charge by the SSE(OHE) or SE(OHE), or Divisional Electrical Engineer (Traction- Distribution) or Assistant Electrical Engineer (Traction Distribution).

(d) The Loco Pilot-in-charge is responsible for the safety of the Crane and its staff and will himself decide whether out-riggers or dogs shall be used and what other precautions must be taken. He must be afforded every assistance in strictly carrying out the rules laid down for the use of Cranes, whether in actual work or being moved to the site of accident with the dummy truck removed.

(e) Relief vans and Cranes working at the site of accident should on no account be moved without the consent of the Senior Locomotive representative at the spot.

(f) No Steam / Diesel Crane or hand crane shall be worked near or adjacent to traction overhead equipment, unless such overhead equipment is made dead and earthed. The movement of the crane jibs shall be done with care so as not to foul the traction overhead equipment. Wherever possible, the direct blast from the Crane funnel to the overhead lines or insulators shall be avoided.

(g) When cranes are required to be worked adjacent to traction overhead equipment, the person- in charge of the work shall give a prior intimation to the traction Power Controller who will make arrangements for overhead line staff to stand by for the purpose of Power Block etc. whenever required.

(h) Provision of Para 16.15 and 16.16 must be rigidly observed for operation of Crane.

(I) Before lifting operations are started, the following instructions will be observed:-

(i) The spring relieving screws will be screwed down on the spring buckle and where these are not provided, packing pieces must be inserted between the spring buckle and the sole bar of the Crane,

(ii) The rail clips should be securely fastened to the rail.

(iii) The out-rigger girders of Steam and Diesel Cranes should be placed in position and should project equally on both sides and packed at the outer ends with sleepers or wooden packing.

(j) Before lifting any load, however light, the balance weight box should be kept in its position until the lift is completed; on no account should any of the weights in the balance weight box be reduced at any time.

Note:- This doesnot, however, apply to the reduction that may be necessary to bring the weight down to the standard axle load when running on a train, but any weights that may have been removed for this purpose, should be restored to the balance weight box immediately the Crane arrives at its destination.

(k) The weight of the fixed balance weight is to be less than sufficient to counterpoise a weight of half the lifting

capacity of the Crane suspended from the jib when at its lowest position of elevation and at right angles to the rails and is not to be more than; that will leave a safe margin of stability to enable the Crane to be shunted with the jib at right angles to the rails and no load on it.

(I) The weight of balance weight should be conspicuously painted on itthus:-

Weight of balance weight:-

Tonnes. Kgs.

16.07. Precautions before lifting with Hand Crane.-

(a) Precautions laid down in para 16.06 (I) (i) (ii) should be observed.

(b) The blocking screws and wedges should be used.

(c) The tail may then be released.

(d) Handles should be secured to the winding shaft.

(e) In order to prevent the jib of the Crane slewing out of control when carrying a load, a guy rope should be fixed to the jib in order that it may be pulled in the direction opposite to that in which it tends to slew to control the jib. The Crane Muccadum will be responsible for warning all staff working with him to stand clear during such operations.

16.08. Precautions while lifting with Hand Crane.-

(a) Jib struts should be used when the Crane is handling a load up a bank or for warping a load which is beyond the sweep of the jib or in any other case when ordinary means do not appear adequate to ensure the equilibrium of the Crane. These struts cannot be used if the jib is to be slewed with the load suspended.

(b) The Crane handles should not be left unmanned either in lifting or lowering. Lowering with the check of the brake only IS strictly prohibited.

(c) When lifting load above half the lifting capacity of a 10 tonne Hand Crane, the rising pulley block should invariably be used.

16.09. Precautions when Cranes are not in use.-

The following instructions should be observed when Cranes are not in use-

(a) The spring relieving screws are to be released and secured so that they cannot work down when running. The packing pieces are to be removed and hung on the hooks provided for the purpose.

(b) The out-rigger girders of Steam and Diesel Cranes are to be stowed away and secured so that they cannot foul the running road.

(c) The rail clips are to be released and secured on the hooks provided for the purpose.

16.10. Precautions for resting jibs.-

The Crane truck should be under the jib, the weight of which should be supported on the centre bearing slide. On the main line, Crane trucks should not be removed until the jib of the Crane has been placed parallel to the line of rails; off the main line, Crane trucks may be moved without this precaution only if the Crane is so weighted that there is no danger of its canting over,

16.11. Attaching Crane to a train.-

(A) Before attaching a crane to a train, the jib should be lowered on to the Crane track and locked to prevent it from swinging while in motion, and it should be certified that it is in proper running order. In the absence of Train examiner, the Crane Muccadum will be the duly authorised person to issue certificate as required vide GR 4.27. Except in unavoidable circumstances the jib must point towards the rear of the train.

(B) The spring relieving serews to be released and secured so that they cannot work down.

(C) The crane should as a rule, be placed four vehicles from the engine, but when proceeding to a breakdown the rule may be relaxed.

(D) The Loco Pilot-in-charge must travel with the Crane and will be responsible for oiling and safety of the crane throughout its journey.

(E) The speed of the train carrying crane shall be restricted as indicated in S.R. 4.27.03. The speed, of 10-tonnes Diesel "Orton" cranes is restricted to 25 KMPH.

(F) However, the following speed limits with trailing and marshalled as last vehicle of the Break- down or Relief Train fortrack laid in 75-R or higher poundage rails with N+3 sleeper density and above and 203 mm. (8"inches) ballast cushion subject to any lower speed restriction notified locally:-

Capacity of Cranes	Max. Axle Load	Max MPH	Speed KMPH
76.0 Tonnes (Breakdown)	19.81 tonnes	25	40
66.0 Tonnes (Breakdown)	16.71 tonnes	35	55
40.0 Tonnes	16.55 tonnes	30	50
30.0 Tonnes	16.11 tonnes	30	50
20.0 Tonnes	16.31 tonnes	30	50
20.0 Tonnes	16.50 tonnes	30	50
20.0 Tonnes	14.53 Tonnes	30	50
20.0 Tonnes	13.82 tonnes	30	50
15.0 Tonnes	14.99 tonnes	30	50

The Divisional Railway Manager will notify locally the sections over which such higher speed for Cranes moving as last vehicles on Break-down or Relief Train will apply.

(G) 120 tonnes B.G. Diesel Crane manufactured by Mis. Orton Crane and Shovel Company, U.S.A, may be hauled in a train with the crane in running order and jib fully resting on the match truck, at speeds upto a maximum of 75 KMPH on:-

(i) Jharsuguda-Bilaspur-Nagpur

(ii) Bilaspur-Katni

Broad gauge sections of this Railway subject to the observance of the following:-

(i) The match truck for the crane should be suitable for being hauled at 75 KMPH.

(ii) The crane should be marshaled as per para 16.11 (C) above.

(iii) Sectional speeds, all local and other speed restrictions as existing or as imposed from time to time.

(iv) All other precaution as contained in the chapter related to running and attaching crane.

(H) 1. It is safe to run 140 1Gottwald B.G. diesel hydraulic break-down crane to RDSO Drawing No 1 WDH 140 CR (ALT5) which is fitted with 2 six wheels bogies with single stage helical and disc spring suspension arrangement and the jib resting on match-truck fitted with two axle bogies having a similar single helical an disc spring suspension arrangement with maximum axle load of 20 T at a maximum speed of:-

(i) When hauled in a train as a trailing load I by diesel or electric locomotive with its jib resting on match-truck =75 kmph.

(ii) When travelling on its own power with or without loads = 5 kmph.

(iii) Bridges- The maximum permissible speed of the crane on bridges of BGML & PBG standard designs drawings shall be as follows:-

Condition applicable for permissible speed = Max. permissible speed.

(a) As trailing load hauled by single WDM2, WAM4 or any other diesel Electric Locomotive with jib resting on match-truck.

(b) Driven by own power, free on rail and moving with a previously lifted load as shown in SK 1. WDH 140 CR ALT-5 and having wheel loads as in sketch LD/SK-612.

(i) Jib parallel to track and

(1) towards front bogie BGML & RBG standard bridges ...5 kmph

(2) towards hind bogie BGML standard bridges ...5 KMPH

(3) RBG standard bridges ...prohibited

(ii) Jib Inclined to track all bridges ...prohibited.

(c) Driven by own power, free on rail and lifting the loads shown in sketch 1 WDH 140 CR ALT-5 and having wheel loads as in sketch LD/SK-612.

(i) jib parallel to track and,

(1) towards front bogie:-

BGML standard bridges ...5 KMPH

RBG standard bridge ...Prohibited

(2) towards hind bogie:-

BGMURBG standard bridges ...Prohibited

(ii) jib inclined to track:- ...Prohibited All bridges

2. For bridges of lower standard than that mentioned above, the chief engineer concerned shall be referred to:-

For track of lower standard, the Chief Engineer concerned shall decide the lower maximum permissible speed. When the Chief Engineer considers that the road bed is not compact or there is improper drainage, he may suitably restrict the maximum permissible speed depending on the local condition.

3. The maximum permissible speed on curves to be decided on the basis of existing provisions of the Indian railways permanent way Manual.

4. Working of the crane:-

(i) The load shall be brought to the shortest possible radius. The jib should normally be brought parallel to the track.

(ii) Based on the type and conditions of the formation, the crane Loco Pilot/supervisor should take adequate pre-cautions to ensure that there is no settlement of the formation under the working crane.

(iii) During crane working, a special watch shall be kept on the condition of fish plates. Any damaged fish plate should be replaced before allowing traffic on the restored track.

(iv) The crane shall not be permitted to work on the girder bridges without the permission of Sr. DEN who will keep in view the provisions of para 3.2 (bridge) of RDSO,s speed certificate. Sr. DEN will obtain sanction of Chief Bridge Engineer, if necessary.

5. The crane should as a rule be placed four vehicles from the engine, but when proceeding to a break-down the rule may be relaxed.

6. All the permanent and temporary speed restrictions in force and those imposed from time to time due to track, bridges, curves signalling and Interlocking etc. shall be observed.

(I) When a Crane is attached to a train the Guard will hand over a memo to the Loco Pilot bringing the fact to his notice and giving him particulars as to the type of the Crane attached and the station to which it is booked. He will on no account start his train unless the Loco Pilot is in possession of this memo, and has received from there Loco Pilot a written acknowledgement for the same. A Caution Order indication the speed restriction to be observed shall also be made over to the Loco Pilot by the Station Master on duty. The Loco Pilot will thereafter be personally responsible to observe the speed restrictions required.

(J) Particular attention to these restrictions in speed must also be paid by Section Controllers and Deputy Chief Controllers so that suitable paths can be arranged for trains conveying Cranes and crossings decided upon in accordance with reduced speeds applicable in each case Excess speed should be avoided.

(K) On electrified sections the Crane supervisor / Loco Pilot / Muccadum will be personally responsible to secure

the jib and other fitting in the Crane suitably to ensure that there is no infringement of electrical clearances and the Crane does not hit or damage any fixed structure or fittings.

16.12. Movement of Cranes to the site of Accident:-

(a) It is usually necessary to approach a site of accident from the station nearest to it with the crane leading. The Official in charge of Relief Train will arrange for this marshalling in consultation with Control at the station short of the site of accident. Some Cranes have reversible dummy trucks which can be lifted bodily by the Crane itself and placed in rear. In case of Cranes which do not have reversible dummy truck these should be marshalled in rear of the Crane at the previous station and the site approached with jib trailing.

(b) It is possible in most cases, to avoid funning with the jib hoisted but should an occasion arise necessitating the Crane to run with the jib unsupported on the dummy truck, the jib must be in the central position, and its swivelling movement prevented by a dependable locking arrangement such as is provided under swivelling base and the speed must not exceed 8 kilometres per hour. The Supervisor-in-charge of the Crane shall see that the jib is hoisted not more than 4115mm(13"-6") above the rail level so as to rule out the possibility of its fouling with any structure, overhead wires or any over-bridge, tunnel etc.

16.13. Running of Hand Crane on Open Line.-

(a) The precautions laid down in para 16.11 for Diesel Cranes must also be observed for Hand Cranes, except sub-para-h.

(b) Counter balance box, if provided should be moved inward to the fullest extent and securely fastened. The weight of the balance box shall be marked on it and no alteration in the weight shall be made except under written sanction of the Chief Mechanical Engineer.

(c) All the operating handles must be removed from the shafts:

(d) The gear for relieving the weight on the central pillar, where provided, must be locked in the travelling position.

Note Any Hand Crane not fitted with buffing gear, spring gear, enclosed axle boxes or with a match truck, will not be considered as a travelling crane and must not be attached to any train without the specific orders of the Chief Mechanical Engineer.

16.14. Lifting-10-tonne Hand Crane.-

(a) The precautions laid down in para 16.07 must be observed.

(b) The maximum load must not exceed 10 tonnes in any circumstances and must be limited to reduce tonnage when prescribed.

(c) Care must be taken to ensure that the track is in good condition.

16.15 Crane working within Station limits.-

(a) Before commencing operations, the Supervisor/ Loco Pilot/Muccadum will clearly indicate by a written memo to the Station Master/Yard Master on duty the nature of the work, the siding line on which the Crane will work, the line or lines to be blocked or fouled during Crane operation and the time required for the work and only on obtaining the written permission from the Station Master/Yard Master as per specimen below, operation will be commenced. On controlled sections where running lines are fouled, the Station Master on duty will not give the permission except with the prior approval of the Controller on duty. Record of such approval and permission asked for and given, must be entered in red ink in the Train Signal Register and Station Diary, including the number of line/lines/siding which will be blocked fouled.

(Proforma of certificate from the SM/YM)

The Crane is permitted to work on line No ..... Siding..... from..... Hrs. .....to Hrs. The line/siding and adjacent line Nos have been protected by red banner flags and there will be no movement on the above lines/siding till the Crane working is completed and a written memo to this effect is received.

Date ..... Station Master

Time ..... Yard Master.

Station Stamp.

(b) Once permission is given to the Supervisor/ Loco Pilot/ Muccadum of the Crane to commence operation as per proforma above, the Station Master/ Yard Master on duty will be responsible to see that no shunting or other movements are allowed which will interfere with the crane working and block the line/ lines on which the Crane will be working and the line likely to be fouled. The points giving access to the line (s) on which the crane will be working or which may be fouled, shall be set against entry; the reception and departure signals for the lines concerned shall be kept at danger, and necessary lever collars shall be fixed on the respective points, slots and signal levers. The Station/Master on duty shall be responsible for advising the Switchman/ Cabin man to this effect and get their acknowledgement under exchange of Private Number. Slide collars shall also be fixed on the respective signal slide of the Station Master's slide control apparatus where provided. In case of non- interlocked point (s), it/these shall be kept set and clamped with padlock at either end against any entry; the keys of the clamped shall be kept by the Station Master/ Yard Master on duty till the Crane working is completed. The Station Master shall make a suitable entry in the caution order register regarding working of crane with the line(s) occupied/ fouled or likely to be fouled by the crane while working and the time from which the permission is given, and the outgoing Station Master on duty shall responsible for getting the entry noted by his reliever before he goes off duty. The Station Master on duty shall advise the Station Master on duty at the adjacent Block station so that necessary caution order can be issued to the Loco Pilot and Guard of the train concerned indicating the location of crane work, speed and other precaution if any. The speed of the train over adjacent line at the site of crane work shall be restricted to 16 KMPH, and Loco Pilot should be advised to exercise extra caution.

(c) *Protection of line:-*

In addition to the precautions mentioned in para (b) above, the station Master/Yard Master on duty will be responsible for the protection of line(s) over which the crane will be working as also the line(s) likely to be fouled by the working of Crane. For this purpose two look out men with red hand signal shall

be posted near the entrance point on either side and two red banner flags be placed at suitable distance from the crane on eitherside. The posting of men and placing of banner flags shall be decided with due regard to the safety of Crane working and minimising interference with the normal working of trains movements.

(d) Crane operations within station limits will be deemed "obstructions" on the line or lines concerned for the purposes of lowering of signals.

(e) If during the course of Crane operations, train movements or other operations are required to be performed on the line blocked or on lines which may be fouled due to Crane working, all Crane working shall be stopped by the Supervisor/Loco Pilot/Muccadum on obtaining a written request from the Station Master/Yard Master to suspend operation. After doing so, the Supervisor/Crane Driver/ Muccadum will give a written memo to the Station Master/ Yard Master in the form given below to the effect that Crane working is suspended, that the jib of the Crane is parallel to the track and the tail locked and no obstruction is fouling the line or lines where train movement or shunting movements are to take place. On receipt of this memo, the Station Master will authorise lowering of signals concerned for the train or perform other movement. The Station Master/Yard Master on duty will also be personally responsible to ensure that all obstructions have been removed from the nominated line before authorising lowering of signals. The certificate of the Crane Supervisor/Loco Pilot/Muccadum is to be kept pasted on the Station Diary.

(Proforma of suspension memo from the Supervisor/Loco Pilot/ Muccadum of the Crane)

To

The Station Master/Yard..... Master Station.

Please note that the Crane working on the line No /Siding No is suspended at Hrs and the line/siding and its adjacent lines are clear and nothins has been kept fouling the lines. Crane work will not

be resume (till receipt of written permission from you. The crane is standing on line No. ...../Siding No. .....

Date..... Supvr./Loco Pilot/ Muccadum.

(f) After the Crane work is over, the Supervisor will issue a memo to the Station Master on duty to the effect that the work is over and the lines blocked and/or fouled are clear of obstructions and are safe for the passage of trains in the proforma appended below. The Station Master/Yard Master will keep the memo attached on the Station Diary.

(Proforma of completion memo from the Supervisor/Loco Pilot Muccadum of the Crane)

To

The Station Master/Yard Master,

.....Station.

Please note the Crane working on line No /

siding is completed at hrs. and the adjacent lines are clear and nothing has been kept fouling the lines. The Crane is standing on line No. ..... /Siding No. .....

Date..... Supvr./Loco Pilot/Muccadum.

Time .....

Note:- The certificate and the memo mentioned above may be in manuscript.

16.16 Crane operations in Block section.-

(a) In the case of crane operation in Block Section or any of the sidings in such a way as to affect the running line in the Block section, the Supervisor-in-charge of the Crane operation will clearly indicate by written memo to the Station Master on duty at the adjacent block station the nature of work, the line(s) of work or line(s) which will be fouled during the crane operation and the time required for the work, and on receipt of permission from the Station Master concerned in writing he will commence operations.

(b) The section concerned shall be blocked before allowing the Crane in block section and the block shall be removed only after clearance of the section by Crane.

(c) Cranes are not to be operated in the block section between sunset and sunrise except in case of accident and for the purpose of removal of obstruction.

(d) When Crane is working on double/triple line section the supervisor in charge should see that the adjacent line is not infringed and if any infringement is involved, or even apprehended, the adjacent line must also be blocked.

(e) On double/triple line section during the Crane operation on one line, the Loco Pilot and Guard of Train on adjacent line(s) shall be issued with caution orders indicating the location of Crane work, speed and other precautions if any. The speed of the train passing over the adjacent line(s) at the site of work should be restricted to not more than 16 KMPH at the site of Crane operation and Loco Pilot should be advised to exercise extra caution.

(f) The Supervisor-in-charge of the Crane operation will be responsible for protection of Crane/ Track vide GR 15.09(1) (a), GR 15.09 (3) and GR 15.01. The same procedure of protection shall also be followed for adjacent line(s) when it is/are fouled. When the adjacent line(s) is fare not fouled and trains are permitted to run vide para (e) above, signals shall be shown vide GR 15.09 (1) (c); and in such case the Crane Supervisor will see that the jib of the crane is turned parallel to the track and tail locked before authorising the train to pass on the adjacent line(s). During night or when visibility is poor the banner flag/red hand signal flag shall be replaced by red signal lamp. Hand signal lamp in place of banner flag shall be placed at the centre of the track on a stand.

16.17 Working of Cranes in sidings.-

Working of Cranes, especially heavier capacity Cranes of 40 tonnes capacity and above in private or assisted sidings or any outlying sidings of the Railway will be regulated by special instructions issued by the senior most Divisional Mechanical Engineer/Senior most Divisional Operations Manager Senior most Divisional Engineer concerned, with the approval of the Divisional Railway Manager.

16.18 Display of Rules.-

Mounted copies of the rules of this Chapter are to be conspicuously displayed on the walls of all engines and

carriage sheds workshops and offices of the departments using travelling Cranes. A copy of these rules enclosed in a suitable waters-proof frame should be fixed on the back of the balance weight box of travelling Crane or at any other suitable place in it for the guidance of the Loco Pilot.

16.19 MFD Equipment.-

(a) To facilitate quicker re-railing operations in case of serious accident/derailment, specially in electrified sections where normal use of Break down Crane involves interference with OHE, this Railway has MFD vans containing re-railing equipment hydraulically operated with lifting straps, jacks, presses etc. forthe purpose of re-railing rolling stock including Diesel and Electric Locomotives as well as Coaching and Goods stock.

(b) Such MFD equipment vans are provided at different locations on this Railway.

(c) The MFD van is under the charge of Senior most Divisional Mechanical Engineer of the concerned Division. For operation of the MFD equipment as well as its supervision there are specially trained staff attached to the Loco Shed homing the MFD van and such special staff accompany the MFD van for its operation.

(d) If the use of MFD equipment is required, in a Division not provided at present with such equipment, a demand may be made on the senior most Divisional Mechanical Engineer of the adjacent Division homing MFD van.

(e) The staff working this MFD equipment must have competency certificate issued by the Senior Divisional Mechanical Engineer/Divisional Mechanical Engineer. This certificate will be valid for 3 years.

(f) The safety rules regarding blocking of lines fouled or obstructed and protection by banner flags/ danger signals applicable to crane working will apply to the working of MFD equipment as well.

16.20 Working Mobile Road Cranes.-

(a) The Mobile Road Crane of various capacities ranging from 1 tonne to 12.5. tonnes are in use on this Railway.

(b) Road Cranes have greater mobility as compared to Rail Cranes because they can be move in areas inaccessible by Rail Cranes and on steeper gradients etc. The Road Cranes can move with a load after lifting over some distance with due care.

(c) The power transmission from the prime mover to the hoisting mechanism or to the propelling mechanism of the Crane is generally electric with push button controls. All motions, travelling forward or backward, derricking, slewing, lifting or lowering are achieved by the operation of electric motors, the current being provided by a main generator under the control of the operator from a switch box near his seat. There are other push buttons or lever type switches for the various operations as mentioned above. Usually, the Cranes are also provided with necessary safety devices against lifting of overloads, incorrect slewing, etc. as basic protection for the safety of the Cranes in operation. The method of working and the precautions to be observed have been notified in local instructions and should be rigidly observed.

(d) The operators manning the mobile Road Cranes under various departments are generally under the control of the officers of the using department. But it has to be ensured that such operators are trained in Kharagpur Shops where facilities exist fortraining of the operators. The operator must hold a Competency Certificate issued by the Senior Divisional Mechanical Engineers/ Divisional Mechanical Engineer concerned.

(e) The training given to a Mobile Road Crane Crane Driver does not permit him to interfere with any vital item in the Crane, and any defect, however small it may be, should be reported immediately to his superior who should get in touch with the Divisional Mechanical Engineer and also with the Works Manager (G). Any trouble shooting of electrical devices on the Cranes should be done by the operator who should report the matter to the Divisional Electrical Engineer of the Division and also the Works Manager (G).

(f) The Cranes have to be operated and maintained according to the instructions received from the manufactures,

and in this regard necessary instructions are given to the Mobile Road CraneDriver. It should be noted that as there are various makes of these Cranes, each Crane may have certain specialties and any Crane Loco Pilot/operator even though holding competency certificate should not be allowed to handle a Crane of a different maker unless he has received a course of instructions in handling the same from the SSE / SE(C&W) to be specified by the Divisional Mechanical Engineer for the purpose and holds an annual "Certificate of fitness" for handling that type of Crane from the SSE / SE(C&W) as per para 16.02 (J).

(g) The Cranes are given their maintenance schedules, change of oils and greases, etc. according to the Maker's instructions, or special instructions issued by the competent authority. At wayside points away from Loco Sheds the Crane Driver should be instructed to be careful to see that Cranes are not worked overdue schedules. He should inform his superior in advance when the Crane is due schedule giving the date so that prior intimation can be sent to the necessary unit responsible for the normal schedule of mobile Crane. The major schedules of such Cranes will be controlled by W.M. (G). Any major break-down shall also be reported for attention to the Works Manager (G)

(h) For the guidance of the Crane Driver/Operator, the capacity at various radius for operation of the jib are indicated on the Crane itself. The operator is also made conversant during his training with the operating speed fortraversing with load and without load and hoisting speeds etc. He should refrain from going against such instructions; as such actions may be dangerous.

(i) Instructions regarding the periodical attention to chains laid down in para 16.03 (c) and (d) must be followed for Road Cranes as well.

(j) The operation of these Cranes will be confined to the sidings alone. In case of working on running lines orworking on a siding fouling or likely to foul the running line provisions of paras 16.15 and 16.16 must be observed and the Crane operations controlled by a Supervisor as per para 16.02(f).

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CHAPTER - XVII

AUTOMATIC AIR BRAKE

17.01. Principles.-

In Automatic air braking system, the medium is compressed air pressure. It obtains its power from the pressure differential between control reservoir pressure and brake pipe pressure. The Brake pipe is originally charged to 5 Kg/CM of the compressed air.

17.02. Description.-

(a) In a Train composed of completely fitted or piped vehicles, the automatic air brake may be operated on every completely fitted vehicle, provided that the Engine air hose is coupled to the first vehicle of the train by means of air hose coupling, angle cocks opened, and that each vehicles is coupled to its neighbour in a similar manner, the rear angle cock of the last vehicle being closed and the air hose placed on the air hose support.

(b) The gauges on the Engine and in the Guard's van when the train pipe is continuous indicate the air pressure available by reduction of which the train can be stopped. The gauges should show not less than the following:-

	Engine Gauge	*Guard's Yan Gauge*
Passenger Train ...	5 Kg./Cm^2	4.8 Kg./Cm^2
Goods Train ...	5 Kg./Cm^2	4.7 Kg./Cm^2

(c) More than 5 kg/Cm^2 is not necessary and the air brake combination in the engine (A9 Valve) should be so set that 2 2 as otherwise brake binding trouble is likely to be experienced.

17.03. How applied and taken.-

(a) The Brake is applied by the engine loco pilot or guard by reducing the brake pipe.

(b) The first application when made by the Loco Pilots should be made sharply by reducing not less than 0.4 kg/ Cm^2 of air pressure initially and further reduction in steps of 0.2 kg/Cm^2 . The different sequence of Brake applications are minimum reduction 0.4 kg./Cm , service applications

0.8 to 1 kg./Cm^2 , full service application 1.5 kg./Cm^2 and emergency brake application, in which the maximum brake cylinder pressure attained in shortest period of time.

(c) In any emergency, the brake may be applied from the Guard's van or any other vehicle of the train, where an application valve is fitted (provided the brake pipe is continuous) by pressing down the valve lever, until the needle of the gauge falls to zero. The Brake is then fully applied on each fitted vehicle.

(d) Should a train on which the automatic air brake is in operation parts accidentally in the portion on which the brake is operated, the air hoses between the parted vehicles will get disconnected, and the brake will be applied, automatically on each of the fitted vehicles.

(e) The brake is released by the engine Loco Pilot by charging the air pressure by means of Loco Pilot's Break Valve (A9 Valve) to the same conditions as existed before the application of the brake.

(f) The automatic air brake can be released on any vehicle by pulling the released lever of the distributor. Unlike in vacuum brake the release rod need not be kept pulled till the Brake cylinder is exhausted.

(g) The Brake gear should be properly adjusted so that the brake blocks firmly grip the wheel treads in the brake applied condition, the test for which may be done by sounding the brake blocks with a hammer.

17.04. Specification.-

(a) The air hose coupling between the Engine and the first vehicle and between each piped or fully braked vehicle and its neighbour must be properly connected. The rear air hose of the piped or fully Braked vehicle forming the last of the sequence from the engines must be engaged on air hose support and the angle cock closed carefully.

(b) When the air hose couplings have been connected, and the angle cocks are opened, the engine Loco Pilot must charge the required air pressure 5Kg./Cm2 and maintain it throughout the journey.

(c) Examination of trains before starting should be done as per General Rule 4.30, 4.31, 4.32, 4.33 and Subsidiary Rules thereto.

(d) Guard and Loco Pilots shall ensure at the time of taking over charge of a train, that their trains have the prescribed minimum brake power as laid down below.

1. *For Goods Trains:-* (i) There must be 5kg/ Cm^2 air pressure registered in the Engine brake pipe gauge.

(ii) For the purpose of working out of the percentage of operative pistons on trains, piped vehicle should be deemed to have in-operative cylinder/cylinders. The percentage has not been expressed in terms of vehicles units but only in terms of brake cylinders, since bogie wagons have two cylinders and four wheelers have one cylinder.

(iii) An active brake cylinder is one in which the air pressure can be admitted through the auxiliary reservoir when the pressure In the brake pipe is reduced by control from the engine and which, moreover, satisfies the stipulation that its piston would remain in pushed-out position for not less than 30 minutes after the air pressure in the brake pipe is reduced.

On steep gradient sections 90% of the brake cylinders must be operative.

Wagon	Empty	Load
BOXN, BCN/BCNA, BRN, BTPGLN	85 mm +/- 10	130 mm +/- 10
BOXNHL, BCNHL	85 mm +/- 10	120 mm +/- 10
BTPN	85 mm +/- 10	130 mm +/- 10
BOY	90 mm +/- 10	135 mm +/- 10
BOBRN	100 mm+/-10	110 mm+/- 10
BOBYN	100 mm+/-10	110 mm+/- 10
BLC	95 mm +/- 10	120 mm +/- 10
BOSTHS, BTPN.BOBSN	85 mm +/- 10	130 mm +/- 10
BVZC	70 mm +/- 10	—
BVZI	32 mm	
ALL TYPES OF WAGON BMBS (KNORR BREMSE DESIGN)	54 mm	54 mm

(vi) No audible leak is permissible in the air brake system along the train.

(vii) Minimum permissible brake power percentage of freight trains shall be followed as prescribed in Operating Manual/IR edition 2008. Brake van or last vehicle wagon at the rear end of the train shall be fully air braked with operative cylinders.

(viii) The position of Empty/ Load Box handle on wagon should be placed on the appropriate position either Empty/Load according to the loaded condition of the wagon.

2. *For Passenger Carrying Train* :-

(i) From an originating station the train must have all vehicles with active air brake cylinders.

(ii) At intermediate stations not more than 10% of in-operative cylinders. (Subject to maximum of 2 cylinders only) can be permitted.

(e) When the engine is attached to the train, the Loco Pilot must see that the air hose coupling on the engine is properly connected to that on the train. Both angle cocks to be closed before detaching their hose couplings of the engine and front vehicles and air hoses are engaged on respective air hose supports.

The Loco Pilot must test the engine automatic air brake apparatus before leaving the shed. Should there by any difficulty in charging and maintaining the required air pressure, after coupling to the train, steps should be taken to locate and remedy the fault, failing which the defective vehicle should be detached without infringing safety. Loco Pilots should ensure that the specified main reservoir Pressure is maintained.

17.05. Recording and testing of Air pressure indication by Guards.-

(a)(i) The Guard must record in the appropriate column in the Guard Memo Book what air pressure is indicated in the brakevan gauge every time the train starts after a halt. He will not give starting signal to the Loco Pilot unless the air pressure as indicated in rule 17.02(b) is registered in his gauge or unless he is authorised by a representative of Mechanical Department to start at lower air pressure than prescribed.

(ii) At the first starting station and at all stations where the engine or any vehicles are detached from the train or any vehicles are attached to the train, before starting when the Loco Pilot has charged the air pressure, the Guard must reduce 0.4 Kg./cm2 air pressure by operating his brake van valve observing the indication needle and then replace his valve to normal and allow the Loco Pilot to charge the remained air pressure. Without doing the Guard must not give the starting signal to the Loco Pilot.

(iii) If the indicator is not registering correct air pressure as given in rule 17.02(b) the fact must be brought to the notice of either the SSE /SE / SE (C&W) or the Loco Pilot.

(b) Air pressure tightness test for Locomotives by Loco Pilots :-

I. *Engine* Engine should be tested for leakage test as follows :-

(A) Open the Loco angle cocks in front and in rear to allow the dirt or water to blowout and apply master gauge on rear air hose couplings. Close the front angle cock of the engine.

(B) Charge the brake pipe pressure to 5 Kg./Cm2 Ensure 5 Kg./Cm2 pressure is registered in the Engine brake power pressure gauge as well as in master gauge.

(C) Drop a pressure by 0.6 Kg./Cm2 through 'Automatic Air Brake' valve (DAB orA9) in application position on loco by Loco Pilot.

(D) Close the BP Charging cut-out cock [3/4 inch or L/T (test mode), A-8 or MU2B on trail] and wait for next 5 minutes.

(E) Pressure drop should not be more than 0.7 Kg/ Cm2 in next 5 minutes.

(F) Any drop in pressure indicates the leakage in the Engine.

(G) Again charge the brake pipe pressure to 5 Kg./Cm2 and ensure pressure is restored instantaneously.

II. *On Trains* :-

(A) Attach the Diesel/Electric locomotive to the rake fitted with Single/twin pipe air brake system and couple brake pipes

and feed pipes. Ensure correct coupling with brake and feed pipe in a manner that there is no leakage of air from coupled joints.

(B) The coupling should be done with angle cocks in closed position.

(C) Open the angle cocks of loco after coupling feed pipe and brake pipe.

(D) Open the angle cock of the brake pipes and the feed pipes on all the wagons and check for continuity and leakage of brake pipe and feed pipe by reducing and rebuilding brake pipe and feed pipe pressure operating by A9 brake valve & angle cock fitted in feed pipe on locomotive (on wagon side) respectively. The verification should invariably to be carried out through the pressure gauges (BP& FP) provided in Guard's Brake Van.

Brake Pipe pressure in train (kg/cm^2)

SN	Length of the train	Locomotive	Brake Van
1	UP TO 56 BOXN WAGONS	6.0	5.8
2	BEYOND 56 BOXN WAGONS	6.0	5.7

Feed Pipe pressure in train (kg/cm^2)

SN	Length of the train	Locomotive	Brake Van
1	UP TO 56 BOXN WAGONS	5.0	4.8
2	BEYOND 56 BOXN WAGONS	5.0	4.7

NOTE: If the pressure is not within specified limit as given above then check for leakage in rake and correct it.

(E) Leakage Rate Test:

After the stabilizing pressure as given in above table, move the Driver's automatic brake valve handle (A-9) towards application position to reduce brake pipe pressure from 5.0 kg/cm^2 to 4.0 kg/cm^2.

(F) After the brake pipe pressure has been stabilized -

(i) Close the brake pipe isolating cock provided between additional C2W Relay valve and brake pipe of the locomotive or isolating cock of Test Rig for checking BP leakage.

(ii) Close the isolating cock provided between feed valve and feed pipe of the locomotive or isolating cock of FP for checking FP leakage

(G) Wait for 60 sec for temperature and gauge settlement then note the drop in pressure in brake pipe & feed pipe pressure gauge in locomotive for 05 minutes.

(H) The drop in brake pipe & feed pipe pressure gauge shall not be more than 0.25 kg/cm^2/min.

(I) If the leakage rate is more than the value indicated in (H), check for excessive leakage on individual wagon as indicated below -

1. A hissing sound would be audible at points where leakage is heavy.

2. Once the hissing sound is heard from a particular area, pin-point the location of leakage by applying soap water solution.

3. Use of permitted material viz. Teflon tape arresting the leakage.

(J) In case leakage is heavy and cannot be arrested, the wagon may have to be isolated/detached.

(K) In case where leakage can be arrested temporarily by tap and the nature of leakage is such that it requires attention at primary depot, clear marking on the wagon should be to draw attention of primary depot for adequate attention.

(L) In case the leakage is from the distributor valve and cannot be arrested, isolation of the wagon can be carried out by closing the distributor valve isolating cock. In such condition, clear marking should be provided on the wagon to indicate this defect to primary depot. Do not close brake pipe angle cocks under any circumstances, either for isolation of wagons or for any purpose whatsoever, except for carrying out shunting operation after which the angle cocks should again be opened to ensure continuity of brake pipe.

17.06. During Journey.-

(a) Loco Pilots and Guards must unscrew their hand brakes fully off before starting.

(b) Loco Pilots will be guided in the use of their air brakes and hand brakes by the orders in force.

(c) If during the journey the Guard of any train finds that the gauge in his Brakevan shows less than the required air

pressure (unless he is satisfied that such is caused by an application of brakes) he must be prepared to apply his hand brake if required and advise the Loco Pilot of the defect at the next stopping station.

(d) The Loco Pilot and'the guard must report to the Train Examining staff at the next train examining station any irregularity or defect in connection with the working of the automatic air brake which may have occurred, and the Guard must in addition, note the particulars in his journal.

(e) When fitted or piped vehicles on which the automatic air brakes are being operated have to be parted for any purpose, the angle cocks of the vehicles where they have to be uncoupled must be closed so that there may be no delay in coupling and the men put on the job are not injured.

(f) In case of failure of the automatic air brake on any train during the journey, if the defect cannot at once be remedied, the train must proceed cautiously to the next convenient station, where the defective vehicle can be remarshalled, detached or otherwise dealt with, the speed of the train being so regutated as to enable the Loco Pilot to have full control of the train by the hand brakes. In all such cases the Guards must be on the alert and assist in stopping the train with the hand brakes.

(g) (i) When two engines are employed to draw a train, the Loco Pilot of the leading engine will be held responsible for the working of automatic air brake. The Loco Pilot of the second engine must, however in case of emergency, assist in stopping or reducing the speed of the train by applying the automatic air brake, or hand brake, as may be required, but he must not maintain or recharge the air pressure.

(ii) When an additional engine or engines are employed to push a train, the Loco Pilots thereon must not interfere with the working of air brake which shall be under the control of the leading engine Loco Pilot as laid down in para (g) (i) above.

(iii) Loco Pilot of all additional engines will at all times keep the handles of the Loco Pilots brake valve in the release position.

(iv) In the event Loco Pilots of the engine in rear requiring in any emergency to attract the attention of the leading engine Loco Pilot, he shall give whistle code as laid down in G.R.4.50 and S.R.4.50.01.

Note:- These rules are laid down to avoid the serious danger which would arise if the Guard or the Loco Pilots of additional engines were to put the brake on, while the leading Loco Pilot was trying to recharge air pressure.

17.07. Stopping.-

(a) Before the train is brought to a stand, the Loco Pilot will release the brake slightly to prevent a rebound of the vehicles and an undue strain on the couplings.

(b) In case of a train becoming divided, the Guard in the rear van must put his hand brake hard on and secure it with the chain or sprag, where provided. He must also take any other precaution that may be necessary to prevent the rear portion moving, before going back to protect his train.

(c) In controlling trains on descending long and heavy grades, Loco Pilots are cautioned against the exhaustibility of the air brake system. Loco Pilots should know what is called the sensitive brake application and should take extreme care in avoiding the fading of the brake power. After repeated brake applications care should be taken that auxiliary reservoirs where the brake cylinders are fed from, are recharged to the original capacity (5 Kg./Cm2). Neglect of this rule may lead to the train going out of control.

(d) On long and heavily graded sections, when trains are braked only by compressed air pressure, it is essential that trains be stopped at suitable time intervals during the run for recouping lost air pressure in auxiliary reservoir and to ensure that train be kept under control and hence halts may be provided on such heavily graded sections either at station or in mid sections for recouping air pressure in the auxiliary reservoir and these halts wherever provided are shown in the working Time Tables. Loco Pilots while working air brake trains must ensure that they strictly observe these halts regardless of whether they are given through signals or not.

(e) The fact that after the brake has been applied the air pressure in the control reservoir gradually decreases due to leakage and that in less than half an hour the brakes may leak off altogether must not be forgotten when a train is brought to a stand on a gradient steeper than 1 in 150. In all such cases measures must be taken to guard against the possibility of a run-away. For this purpose, precautions mentioned in SR.6.04.02 (d) must be observed strictly.

The Guard must always be vigilant and be prepared to assist the Loco Pilot by applying hand brakes, if called upon to do so by the Loco Pilot and if necessary in an emergency. If the Loco Pilot requires additional brake power, the Guard and Assistant Loco Pilot shall pin down hand brakes on as many vehicles as the Loco Pilot may consider necessary.

17.08 Passenger Train Stopping Apparatus -

(a) Passenger carriages are fitted with an apparatus enabling passengers, in case of emergency, to apply partially automatic air brakes and so to attract the attention of the Loco Pilot and the Guard of the train except such particular carriages trains as may be exempted vide GR. 4.18.

(b) On noticing the drop of pressure in the brake pipe pressure gauge, the Guard, Loco Pilot, Motorman, Asstt. Loco Pilot will take necessary action as laid down in SR.4.18.01 and4.18.02.

(c) To reset the apparatus to enable the train to proceed, it is only necessary for the Guard or Asstt. Loco Pilot to push one of the discs to its socket or to turn the disc through 900 as the case may be, which will cause both disc to resume their normal position and the brake blocks to get released.

17.09 General.-

(a) Air Hose couplings must not be left hanging loose but must be properly secured on the air hose support provided for the purpose.

(b) To couple the air hoses, they must be taken one in each hand and lifted sufficiently high to enable the palm ends

of both air hoses to be coupled together and when lowered the coupling packing ring of one palm end will fall in the coupling case of the other end and hold in position with the stop-pin.

(c) To uncouple the air horses, they must be lifted straight up, when the coupling packing ring of one palm end will come out of the coupling case of the other palm end and air hose palm ends will separate.

(d) When connecting and dis-connecting Air hoses, staff must be extremely careful. When the Air brake system is under charging, there will be a pressure of 5.0kg/CM2 in Air Hose and hence before handling them, respective angle cocks should be closed and after uncoupling/coupling angle cocks should be opened.

(e) Care must be taken in un-coupling air hose Palm ends that the MU washers are not displaced or lost.

(f) Shunting staff and other when passing between vehicles must not step on the air hose coupling interfering with or damaging them.

(g) When automatic air brake vehicles are placed in siding or stabled with in the station limits, the brakes must be released, and vehicles kept from moving by the application of the hand brakes if fitted, or by sprags or chains on the required number of vehicles if necessary.

(h) Guards and other concerned staff must take care that articles are not placed in Guard's vans in such a position as to come in the way of the lever of the Guard emergency valve.

17.10 Instructions to Loco Pilot and Guard on the use of Air Brakes.-

Loco Pilots and Guards are being instructed in the training Centre during their initial and refresher training period regarding the air brake system and its use. They must be well acquainted with all the instructions of this chapter and ensure strict observance.

17.11 Recording of Air Brake particulars by Guards.-

(a) The Guards must be careful to show in their journals and on the copy handed to the Loco Pilot the, particulars of

air pressure and number of vehicles with active / In-active cylinders on train.

(b) In all cases where the active cylinder is made in-operative or vice-versa, during the journey, the change and stations where it took place must be noted by the Guard in his journal and on the copy handed by him to the Loco Pilot.

17.12 Loco Pilot to blow through.-

In order to prevent the accumulation of Moisture and dirt in the pipes of automatic air brake apparatus Loco Pilots are instructed that before leaving shed with their engine to work a train, a good blow through should be given with the Loco Pilots brake valve by opening the front and rear angle cocks. A through blow should be given by opening the drain cock of main reservoir also. The accumulated moisture and oil will be drained out. Likewise before engine is attached to the train, the rear hose should be opened and blow-through given. After the engine is attached to the train and the rear air hose of the engine and the air hose of the first wagon of the train air hose coupled, the blow-through should be given by opening the rear angle cock of the last vehicle.

17.13 Other responsibility of staff.-

(a) The working of automatic air brake by the engine Loco Pilot will not relieve the Guard of any responsibility as to the braking of the train. Guards must therefore keep a good look-out and be prepared to apply the automatic air brake or hand brake should any necessity arise.

(b) Engine Loco Pilot must satisfy themselves that the automatic air brake is in proper working order before starting and at each station where any vehicle is attached or detached. They must also test the brakes before descending steep inclines and while approaching any danger signal or terminal station; the speed of the train must be reduced if necessary so as to stop the train at the proper place. Guards must watch the speed of the train and assist the engine Loco Pilot by the use of their Air Brake and Hand brake when necessary.

(c) Unless the automatic air brake is working properly while the train is on run, the engine Loco Pilot must whistle for the

Guard's hand brakes, stop the train and inform the Guard that the automatic Air Brake is out of order and that the hand brakes must be applied upon for working the train to the next convenient station. In the case of failure of the automatic air brake on any vehicle during the journey and if the defect cannot at once be remedied, the train must proceed cautiously to the next convenient station, where the defective vehicle can be remarshalled / detached or otherwise dealt with. The speed of the train should be so regulated as to enable the Loco Pilot to have full control of the train. In all such cases the Guards must be on the alert, and assist in stopping the train.

Note Special precautions to be observed on Ghat sections shall be laid down in the working Time Table and also in the Special Ghat Section Rules by the Divisions.

17.14 How to locate leakage in Air pressure.-

Normally, the leakages are at the joints of the Air Hoses couplings namely at the palm ends and at nipples, at angle cock spindles, at the grip seal joints on main brake pipe, branch pipe etc. The leakage is usually detected by hissing sound produced by the air blowing-off. For detection of minor leaks, soap solution can be applied at joints where bubbles will be formed if leakage exists.

17.15 Trains with air brakes.-

(a) Normally, trains must run fully air braked.

(b) In case of emergency when a passenger train, for any reason has to run non-air braked, the speed must not exceed 40 KMPH and for mixed and goods train must not exceed 32 KMPH subject to, any lower speed restriction which may have been imposed over a particular section for any reason. In any case, a passenger train must not run non-air braked over any portion of the line without the permission of the Principal Chief Operations Manager. However, running of non-air braked goods train in emergency may be permitted by the DRM.

(c) In such case, the load of the trains must be reduced and the Loco Pilot and Guard of the train will be responsible to see the train is under control to stop wherever 'required.

17.16 Air pressure for Ghat section.-

(a) In addition to the specification on air pressure requirements and all other instruction laid down for goods trains in the earlier paras, it should be further ensured that a minimum of 90% of total No.of cylinders are fully operative on train on ghat section.

(b) If the required brake power, as defined above is not available or if the Loco Pilot doubts whether the brake power is sufficient or not, he has to stop and sufficient number of hand brakes have to be pinned down to ensure control on a down gradient.

17.17 Attaching of vehicles not fitted with automatic air brakes to coaching trains.-

(a) Mail, Express and passenger trains fitted with automatic air brakes, brake piped vehicles (vehicles fitted with only brake pipe and not with distributor valve, brake cylinder, brake rigging etc.) may be attached not more than one. Such vehicle attached on a passenger train should be-protected by one or more vehicles fitted with automatic air brakes attached in rear of it.

(b) No goods vehicle fitted with brake pipe only is permitted to be attached to a coaching train. Vehicles, both coaching & goods, fitted with brake pipe only, may be attached to troop trains and special .trains conveying military stores etc., but the specification of brake power laid down in para 17.04 must be followed except if any relaxation is permitted by CME / Sr. DME/DME in case of emergency.

17.18 Dis-connection of means of communication:-

If disconnection of means of communication to prevent misuse is permitted vide G.R. 4.18, the procedure and precaution laid down in the said GR & S.R. thereto should be followed.

17.19 Testing of communications and alarm chains on running trains.-

(a) The communication provided in passenger carriages for stopping trains in case of emergency, must be tested by Divl. Optn. Manager, and Divl, Meeh. Engineers, their

Assistants and also by the Divisional Transportation Inspectors and C & W and Loco Inspectors in running train at least once a month. The test must be made by pulling the chains in one of the passenger carriages on the train, while the train is on the move but the test should be avoided while a train is ascending an incline or when a train is running late. Divisional Safety Officer shall also make similar checks.

(b) The result of the test must be recorded by the testing officials and reported to the Divisional Operations Manager or Divisional Safety Officer and the Divisional Mechanical Engineer at once the following particulars are to be recorded:-

(i) Date, time train Number and the number and class of the Carriage in which the chain was pulled.

(ii) Time that was taken to stop the train after the chain was pulled.

(iii) Whether signals were properly exchanged between the Guard and the Loco Pilot.

(iv) The time that elapsed before the Guard came to the carriage from which the chain was pulled.

(v) Total duration of the halt.

(vi) Approximate estimated speed of the train at the time of test.

17.20 Application of automatic air brake from the brake van.-

The Automatic air brake may be applied from the brakevan in an emergency only. The application of Automatic air brake must, in such cases, be gradual, as there is risk of the train parting owing to sudden application of the air brake from the rear.

17.21 Blanking "off" automatic air brake distributor valve.-

When an automatic air brake distributor valve or its brake cylinder on a vehicle is out of order, the distributor valve and brake cylinder must be put out of action. The brakes of the individual wagon can be isolated by shutting off the isolating cock. This isolating cock is either fitted on the distributor valve itself, or on the branch pipe connecting the brake pipe to the distributor valve.

17.22 Empty load handle on special type bogie fitted wagons.-

(a) The special type bogie fitted wagon with higher carrying capacity are provided with a mechanical device known as empty load box, by the manipulation of which, the brake power of a wagon can be increased or decreased.

(b) This equipment has been provided to ensure that the train has adequate brake power in the empty as well as loaded condition of the wagon to enable it to be kept under proper control at all times.

(c) When the wagon is loaded, its brake power must be increased and this is done by operating a small Empty / Load Box handle (provided at the side of the wagon just below floor), from the "Empty" position to the "loaded position". These two positions are clearly marked on the plate on which the handle is fixed, by legend and also by colour.

(d) When, however, the wagon is empty and as such increased brake power is not necessary, the Empty / Load Box handle MUST BE set at the "Empty" position.

(e) If the Empty / Load Box handle is not set in the correct position, a serious accident can happen, as in the loaded condition the train will have inadequate brake power, on the other hand, when it is empty, severe application of brake will skid the wheels and cause them irreparable damage.

(f) All station and yard staff both operating and commercial also train examining and running staff should be fully acquainted with the operation of the Empty / Load Box device fitted on special type bogie fitted wagons. The following instructions should be strictly observed:-

(i) The handle of Empty / Load Box should be at the "Empty" position when the wagon is empty or when it is loaded with light materials like bamboo etc., so that the gross weight of the wagon is not likely to exceed 50 tonnes. The handle should be set to "loaded" position when the wagon is fully loaded or if the gross weight is above 50 tonnes.

(ii) The SSE/SE/JE(C&W) will be responsible for the correct setting of the Empty / Load Box handle at all originating

stations where the train is examined and certified fit by the Carriage & Wagon staff and at stations where the trains are passed by them. This should be recorded in the Air pressure brake certificate also.

(iii) The Guard will be responsible for the correct setting of Empty / Load Box handle at Wayside stations where any shunting is done or when a stabled train is picked up. The Guard must, however, be vigilant to see that when his train is detained at a station for any length of time, no unauthorized person interferes with the handle. This caution is to be exercised particularly when the train is running empty.

(iv) The staff responsible for loading or unloading of the wagons should also ensure that the handle of Empty / Load Box is correctly set after loading or unloading. Just before unloading commences, the Empty / Load Box handle should be changed to “Empty” position.

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CHAPTER - XVIII

TRAIN LIGHTING

18.01. Electrical Equipment in Coaching stock.-

(a) Coaching stock is generally provided with lights and passenger coaches are provided with fans also. Some coaches are fitted with generator equipment such as Alternator/Dynamos and batteries whereas ottler coaches are unequipped. While each light orfan has its switch inside the coach, equipped coaches have also a control switch fixed at the end of each coach.

(b) All defects in the lighting of trains are attended to by Electric Fitters of the train lighting section posted at certain base stations and also at certain intermediate stations en-route.

(c) Flying Squad Fitters are provided in certain Mail and Express trains in addition to the Train Lighting staff in the Train Lighting Depots and the stations en- route. Guards are to ensure proper accommodate for Flying Squad Fitters and report any defects in the train to them in order to get the defects rectified “while on run”.

(d) Following is the list of stations at which Train Examiners (Electrical) and Train lighting staff are posted over this Railway:-

Durg	Bilaspur
Anuppur	Raipur
Shahdol	Nainpur
Dongargarh	Chindwara
Gondia	

18.02. Marshalling of coaches.-

(i) Rakes should be marshalled in such a manner that equipped coaches and unequipped coaches are distributed evenly over the train so that two unequipped coaches are not marshalled side by side. On a rake not less than 80% of the total number of coaches should be equipped coaches. Non-electrified coaches should not be marshalled inside a block

rake. Parcel Vans also should be marshalled outside the passenger coaches.

(ii) If for any reason any coach is marked sick or booked for repairs, the coach after being repaired should go back to the same rake. When for any cause a coach is detached from a Mail, Express or a Passenger train, the Station detaching it should at once send a message to the next station where spare coaching stocks are based, as also the concerned control advising the class and type of vehicle detached, so that steps may be taken to replace the vehicle on the rake at the earliest possible opportunity.

(iii) With the technical developments and the superiority over the conventional 24 Volts system, certain rakes are working on same principle but at different voltage. When any coach working 24 Volts is required to be marshalled, it should be so marshalled that continuity of original system is not disturbed. Further as far as possible all the 24 Volts coaches, on such trains should be marshalled together at one end, to make it easy to connect them together in the case of failure of generating equipments on these coaches.

18.03. Control of Lights and Fans.-

(a) With a view to preventing an undue drain on batteries, lights and fans on train service coaches are to be switched on as follows -

(i) *Local orbranch line trains:* - Half an hour before starting time.

(ii) *Mail, Express and Passenger trains:* - As soon as the rake is backed on the platform line or one hour before the departure of the train whichever is later.

(b) On termination of a train, after the passengers alight the Train lighting staff must switch off the fans and lights.

18.04. Guard's duties.-

(a) On taking over a train, the Guard must satisfy himself that the lights and fans and the side and tail lamps are in working order.

(b) To avoid wastage of electrical energy, in the morning when there is clear day light, the lights and fans must be switched off and then fans only switched on if required.

18.05. Failure of Lights and Fans on coaches.-

If the train lighting staff or Carriage and Wagon staff cannot rectify a defect before the departure of, the train, they will inform the respective Divisional Electrical Engineer and the Train Lighting staff at the station ahead by sending message. The Guard will advise the Section Controller through the Station Master. In case of failure of lights and fans en-route the Guard should take necessary action as far as practicable to rectify the fault. If he fails, he should inform the Train Lighting staff at the station ahead over walkie-talkie set or through ASM on duty on control phone.

18.06. Duties of Station Masters / Yard Masters / Chief Station Manager / Chief Yard Master.-

(i) At Stations where coach/coaches or complete rakes are detached / stabled and if no Train examining staff and no Electrical staff are posted there, it will be the duty of the Yard Masters / Station Masters / Station manager/ Chief Yard Masters in order to prevent wastage of current and theft of fittings to see that all lights and fans are switched 'off', the doors and windows are locked and the compartments are not occupied by unauthorised persons. Similar action should be taken in regard to electrically equipped spare stock in station yards. The doors of the compartments are to be padlocked.

(ii) It is extremely important that blocked racks are not split up or coaches interchanged. A coache in any rake be marked sick, it should be replaced by one of the spare coaches. A coach belonging to a particular block rake should not be used to replace a 'sick' coach of another rake unless absolutely unavoidable.

(iii) When any dynamo and battery fitted vehicle forming part of a block rake is cut off en-route, an advice should be sent immediately to the nearest Train Lighting Examiner, the Divisional Electrical Engineer concerned and the Divisional Operations Manager stating where the vehicle has been detached. At train examining stations this advice will be sent by the JE(C&W) and at other stations by the Station Master.

18.07. Movement of Equipped coaches, Generator Cars and A. C. Coaches.-

Coaches provided with costly equipments shall be moved by Passenger trains only. Movement by Goods trains should not be allowed (i) to avoid thefts and pilferage of costly equipments (ii) for putting back these coaches into service after the earliest possible attention to avoid loss of Revenue. Controllers and other operating officials should ensure that such coaches move by passenger trains only. But the coaches with such equipment from and to shops should be moved by "Shop special" or "Goods train" with RPF protections. In unavoidable circumstances when the coaches with costly equipments are despatched by Mixed / Parcel train, they should be provided with escort.

18.08. Fire on Electrically fitted carriage.-

(a) In the event of electrical fittings in a coach catching fire, the Guard / Loco Pilot / any other on duty staff on train shall take all possible actions to stop the train and the Guard shall-

(i) remove the battery fuse;

(ii) remove the dynamo belt;

(iii) see that the fire is extinguished;

(iv) remove loosely hanging wires if. any.

(b) If there is any Generator Car marshalled in the rake, the Guard should ask the staff accompanying the Generator Car to shut down the Generator and cut off the supply.

(c) In case of wood work of the coach catching fire, all possible steps with available means shall be taken to prevent it from spreading and to extinguish it. In this connection the stipulation of GR 6.10, SR 6.10.01 and 6.10.02 should also be followed.

(d) In case of fire on train in mid-section, the Guard/ Loco Pilot of the train shall give immediate intimation to the controller and other concerned over portable Telephone or other means if the fire cannot be extinguished at the initial stage.

18.09. Examination of Electrical equipment by SSE/SE(JE (C&W) -

SSE/SE/SE(C&W) in absence of Electrc Train Lighting staff, should pay attention to the following points:-

(i) A dynamo should not be interfered with except when an obvious defect has developed; the belt should then be removed and the dynamo labelled 'For repairs'.

(ii) When a missing belt is replaced, care should be taken to ensure that the tention on the belt is adjusted correctly.

(iii) A blown fuse should only be replaced with the correct gauge of wire supplied for the purpose. Care is necessary to be taken owing to risk of fire.

(iv) Lamps burnt out, broken or missing, should be replaced.

(v) No majorfan repairs should be attempted. Loose fan guards may be tightened or re- connected and fuses replaced.

(vi) Intimation of any repairs carried out or of any defect requiring attention should be sent by a memo, through the Guard of the train, to the next station at which Electrical Train Lighting staff are available.

18.10. Special equipment on Pantry Cars, Air conditioned coaches and Inspection Carriages.-

(a) Pantry cars are provided with special switches by which their own installations are fed from their own equipment not assisting the rest of the equipped coaches on the rake.

(b) All Inspection Carriages are provided with special switches. If the Guard receives a complaint that the lights and fans have failed he should advise the electrical Train Examiner.

(c) Air-conditioned coaches are normally accompanied by attendants who should attend to the defects and failures, if any.

18.11. Breakage of cells.-

(a) In the event of any battery fitted coach being subjected to rough shunting or a bump or being derailed the staff present on the spot must see whether any liquid is dropping from the

battery box. If any liquid is found dropping this matter must be reported at once to the Yard Master or the Station Master concerned who will arrange to have the electrical equipment examined by the Train Lighting staff and obtain full report. If there is no Train Lighting staff provided at the station, the nearest Train Lighting staff must be informed by the quickest possible means.

(b) Whenever Air-conditioned Coaches and Inspection Carriages are sent to base station or Workshops for repairs to electrical equipment, the keys of padlocks locking the doors must always be sent with such carriages.

18.12. Emergency lighting equipment in Brake- van of passenger carrying trains.-

(a) All trains carrying passengers except EMU shall carry Emergency lighting equipment in portable sealed box in the brakevan.

(b) *The emergency Lighting Equipment consists of the following items:*

(i) Tripod Stand.

(ii) Platform with 2 Automobile Headlights and a 3-pin socket.

(iii) One hand lamp and Kent Coupler socket wired with 2 core TRS cable.

(iv) One kent coupler socket and 3-pin plug with connecting TRS cable.

(c) *Procedure for assembling:-*

(i) Tripod stand is to be fixed in position.

(ii) Automobile Head lights would be installed fixing them in the direction to be focused according to circumstances.

(iii) Plug is to be fixed in the socket provided at the Tripod stand and kent coupler to the kent coupling socket of the coach.

(iv) The emergency light should be coupled up or connected to the coach which has its batteries in good condition. In case there is no coupler or no current in the coupler, the wire may be directly connected to the battery.

(v) The hand lamp may be used for illuminating any place where the projector light does not give adequate illumination or where close inspection is necessary.

(d) *Training to the Guards:-* The Guards are trained at the Zonal Training Centre during their initial and Refresher course of training in the use of emergency lighting equipment in the event of accident to a Passenger carrying train. It is the duty of every Guard to be fully acquainted with the technique and procedure for using these lights and to bring these lights into use when necessary.

(e) The Guard should personally satisfy himself that the equipment is in good working order before taking over from the Train Lighting staff/ Station Masters / Guards at originating or interchanging or Guards changing stations and should sign in the register maintained at the station and make an endorsement in the Guard's ticket. He is personally responsible for loss or damage to the equipment during the period the equipment under his custody. The TAR (Elect) while handing over the E.L.Box to the Guards will test the same in their presence.

(f) *Custody of the emergency lighting equipment:-The* emergency lighting equipment is distributed by the SSE/SE/ JE (Electrical) of base stations wherever SSE/SE/JE (Electrical) are posted. At those stations where SSE/SE/JE (Electrical) orTLMs are not posted, it will be in the custody of the Station Master. The JE/SE/SSE(Elect)/Station Master will be responsible forthe safe custody of the emergency lighting equipment in his care.

(g) *Handing over the equipment at the originating or interchanging stations:-*

Before a train leaves its originating / interchanging station, the SSE/SE/JE (Electrical)/Station Master will handover the emergency lighting equipment to the Guard of the train and take an acknowledgement of the Guard in a register which must be opened separately for this purpose.

h) Handing over of the equipment from the Guard to Guard:-

When the Guard of the train changes, the emergency lighting equipment should be handed over to the outgoing Guard by the incoming Guard with acknowledgement duly signed.

(i) *Handing over of the equipment at the terminal stations:-*

At the terminal station, the emergency lighting equipment will be taken over from the Guard by the SSE/SE/JE (Electrical) in case of those stations where SSE/SE/JE (Electrical) are posted or by the Station Master in respect of other stations. The SSE/ SE/JE (Electrical) or the Station Master shall hand over the emergency lighting equipment of the Guard on the pairing rake on its return trip duly taking acknowledgement in the register.

(j) *Handing over the equipment at the junction interchange point with other Railways:-*

In the *case* of rakes which continue their run on other Railways, the emergency lighting equipment will be removed at the junction interchange station and handed back to the Guard of the return train.

For the maintenance and proper watch over the movement of the emergency lighting equipment, a register will be maintained by the SSE/SE/JE (Electrical)/Station Master at the originating/ Terminating/junction inter-change station showing the movement of emergency lighting sets.

(k) *Branch line train:-*

For branch line train service for which the same rake returns after a short halt at the terminal station, the emergency lighting equipment should not be removed at terminal station. The equipment will be in the custody of the Guard till it is returned by the G'uard at the base station.

(l) Breaking of seal :-

The equipment will be handed over to the Guard in sealed condition. In case any necessity arises for breaking the seal, the Guard concerned should make an entry in the journal kept inside the box giving reasons for breaking the seal. The Guard should while handing over such equipment to either originating or interchange or terminal stations, also sign in the register

maintained at the station for having handed over the equipment with the seal in broken condition. The SSE/SE/JE(Electrical) should check and test the equipment thoroughly before putting fresh seal on such boxes. At stations where the equipment is handled by the Station Masters, the concerned Station Master should inform the Electrical staff of having received the equipment with the seal broken and the Electrical staff after thoroughly checking and testing the equipment should seal the same.

(m) If for any reason, any train is terminated at an intermediate station, the Station Master shall be responsible to return the equipment to the SSE/SE/ JE (Electrical)/ Station Master of the base station in consultation with the Section Controller and Guard of the train.

(n) If any special train is arranged, the Station Master of the station concerned should make arrangement for providing the emergency lighting equipment for the train, by contacting the concerned officials at the Divisional Head Quarters in advance.

(o) Instructions issued by the Electrical & Operating Departments from time to time should be studied by the Guard thoroughly and he should act accordingly.

(p) In case any E.L. Box is not received back by the pairing train, the SSE/SE/JE (Elect)/Station Master shall take immediate action to trace out the box and restore it to service. In case of loss of E.L. boxes, the matter should be reported and responsibility fixed.

18.13. Maintenance and testing of the equipment.-

(a) The equipment whether in the custody of SSEZ SE/JE (Electrical) or the Station Master will be tested periodically at intervals of not exceeding 10 days by the electrical staff nominated for the purpose who should sign the journal kept inside the box and record the proper functioning or otherwise of the equipment. The maintenance of light boxes should normally be carried out by the Electrical staff at the base station.

(b) All Electrical Officers, while on inspection, have instructions to specially spot check the emergency lighting

equipment to ensure correct maintenance at all times and to deal severely with irregularities if any.

(c) Divisional Safety and Operating Officers must also carry out similar checks.

18.14. Wax Heater.-

All Postal Vans are provided with Wax Heaters. The postal staff should ensure that these Wax Heaters are in working order. The Guard, on being informed of any defect should intimate the Train Lighting staff at the next station provided with train lighting staff to have the same rectified.

18.15. Engine Head Lights.-

(a) In the event of HL bulb fusing, Loco Pilot should replace it. If not available on Loco, replace the fused bulb with working HL bulb of rear cab/other hood and ensure that the train/loco is not detained abnormally on this account.

(b) The Loco Pilot should not tamper with the Engine head light wiring and fittings for temporary lighting in the locomotive since such temporary lighting causes failure.

18.16. Electric failure in Corridor type first Class coaches.-

ICF Corridor type 1st Class coaches are provided with attendants. The attendants are trained in the attention to minor repairs in their coaches like replacement of bulbs, fuses, etc. The attendants should have the full complement of tools and spares for such purposes and they are to attend to such minor repairs.

18.17. DRS Cards.-

The deficiencies of electrical fittings in Passenger carrying trains are recorded in these Cards.

Guards should ensure that the train leaves with the DRS Cards. He should return the DRS Cards at the destination station to the Electrical staff. In case DRS Cards are not provided, the Guard should obtain a certificate from the Electrical staff and record the same in his ticket with reasons for not receiving DRS Cards.

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CHAPTER - XIX

ELECTRIC TRACTION

Safety Measures to be observed in A.C. Traction Areas.

19.01. General and Subsidiary Rules.-

Rules applicable in electrified sections have been given in Chapter XVII of General Rules and in the Subsidiary Rules made there underfor Electric Traction. The General Principles governing operation and maintenance of traction overhead equipment, electric locomotives and signal and telecommunication installations have been given in the A.C. Traction Manual, -these Rule books shall be kept in each station and yard office and all the staff responsible for dealing with the movement and operation of trains shall make themselves thoroughly acquainted with these rules for safe working and shall be held responsible for knowledge and compliance with the same.

Brief references to important rules required to be followed by Loco Pilots, Guards Station/Yard staff etc. in their day-today work have been given in this Chapter. These are, however, illustrative and not exhaustive, Loco Pilots should ensure that these instructions as well as those contained in Chapter XVII of the General Rules and Subsidiary Rules there to and also those contained in the A.C. Traction Manual are known to their crews as far as they are concerned. Station Masters and Yard Master will similarly make their staff conversant with these rules.

19.02. General Safety Precautions.-

(i) All staff are warned that contact with or approach within 2 metres of any live portion of the 25 KV traction overhead equipment, unless protected by screen as per rules, is dangerous and should be strictly avoided (GR 17.04 and Subsidiary Rules thereto). The zone with 2 metres of any live portion of equivalent is to be treated as dangerous.

(ii) Notwithstanding the above, the Loco Pilot of an electric locomotive is permitted to change the head-light bulb of the

locomotives while standing on the buffer beam projection at the floor level of the cab.

19.03. Movement of Diesel locomotives on electrified sections.-

(i) Fueling of the loco shall only be carried out in yards outside the electrified zone.

(ii) *Watering of carriages:-* Normally, all passenger carriages to move on the electrified sections, should be fitted with the side filling arrangement so that the water can be filled in the tanks from the ground level only.

In the case of coaches equipped with conventional arrangements for filling of water from the roof only, the filling of water in the coaches shall be resorted to only on the non-electrified lines. However, the watering of such coaches suitable for filling from the top only, may be done at specific places where special sectioning arrangements for overhead equipment are provided and authorised traction staff posted for according 'Permit to work',

19.04. Unwired tracks.-

No electric locomotives with pantograph raised shall under any circumstances be taken to an unwired section. All levers in cabins giving access to unwired lines have a yellow point mark warning the Levermen against setting the unwired lines for electric locos.

19.05. Power block:-

(i) The detailed procedure for obtaining power blocks has been given in GR 17.04 and Subsidiary Rules there to and this must be rigidly followed.

(ii) The sequence of switching operations for granting and cancelling the power block for particular sections is included as an Annexure to the appendix of Station Working Rules under 25 KVA.C. Traction. These should be strictly followed by all staff. Failure to follow the sequence indicated is likely to lead to dangerous consequences. When any isolator switch is changed from its normal position, for staff to work on overhead equipment, a danger Board shall be exhibited on

the switch with the caption 'Danger, Men working'. An adequate number of such Danger boards are provided at each station.

19.06. Section Insulators.-

In order to isolate Up and Down running lines and also sometimes Main and Loop lines or different grids in the yard, the cross-overs connecting Up and Down lines or cross-overs / turnouts connecting main and loop lines or different grids of the yard are provided with section insulators so that when one line or grid is made electrically dead or there be any fault on the same, the other line / grid is not affected. The speed of the electric locomotive with pantograph raised over such section insulators shall not exceed 30KM per hour subject to any other speed restriction which may be in force.

When one of the two sections separated by a section insulator is dead, the pantograph of the electric locomotive on the live section shall not proceed closer than 10 metres towards the section insulator marking the end of the dead section.

19.07. Fire.-

Regarding fire on or adjacent to any electrical equipment, refer to SR 6.10.02, SR 6.10.03, SR 6.10.04 and SR 6.10.05.

19.08. Power supply to Colour Light Signalling.-

(i) Power supply for colour light signalling on each station on the electrified stations is arranged from two independent sources as under:-

(a) One from Traction Overhead Equipment by means of step down auxiliary transformer for allowing the Voltage from 25000 Volts to 230 Volts other from another traction overhead equipment orfrom local supply.

(b) Where the station is not electrified and there is no local electric supply available, both the sources (the primary as well as the duplicate) will be from the Traction Overhead Equipment by means of step down transformers. The two sources will, however, be tapped from the traction overhead equipment belonging to two different independent sections so that the outage of both the sources at the same time is reduced to the minimum.

(c) The Change over from main supply to stand-by may be automatic or manual. In case of manual change over arrangement the SM on duty will operate the change over switch to the stand-by Power supply in the case of interruptions to the main power supply and vice-versa wherever such switch is provided to indicate the availability of both main as well as stand by power supply.

(ii) The Station Master shall be guided by the general procedures embodied in the Station Working Rules in restoring power supply to colour light signals at the respective stations. The Station Master shall ensure that power supply forthe colour light signals will be switched over to the duplicate source in the case of power failure of the local supply or power block on theirtraction overhead equipment.

Power blocks should be imposed after giving due consideration to the effect of the power blocks on power supply to the colour light signals, when the power is tapped from traction overhead equipment.

While permitting Power blocks on either of the OHEs, it is to be ascertained that the alternative power supply is available so that the supply to the colour light signals is not interrupted thereby causing all signal light to go off.

19.09 CONCEPTS OF ELECTRIC TRACTION

A Power Supply :

25 KV, AC, 50 Hz single phase power supply for electric traction is derived from the grid system of State Electricity Boards through traction sub-stations located along the route of the electrified sections at distances of 35 to 50 km apart. The distance between adjacent sub-stations may, however, be even less depending on intensity of traffic and load of trains.

B. Sectioning of OHE:

To ensure rapid isolation of faults on the OHE and to facilitate maintenance work, the OHE is sectioned at intervals of 10 to 15 km along the route. At each such point a ‘switching station interrupter’, usually rated at600A, is provided. The shortest section of the OHE which can be isolated by opening interrupters alone is called a ‘sub-sector’. Each sub-sector

is further sub-divided into smaller 'elementary sections' by provision of off-load type manually operated isolator switches.

At some stations with large yards, alternative feeding arrangements are provided so that the power for feeding and yards may be drawn from alternative routes. Normally the switch is locked in one position, being changed to the other when required after taking necessary precautions.

To meet requirements at electric loco running sheds, isolator with an earthing device in the 'off' position is provided. At watering stations, manually operated interruptersand isolators with earthing heels are provided to enable switching off of the power supply locally and earthing the OHE to enable working on roofs of rolling-stock. There are several types of switching stations, as detailed in the following paras :-

C. Feeding Post (FP): It is a supply control post, where the incoming feeder link from grid substation is terminated :

Each feeder supplies the OHE on one side of the feeding post through interrupters controlling supply to the individual lines. Thus, for a two track line, there will be four interrupters at each feeding post.

D. Sectioning and Paralleling Post (SP) :

These posts are situated approximately midway between feeding posts marking the demarcating point of two zones fed from different phases. A 'paralleling interrupter' is provided at each 'SP' to parallel the OHE of the up and down tracks of a double track section; 'bridging interrupters' are also provided to permit one feeding post to feed beyond the sectioning post upto the next FP if its 25 kV supply is interrupted for some reasons. These bridging interrupters are normally kept open and should only be closed after taking special precautions as detailed in these rules.

E. Sub-Sectioning and Paralleling Post (SSP) :

One or more SSPs are provided between each FP and adjacent SP depending upon the distance between them. In a double track section, normally three interrupters are provided at each SSP i.e. two connecting the adjacent sub-sectors of up and down tracks.

F. Sub-Sectioning Post (SS) :

These are provided only occasionally. They are similar to SSPs with provision for sectioning of the OHE but not paralleling.

G. Neutral Section: It is a short section of insulated and dead overhead equipment which separates the area fed by adjacent substation or feeding post.

A neutral section is provided to make it impossible for the pantograph of an electric locomotive or EMU train to bridge the different phases of 25 KV supply, while passing from the zone fed from one substation to the next one. Since the neutral section remains 'dead', warning boards are provided in advance to warn and remind the Loco pilot of an approaching electric locomotive/EMU to open locomotive circuit breaker (DJ) before approaching the 'neutral section', to coast through it and then switch 'on' on the other side. Special care is taken in fixing the location of neutral sections, on level tangent tracks far away from signals, level crossing gates etc. to ensure that the train coasts through the neutral section at a sufficiently high speed, to obviate the possibility of its stopping and getting stuck within the neutral section.

H. Other Important Equipment at Switching Stations :

Certain equipments are installed at various points to protect the lines, to monitor the availability of power supply and provide other facilities. These are generally as under:

1. Lightning arresters are provided to protect every sub-sector against voltage surges.

2. Auxiliary transformers are provided at all the posts and also at certain intermediate points to

supply AC at 240 V, 50 Hz required for signalling and operationally essential lighting installations. To ensure a fairly steady voltage, automatic voltage regulators are also provided where required.

3. Potential transformers are provided at the various switching stations for monitoring supply to each sub-sector.

4. A small masonry cubicle is provided to accommodate remote control equipment, control panel, telephone and

batteries and battery chargers required for the control of interrupters and other similar equipments.

19.10 OVERHEAD EQUIPMENT

A Catenary and Contact Wires :

1. The overhead equipment above the tracks comprises the following: -

a) A stranded cadmium copper wire of about 65 mm2 section or stranded aluminium alloy wire of about 116 mm2 section for catenary.

b) A grooved hard drawn copper contact wire of 107 mm2 cross-section (when new) supported from the catenary by means of droppers of 5 mm diameter spaced not more than 9 m apart.

2. The catenary and contact wire together have an equivalent copper section of 157 mm2. The current normally permissible on a single track is 600 A approximately, because of equivalent cross-sectional area of OHE. This current limit is based on the temperature limit of 85°C in contact wire. Certain sections in Waltair-Kirandul section have the catenary and contact wires together having an equivalent copper section of 200 mm2.

3. For loop lines, sidings, yards and spur lines excluding the main running lines and first loop or lines taking off from main running line, tramway type OHE having only grooved hard drawn copper contact wire of 107 mm2 section is provided.

B. Height of Contact Wire :

The normal height of contact wire for regulated OHE is 5.60 m (with 10 cm pre-sag for 72 m span) above rail level. For unregulated OHE in areas with a temperature range of 4°C to 65°C, this figure is 5.75 m and in areas with a temperature range of 15°C to 65°C, it is 5.65 m. In certain cases, such as under over-line structures, the height may be as low as 4.65 m on BG and 4.02 m on MG. For passing oversized consignments on such lines, special precautions have to be taken.

C. Span of Supporting Mast/Structures :

The span normally used for supporting the OHE from masts/ structures using the cantilever type bracket assembly varies from maximum 72 m on straight track to 27 m on curved track, the spans depending upon the degree of curvature. The catenary system is normally supported on straight tracks at maximum intervals of 72 m (63 m on MG) by cantilever type arms fixed to galvanized broad flange or/ section steel masts or fabricated steel structures. On curves, the catenary is supported at closer intervals, the spans adopted depending upon the degree of curvature.

D. Stagger:

The contact wire is staggered so that as the pantograph glides along, the contact wire sweeps across the current collecting strips of the pantograph upto a distance of 200 mm on either side

of the centre line on straight runs and 300 mm on one side on curves. This ensures a uniform wear of the current collecting strips of the pantographs.

E. Overlaps: The OHE conductors are terminated at intervals of about 1.5 km with an overlap generally, the conductor height being so adjusted that the pantograph glides from one conductor to the other smoothly.

There are two types of overlap spans, as under:-

a) Uninsulated overlap spans where the distance of separation between two contact wires is 200 mm and the two conductors are permanently connected together electrically by suitable jumpers.

b) Insulated overlaps, where the two OHE systems are kept apart at a distance of 500 mm normally the electrical discontinuity at insulated overlaps is bridged by interrupters or isolators, except at neutral sections.

F. Regulated and Unregulated OHE :

OHE with automatic tensioning called 'regulated OHE' is generally provided for all main lines. However, for large isolated yard and unimportant lines, automatic tensioning is

dispensed with in the interest of economy and only unregulated OHE is used.

G. Section Insulator Assembly :

Section insulators are provided to insulate the OHE of one elementary section from the OHE of the adjacent elementary section such as at cross-overs. When the pantograph of a locomotive passes from one track to another along a cross-over/turnout, current collection changes from one OHE to other and, therefore, the runners of the section insulators overlap with contact wire so that there is no arcing.

On double line sections with runners trailing, the section insulator assembly using porcelain insulators is fit for speeds upto 120 km/h provided it is installed between the first one-tenth and one - third of the span. In case the runners of the section insulator assembly are in the facing direction or it is not installed within the first one third of the span, the speed should be restricted to 80 km/h.

19.11 GENERAL DESCRIPTION OF ELECTRIC ROLLING STOCK

A Classification of Electric Rolling Stock :

Locomotives and Multiple Unit stocks are classified by means of a three/four letter code followed by a number to indicate the individual class and a series of the same.

The code letters used forAC locos and EMUs are given below:

The first letter denotes the Gauge: 'W for BG and 'Y' for MG.

The second (middle) letters 'A denotes the system of power supply for which it is suitable - AforAC & C for DC, CAfor DC &AC.

The third letter for locos indicates the class of service -

M' for mixed traffic locos suitable for both passenger and freight services,

'G' for Freight (Goods) service locos,

'P' for Passenger services locos, and

'S' for Shunting locos.

Multiple Unit Stock is denoted by the letter 'U'.

The various classes of AC locos and EMIls at present in service on Indian Railway are as under:-

(a) AC Locos— WAG1, WAG2, WAG3, WAG4, WAG5, WAG6, WAG7, WAG9, WAG9M

(b) WAP1, WAP2, WAP3, WAM1, WAM2, WAM3, WAM4, WAP4, WAP5, YAM1

(c) AC/DC Locos— WCAM1,

(d) AC EMUs— WAU1, WAU2, WAU3, WAU4, YAU.

In addition, two types of BG DC EMUs converted for AC working are in use on the Eastern Railway.

B. Important Equipment of Electric Loco/EMU :

1. Pantograph :

For collecting power from 25 kV ac contact wire, pantographs are mounted on the roof of the traction vehicles. AM 12 pantograph of Faively design has been adopted by Indian Railways for 25 kV ac electric locomotives and EMUs. These pantographs are provided with steel strips for current collection. The raising and lowering of the pantograph is by means of a pneumatically operated servo motor. This pantograph is a single pan design having two o-springs mounted on it. For keeping the pantograph in the lowered condition, main springs have been used. The suspension of pan is on plungers.

This pantograph is suitable for operation upto 140 km/h. For increasing the speed potential, improved pantograph with lower dynamic mass and independent pan heads have been used. Further, in order to improve the life of the contact wire, use of carbon strips has also been tried. Use of carbon strips for current collection has already been adopted in European countries.

Use of carbon strips necessitates change in the design of the pantograph; the pan head which is more or less rigid in case of steel strip pantograph needs to be made more flexible in the vertical, horizontal and transverse movement for carbon strip pantographs. This is achieved by improved suspension of the pan head. The speed potential of such a pantograph is of the order of 250 km/h.

2. Circuit Breaker :

— Air Blast Circuit breaker

— Vacuum Circuit breaker

These breakers are designed for isolation of power to the traction vehicle in the event of faults.

Vacuum Circuit Breakers were introduced on electric locomotives on Indian Rlys. in the year 1985.

The VCB is a simplified design with fewer number of parts (260 Nos.), have a simplified control block and self - contained interrupting medium that is vacuum. Due to these features, the life of the main contact achievable is as high as 1 lakh electrical operations as against 20,000 operations for air blast circuit breakers. As a result, the periodicity of replacement of main contact is second POH for VCB and IOH for Air Blast Circuit Breakers. Besides these factors, VCB also offers the advantages of reduced size, reduced weight and reduced maintenance cost as compared to this for air blast circuit breakers. The total trip-time for VCB is less than 60 milli-seconds while the same is of the order of 100 milli-seconds for air blast circuit breakers. The air blast circuit breaker is only capable of breaking the fault current with breaking capacity of 250 MVA. The VCB, besides having breaking capacity, is also designed for making capacity of the same rating, i.e. 250 MVA and can handle the same level of fault current during closing also.

3. Transformer :

Power to the traction vehicles is available at 25 kV ac single phase from the contact wire. In order to step down the voltage as well as to control the same for feeding to the traction motors, the traction power transformers are provided on the traction vehicles.

These transformers generally have a primary winding, a regulating winding, traction secondary windings and auxiliary windings. The regulating winding is designed for choosing appropriate voltage for the traction motors. The auxiliary winding is required for feeding the auxiliary motors on the locomotive.

In order to increase the h.p. of the locomotives, the traction transformers have been uprated from time to time keeping

the overall dimensions unchanged on account of space constraint. The upratings have been achieved by using increased copper section of the conductor used, improved insulation scheme and, in certain cases, adoption of aluminium foil wound construction for minimizing the losses.

With the introduction of thyristorised converters, the design of the traction transformer has undergone simplification with the deletion of regulating winding. The transformer for thyristorised converter becomes a two limb construction and traction secondary winding split into 4 windings for two step sequence control.

The traction transformer necessarily has to have forced oil circulation and forced air cooling. For this purpose, oil pump, oil cooler and blower form an integral part of the traction transformer.

4. Tap Changer :

Tap changer is provided on 25 kV (HT) regulating winding of locomotive transformerfor controlling the voltage input to main transformer.

5. Traction Motor :

In case of traction motor, great emphasis is being given on improving power to weight ratio, keeping in view the limited space available on the locomotive for mounting the same. There is continuous effort to improve the performance of traction motors by making them lighter/compact, and, at the same time, more reliable. Indian Railways have been adopting the latest technology available for design and manufacture of traction motor. Over a period of years, the traction motors have become now 2.5 times lighter, specially for EMU application.

6. Arno Converter:

Arno Converter is a special duty machine for conversion of single phase in-coming supply into 3 phase out- put supply. 3 phase supply is essentially required on most of the electrical locomotives for driving certain auxiliary equipment like blowers and compressors. The function of Amo Converter is to supply 3 phase power required for these auxiliaries.

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CHAPTER - XX

STATION WORKING RULES

20.01. Introductory.-

The object of issuing Station Working Rules is to regulate safe working of trains at and between stations, taking into consideration local conditions and special features, such as, the layout of the station yard, signalling and interlocking, gradients within the station limit, gradients at the approach of the station, Catch and Slip sidings, arrangements for ensuring that the line nominated for reception is clear and free from obstructions, measures for ensuring correct setting and locking of points, etc. Station Working Rules are also intended to draw the attention of the staff concerned to the rules governing the granting of "Line Clear", taking off signals, reception and despatch of trains, berthing of trains, working of level crossings, shunting, stabling of vehicles, and rules regarding working during failure of points, signals interlocking, block instruments, partial / total interruption of communication and in an emergency etc. The duties of different categories of staff entrusted with safe working and the equipment required for the same are also incorporated in the Station Working Rules. Station Working Rules must, at all time, be in conformity with the General and Subsidiary Rules and Block Working Manual Rules; they are "special instructions" within the meaning of GR 1.02(50). There should be no provision in the Station Working Rules contrary to General and Subsidiary Rules or Block Working Manual Rules.

Wherever any "Approved special instructions" within the meaning of GR 1.02(4) are incorporated in the Station Working Rules reference to the relevant letter of CRS should be quoted therein.

Note : Special Working Rules have been provided at stations on electrified sections giving special instructions in connection with overhead electric traction, issued under the joint signatures of Division Electrical Engineer (Traction) and Divisional Operations manager/Divisional Safety Officer. These are given as an Appendix to Station Working Rules

20.02 Preparation, issue maintenance and revision of Station Working Rules.-

(a) All Station Working Rules and their amendments will be prepared in the Divisions and issued under joint signatures of the Divisional Operations Managerand Divisional Signal & Telecom Engineer at interlocked stations and by Divisional Operations Manager and Divisional Engineer at non-interlocked stations on each page. In case of new S & T construction work, the DSTE (Con)/Dy. CSTE (Con) or DSTE(RE)/Dy. CSTE (RE) may sign the SWR in place of CSTE. Each copy of the Working Rules must be signed in ink by the officers issuing them the Working Rules must be scrutinized carefully before issue, to ensure that they are correct in every respect and conform to the conditions of working at the station prevailing at the time of issue. Each page of the station working rules should be initialed by the Sr. DOM/DOM before issue.

Note : *The station Working Rules or any portion thereof, shall not be brought into effect in anticipation of any works to be brought into use at a date subsequent to that on which the Station Working Rules concerned are brought into force.*

(b) Copies of Station Working Rules shall be distributed as follows:-

(i) Station and each cabin	One copy each, (one more copy to be kept in SM's Confidential file).

Note : *Each Block/Non-Block Cabin concerned to reception/ despatch/other movement of trains shall be supplied with the Station Working Rules or copy of the working rules pertaining to the Cabin concerned.*

(ii) Guard's Hd. Qrs. Station	1 (one extra copy for Guard's Reference file)
(iii) Loco Shed	2 (one for Loco Pilot's Reference file and one for SSE/SE (Loco)/ SSE/ SE (Traction)
(iv) Divi. Transport. Inspector	1 Copy for each station in his jurisdiction.

(v) SSE/SE (Signal)	1	------do---------
(vi) SSE/SE(P. Way)	1	——————————do——————
(vii) SSE/SE (Loco)	1	——————————do——————
	1	Copy for DOM
	1	Copy for DEN
(viii)Divisional Office	1	Copy for DSTE
	1	Copy of DME
	1	Copy for Chief Controller
	1	Copy for Safety Section
	1	Copy for Sr. DEE (Op)
		or Sr. DEE (Tr.D).
(ix) PCOM's Office	1	Copy
(x) Principal, Zonal Railway Training Institute	1	Copy
(xi) Commissioner of RlySafety	1	Copy
(xii)PCSTE's Office	1	Copy
(xiii)PCME's Office	1	Copy
(xiv)CSO's Office	1	Copy

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

(d)AII Class III staff concerned with the movement of trains in and out of the station namely, Station Superintendents, Station Masters, Assistant Station Masters, Chief Yard Master, Yard Masters, Assistant Yard Masters, Shunting Jamadar, Yard Master, and Cabinman including relieving and rest giver staff of these categories as also any other category of staff who may be temporarily put to work in any of the above categories must read and understand the Station Working Rules, and they must not be allowed to take charge unless they sign on

form “A” attached at the end of the Station Working Rules to certify that they have read and thoroughly understood the Working Rules. The Station Manager/Station Master/Yard Master/Chief Yard master in charge shall examine his staff to satisfy himself that the rules have been thoroughly understood by them, and he shall certify to that effect by affixing his signature and date.

(e) In regard to Class. IV staff concerned with the movement of trains in and out of the station namely, Cabinman, Pointsman, Leverman, Porters etc. including relieving and rest giver staff of these categories, the Station Manager/Chief Yard Master/Station Master/Yard Master in charge must read out and thoroughly explain the Working Rules to the staff concerned and must ensure that they have understood the same before they are permitted to take independent charge of work at any station and the Station Master/Yard Master/CYM/SS must certify in form “B” of the Station Working Rules to this effect. He shall also obtain the thumb impression or signature of the staff concerned, in form “B” attached at the end of the Station Working Rules in acknowledgement of such staff having understood the Station Working Rules.

(f) The duplicate copies of the Assurance Register on form “A” & “B” attached to the Station Working Rules bearing the signature or thumb impression of the staff shall be kept under the personal custody of the Station Master/Yard Master/ Station Superintendent/Chief Yard Master.

(g) When any correction or amendment to the Station Working Rules is issued, the Station Superintendent/Chief Yard master/Station Master/yard Master will be responsible to see that Station Working Rules are promptly corrected accordingly and are read and understood by each staff mentioned in sub-clause (d) and will obtain their acknowledgement in the Assurance Form ‘A in token of their having read and understood the corrections or amendments to the Rules. In regard to Class IV staff having been mentioned in sub-clause (e), he (Station Master/Yard Master/ Station Superintendent/ChiefYard Master) will explain the corrections/amendments to them and certify accordingly in the Assurance Register and also obtain the

signature or thumb impression of the staff concerned in the Assurance Form "B".

(h) Corrections to the Station Working Rules should be made personally by the SS/CYM/Station Master/Yard Master who will enter correction/amendment in a register of "Correction slips" to be appended at the end of the Station Working Rules. This appendix to the Station Working Rules should indicate the para of the Station Working Rules which has been corrected or amended, the number of correction slip, the reference number of the Divisional Office and the authority issuing the correction slip.

20.03. Principles to be observed in the framing of Station Working Rules.-

(a) The SWRs should be self contained, brief, to the point and in an unambiguous, intelligible and simple language both in English and Hindi. The SWR must be page numbered with the station name code written on each page.

(b) General and Subsidiary rules and Block Working Manual rules should not be extracted in the Working rules. Relevant General Rules/Subsidiary Rules/Block Working rules numbers, however, may be mentioned against each page.

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

20.04 Framing of Station Working Rules.-

The Station Working Rules shall be framed as per the following proforma and contain all information in the given sequence.

No. .....

.....Railway

.....Division

STATION WORKING RULES OF.....

(Name of the station)

..... (BG/MG/NG)

Date of Issue : .....

Date brought in force .....

NOTE : *The Station Working Rules (SWR) must be read in conjunction with General and Subsidiary Rules and Block Working Manual. These rules do not in any way supersede any rule in the above books.*

1. Station Working Rule - Diagram :

SWR Diagram No. ..... based on CSTE/ ..... Railway and signal Interlocking Plan No. ..... should show the complete layout of the yard, Points, Signals, gradients and interlocking arrangements of the station including the non-interlocked sidings, exact and actual holding capacity of all the individual lines in meters, actual inter signal (demarcation point) distance, names of adjacent stations and IBH signals, where provided, on either side of the station with their respective distances from the centre lines of the station building to the central line of the adjacent stations and any other information necessary in the day to day operation of trains. The particulars of date up to which it is corrected should also be mentioned. SWR diagram should show actual distances and not the minimum prescribed. It should be signed by the Divisional Operations Manager, Divisional Signal & Telecom Engineer and Divisional Engineer. The detection table, laver Collar Chart and Pull Sheet may be provided in Appendix 'B' Pull Sheet should be reproduced on a board brightly painted in the cabins to be placed above the Lever Frames.

2.0 DESCRIPTION OF STATION

2.1 GENERAL (LOCATION)

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

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

———————— Station is situated between ---------- (Name of adjacent station on one side) in the ----------

— (North/South/East/West) side at a distance of ---------- — km and ----------(Name of adjacent station on the other side) in the ----------(North/South/East/West) at a distance of ---------- km.

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

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

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

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

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

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

2.4 GRADIENTS IF ANY

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

2.5 LAYOUT

Under this head, information pertaining to the number of running lines in the main yard (namely UP Loop, Up Main, DN main and Common Loop etc.) Goods sheds/ siding, Hot Axle

siding, passing sidings, engineering sidings, sidings taking off from the yard with the details whether electrified/ non-electrified etc. and how they are isolated from the running lines should be mentioned. The information in relation to provision of low/high level platforms on the running lines/ goods sidings should be given.

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

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

2.5.2 NON RUNNING LINES AND THEIR CAPACITY IN CSR.

2.5.3 ANY SPECIAL FEATURE IN THE LAYOUT

Any special feature of the yard such as catch siding, slip mentioned.

2.6 LEVEL CROSSINGS:

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

3. SYSTEM AND MEANS OF WORKING

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

4. SYSTEM OF SIGNALLING AND INTERLOCKING

4.1 The standard of interlocking, type of signaling(MLQ/TALQ/ MAUQ/MACLS), method of operating the signals/points from lever Frames/ Control Panel/VDU/CTS, provision of axle counters/track circuits on running lines Calling-on signals/

IBS, special signaling features such as fixed Warner, stop boards at terminal stations, emergency cross-overs, permanently locked points, motor operated points at an otherwise mechanically worked stations, emergency/crank handle keys and their custody, indications (electric/banner type) of points/trap points/signals/track circuits/axle counters need to be mentioned. The detailed description of the lever Frame/control panel/Video display Unit for route setting using point/signal/gate control switches, individual operation of points, operation of gates within the station limits, setting of points using the crank handle and the maintenance of proper records of emergency operations counters provided on the panel need to be mentioned here. Procedure for working of station is provided with train protection and Warning System and Anti Collision Device need to be mentioned.

The procedure for resetting of the system in case of failure of Axle counter on berthing portion as well as IBS section, emergency operation of points, emergency route cancellation, clearing of Block etc. also need to be mentioned from operation point of view.

(Details of signaling and interlocking should, however, be given in Appendix 'B' and details of Anti Collision Device, if provided, be given in appendix 'C')

4.2 CUSTODY OF RELAY ROOM KEY AND PROCEDURE FOR ITS HANDING OVER AND TAKING OVER BETWEEN STATION MASTER AND S&T MAINTENANCE STAFF.

4.3 POWER SUPPLY

The source of power supply for signaling such as Dn At/Up At/local supply (State electricity Board) Diesel generator Instruments, whether co- operative or non co-operative/UPS/ Integrated Power Supply etc. should be mentioned here. It should be clearly mentioned whether the change over from one source of supply to the other shall be automatic or manual in case of failure of normal source of supply. The procedure for manual change over should be described.

5. TELECOMMUNICATION:

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

(i) Section Control/Dy Control/Traction Power Control Telephone, etc.

(ii) Auto/DOT Telephones

(iii) Magneto Telephone with the cabins/gates

(iv) IBS Telephone with IBS at KM…..

(v) Telephone with Axle counter reset boxes

(vi) Telephone for yard communication

(vii) VHF sets and

(viii) Mobile Train Radio Communication(MTRC)

The action to be taken in case of failure of communication given above to be clearly spelt out.

(Details of working should be given in appendix 'B'.

6. SYSTEM OF TRAIN WORKING:-

6.1 DUTIES OF TRAIN WORKING STAFF

The duties of the train working operational staff such as Station Master, Cabin Master, Cabinman, Leverman, Pointsman, Porter, Gateman fortrain operation should be mentioned in detail in Appendix 'D' giving specific references to the G&SR of the Railway and the Block Working Manual.

6.1.1 TRAIN WORKING STAFF IN EACH SHIFT

The availability of above operation staff provided at the station in each shift with their duties for working of trains should be mentioned in appendix 'D'.

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

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

6.1.3 ASSURANCE OF STAFF IN THE ASSURANCE REGISTER

Every train passing staff posted newly at the station or leave reserve staff at the station or regular staff who has resumed

his duties after more than 15 days absence must go through Station Working Rules in force and give assurance in the prescribed Assurance Register.

6.2 CONDITIONS FOR GRANTING LINE CLEAR

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

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

6.2.1.1 Setting of points against block line.

6.2.1.2 Reception of train on blocked line.

6.2.1.3 Reception of train on non- signaled line.

6.2.1.4 Despatch of train from non signaled line.

6.2.1.5 Despatch of train from line provided with common starter signal.

6.2.1.6 Any other special conditions should be mentioned giving reference to the G&SR.

6.3 CONDITION FOR TAKING 'OFF' APPROACH SIGNALS

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

6.3.1 RESPONSIBILITY OF STATION MASTER FOR RESTORATION OF SIGNALS TO 'ON'

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

6.4 SIMULTANEOUS RECEPTION/DESPATCH, CROSSING AND PRECEDENCEOF TRAINS:

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

6.5 COMPLETE ARRIVAL OF TRAINS:

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

6.6 DESPATCH OF TRAINS:

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

6.7 TRAINS RUNNING THROUGH:

The provisions given in G&SR should be mentioned.

6.8 WORKING IN CASE OF FAILURE:

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

6.9 PROVISIONS FOR WORKING OF TROLLEYS/ MOTOR TROLLEYS/MATERIAL LORRIES:

Some of the precautions as given below should be mentioned:

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

(ii) Motor trolleys/ Tower Wagon/Material Lorries are not likely to actuate the axle counter correctly. When they are to run over the section split by axle counters, the whole section to be treated as one and next train to be started after the last train has arrived complete.

(iii) In all other respects the working of a light motor trolley shall confirm to the rules laid down for ordinarily trolleys while running without block protection and to those laid down for

motor trolleys while running under block protection or following another light motor trolley or a motor trolley.

(iv)Any other restriction on movement of trolleys/motor trolleys/material lorries/tower wagons etc.

7. BLOCKING OF LINE:

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

8. SHUNTING:

8.1 General Precautions

8.2 Shunting in the face of approaching train.

8.3 Prohibition of shunting, special features in any.

8.4 Shunting on single line-

Within station section

Between Last Stop Signal and opposite First stop signal.

Beyond opposite First Stop Signal.

During failure of block instrument on single line.

8.5 Shunting on double line-

Block Back

Block forward

Following a train travelling away

Up to IBS

Beyond IBS

During failure of block instrument on double line.

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

9. ABNORMAL CONDITIONS

(a) THE RULES TO BE ONSERVED IN THE EVENT OF ABNORMAL CONDITIONS.

The procedure to be followed in the eventoffoilowing abnormal conditions should be specially mentioned.

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

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

(iii) Trains delayed in block section.

(iv) Failure/passing of Intermediate Block Stop Signal at 'ON'.

(v) Failure of axle Counter Block /BPAC.

(vi) Failure of MTRC.

(b) PROCEDURE FOR EMERGENCY OPERATION OF POINTS BY CRANK HANDLE.

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

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

(c) CERTIFICATION OF CLEARANCE OF TRACK BEFORE CALLING ON SIGNAL OPERATION IN INITIALED.

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

(d) REPORTING FAILURE OF POINTS, TRACK CIRCUIT/ AXLE COUNTER AND INTERLOCKING.

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

(ii) The entries in failure register to the don e with message to the section controller.

9.1 TOTAL FAILURE OF COMMUNICATION

Provision of the SR and instructions laid down in Block working Manual relating to the working of trains during total failure of communication at the station should be briefly summed up

giving the action to be taken and by whom and what precaution to be taken giving reference to the relevant provisions of the G&SR.

9.2 TEMPORARY SINGLE LINE WORKING ON DOUBLE LINE SECTION

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

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

10. VISIBILITY TEST OBJECT.

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

11. ESSENTIAL EQUIPMENTS AT THE STATION

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

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

In foggy or tempestuous weather or in dust storm when V.T.O cannot be seen from the SM's office, the SM shall send trained men to act as for signalmen, instruction regarding their selection from traffic and Engineering Departments, entry of their names in the Fog Register and taking assurance by the SM to be mentioned clearly.

20.05 Appendices to the Station Working Rules-

Appendix 'A Working of level crossing gates.

Appendix 'B' System of signaling and interlocking and communication arrangements at the station.

Appendix 'C' Anti collision device (Raksha Kavach)

Appendix 'D' duties of train passing staff and staff in each shift.

Appendix 'E' List of essential equipments provided at the station.

Appendix 'F' Rules for working of DK stations, Halts, IBH, IBS and outlying sidings.

Appendix 'G' Rules for working of trains in electrified sections.

(To be jointly signed by Divisional Operations Manager and Divisional Electrical Engineer)

20.06 Use of Crack Handle for Motor operated points:-

At stations where points are operated by electric Motors the following procedure shall be observed in case of failure of such point(s).

(a) At stations where points are worked by means of electric points Motors as in the case of Panel/Route Relay interlocking, in the event of their failure the point can be operated locally by using crank handle(s). For this purpose, separate crank handle for each point or a common handle for group of points will be provided according to the design of interlocking at the stations. These crank handles are interlocked with the signals and are housed in the appropriate interlocking box(s) or electrical apparatus. In the event of failure of point/motor, to set the point(s) manually, Emergency Crank Handle may be taken out from the interlocking box(s) or electrical apparatus.

(b) In the event of failure/defect of electrically operated point(s) trains may be received/dispatched on signals after manual operation of points by the emergency crank handle(s), which is/are interlocked with the signals provided-

(i) The Station Master deputes a responsible operating official with the crank handle to operate the defective motor operated point manually. The emergency crank handle can either be personally handed over or electrically transmitted to him (when such facility is provided) by the Station Master/ Asstt. Station Master /Cabinman/ Leverman on duty with instructions to set the defective point(s) to the desired Pintsman (viz. normal or reverse), the facing and trailing points must be clamped and padlocked. The operating official so

deputed, after complying with such instructions should return the emergency crank handle either personally or transmit electrically to the Station Master/Asstt. Station Master/ Cabinman/Leverman on duty, in-charge of operation.

(c) The Station Master/Asstt. Station Master/Cabinman/ Leverman on duty should verify from the visual indication available on the panel other means that the points are set to the desired position as instructed by him (normal or reverse) and thereafter return the crank handle received by him to the appropriate interlocking box.

(d) He should verify from the operating official deputed to set the defective point(s) that the same is also clamped and padlocked, supported by a Private Number in case of electrical transmission of the crank handles or by obtaining the signature of the operating official in the crank handle register.

(e) The Station Master/Asstt. Station Master/Cabinman/ Leverman on duty ensuring the correct setting of defective point(s) as required in paras (b), (c) & (d) above can take off the concerned signals for movement of the trains over the said point(s).

(f) If even after complying with the instructions contained in paras (b) to (e) by Station Master/Asstt. Station Master/ Cabinman/Leverman on duty, the correct setting of the defective points to the desired position is not indicated in the visual indication provided; the train will be piloted in and out in terms of GR 3.69 & GR 3.70 and SRs there to.

Note:- (a) The cases of failures of motor operated point(s) should be promptly reported to the SE/JE(signal) concerned for immediate rectification of the same.

(a) Whenever an emergency crank handle is required to be used by a signal official for maintenance work or in the event of failures, the signal officials will give a disconnection memo to the Station Master on duty and after making necessary entries in the Emergency crank Handle Register and then handover to him Emergency crank Handle(s) is / are returned to the Station Master on duty.

(b) Whenever Emergency Crank Handle(s) is/are handed over to a signal official for maintenance work or for rectification

of failure, the points for the affected lines should be treated as non-interlocked and the Station Master on duty is responsible for introduction of non interlocked working and trains will be piloted in and out after clamping and padlocking the points over which the train is to pass as per GR 3.69 & GR 3.70 and SRs there to.

(c) An Emergency Crank Handle Register should be maintained in the following proforma by the Station Master on duty wherein the particulars of the usage of Emergency Crank Handle must be recorded:-

(1) Date

(2) Point no. which failed or is required to be tested.

(3) Time of failure.

(4) Disconnection memo no. received from S&T staff.

(5) Signature of Pointsman/Signal official to whom the Emergency Crank Handle is handed over/Transmitted.

(6) Time Emergency Crank Handle is sent out/Transmitted.

(7) Signature of the Pointsman to ensure correct setting, clamping of the points.

(8) Date and time fault rectified.

(9) Time Emergency Crank Handle received back by the Station Master on duty.

(10) Signature and designation of the signal official who rectified the fault.

(11) Remarks.

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CHAPTER - XXI

FIRE FIGHTING

21.01 Introductory.-

Safety against fire hazards of passengers and goods entrusted to the Railway is of the utmost importance and Railway staff should ensure that all precautions are taken to avoid losses caused by fire.

21.02 (A) Civil Fire stations: - Civil fire services are available at: - Raigarh, Champa, Bilaspur, Raipur, Nagpur. Chhindwara, Katni.

(B) Fire fighting appliances such as chemical fire extinguishers and fire buckets are provided at all the stations whereas fire hydrant equipments are provided at certain stations.

(C) A chart showing the respective Railway and P& T telephone numbers, fire appliances and the sources of water supply available for fighting fires should be exhibited conspicuously at all stations, yards, sheds offices etc.

In the event of a fire, information shall be sent to the nearest civil fire station expeditiously. Railway staff should take the help of all available fire fighting equipment to extinguish the fire. They should also render full assistance to the civil fire brigade for extinguishing the fire.

21.03. Fire Fighting equipments.-

(a) DCPT fire extinguisher. This is dry chemical powder type fire extinguisher, 5kgs weight, ISO: 2171/1985 dry chemical powder to IS: 4308/1982, Gas cartridge for fire extinguisher to IS: 4947/1982. The fire extinguisher should be completed with dry chemical powder, cartridge and fitted with high pressure discharge hose with brass nozzle and gun metal cap.

(b)(i)Fire fighting appliances should be kept in places easily accessible and the staff must know the location where the fire appliances like hydrant hose-pipe,, extinguishers, buckets, etc are installed.

(ii) All Station Masters and Supervisors concerned shall maintain a list of the fire fighting equipment available at their station / sheds offices and all the staff working under them must be conversant with the use of the same.

(iii) The Station Master and Supervisors concerned shall see that the Water buckets and sand buckets are properly kept filled with water and sand respectively. They should give prompt information to the official in charge of the (Fire station) of the jurisdiction whenever the fire extinguisher is used or in case of any defect or deficiency in fire fighting appliances.

21.04. Fire Prevention.-

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

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

(i) Smoking or lighting a flame at places where it is prohibited should be strictly avoided.

(ii) Ash trays should be provided and use at places where smoking is not prohibited.

(iii) Burning Cigarettes, Biris etc. or Match sticks should not be thrown out without ensuring that they have been completely extinguished.

(iv) Places of work should be kept clean and free from waste paper, cuttings, scrap, Rubbish etc.

(v) Dust bins must be provided for throwing scraps and combustible waste materials and these should be kept at a safe distance from the building.

(vi) Overloading of electric circuit should be avoided and electrical installations should be checked periodically.

(vii) Petrol, paints, explosive materials and gases should not be kept in stores and godown which do not conform to the standard specification for such storage as specified in IRCA Red Tariff.

(viii)Adequate number of fire buckets and fire extinguishers for offices, stores, workshops and shed etc, should be provided.

(ix) Fire fighting appliances should be periodically checked and all staff trained in their proper use.

(x) Rules for marshalling and shunting of inflammables, explosives and other dangerous goods as laid down in the IRCA Red Tariff and Chapter VI of the Operating Manual should be strictly observed.

(xi) Supervisory staff should ensure that the staff working under them are conscious of fire hazards. Posters issued from time to time for prevention of fire should be exhibited conspicuously. Circulars and standing orders issued from time to time on this subject are to be read, noted and strictly followed by the railway staff.

(xii) Supervisory staff must ensure that while dealing with wagons containing explosives, petroleum, kerosene and other dangerous or inflammable goods, the rules in this regard contained in the IRCA Red Traiff are stricly adhered to.

21.05. Fire extinguishers in Coaching trains.-

(a) Fire extinguishers are provided in each brakevan/power car of all coaching trains, RMS Vans, Dining/Pantry Cars, A.C. Coaches, Non AC coachesand Inspection Carriages.

(b) *In brake van of coaching trains:-*

(i) The SSE/SE/JE(C&W) at originating station shall be responsible for the maintenance of required stock in good condition and supply of fire extinguishers in brakevan of passenger carrying trains. Each brakevan (SLR) shall be provided with 2 numbers DCPT type Fire extinguishers.

(ii) A serial number with the depot station code should be painted on each fire extinguisher.

(iii) A register for the fire extinguisters of the brakevan should be maintained at the respective base station. The particulars of movement of fire extinguishers and servicing should be entered in this register.

(iv) The SSE/SE/JE(C&W) will take signature of the Guard in a register maintained at the originating station while handing overthe fire extinguishers in the brakevan. Similarly, the Guard will also take the signature of SSE/ SE/JE(C&W) while returning them.

(v) Guards working coaching trains must verify before starting their trains from the originating station that the fire extinguishers are supplied and seems to be in working order. In case of any defect or deficiency, the Guard must bring it to the notice of SS/SM/ GASM/Train Inspector who will arrange for immediate replacement. If a passenger carrying train leaves the originating station without fire extinguishers the SM/SMR should send a report to Sr. DOM/DOM for immediate further action.

(vi) When the Guard of the train changes, the fire extinguishers should be handed over to the out going Guard by the incoming Guard with acknowledgement duly signed. But at interchange point with other Railway, the fire: extinguishers should be taken over by the SSE/SE/JE(C&W) from the incoming Guard and handed over to the Guard of the pairing train. To keep such particulars of taking over and handing over, a register should be maintained and Guard's signature obtained therein.

(vii) A spare stock of fire extinguishers should be maintained by the SM/SS of all base stations so that in case of any fire extinguisher found defective or deficient it may be replaced readily.

(viii) The sectional DTI, Safety Counsellor, Fire Inspector and other officials will frequently conduct check in regard to provision of fire extinguishers in Brakevan.

(ix) In case a coaching train terminates at an intermediate station for any reason, the SSE/ SE/JE(C&W) will arrange to

take over the fire extinguishers from the Guard and send them to the base statior in consultation with, the Sectional Controller.

(x) The case of non-receipt of fire extinguishers at the Terminal/originating station or at junction / interchange Point, though supplied to the brakevan should be reported by the SS/SM of Terminal/originating station to all concerned officials for necessary action.

(c) In RMS Van, A. C. Coach, Inspection Carriage and Dining Car.

(i) Train Examiners at the originating stations are responsible for the maintenance of required stock in good condition and supply of the fire extinguisher in RMS Van, A.C. Coach, Inspection Carriage and Dining Car.

(ii) The Train Examiner at the originating station shall make an entry in the DRS card regarding the supply of fire extinguisher in above mentioned coaches.

(iii) At interchange points with other Zonal Railways, the SE/JE(C&W) should see that the fire extinguishers are removed from the RMS Van & despatched by the pairing train. The fire extinguishers in A.C. Coaches, Inspection carriages and Dining Cars will continue to be pooled through in the custody of Caretakers, Saloon attendants, Dining Car Manager etc.

(iv) If the Postal vans are vacated by the postal staff at an intermediate station for any reason the SE/JE(C&W) on duty will check up the fire extinguisher, take it over and send it to the base station. In case such intermediate station is not provided with SE/JE(C&W) this responsibility will devolve on the Station Master.

(v) Procedure indicated in item b(ii), b(iii) and b (iv) of this rule should be followed for these extinguishers. But SE/ JE(C&W) will be responsible for such maintenance job.

(vi) So long the fire extinguishers are in the RMS Van, A.C. Coach, Inspection Carriage and Dining Car, the official-in-charge of these coaches will be the custodian of the

extinguishers. They will be responsible to see that the extinguishers are kept carefully and ready for use. If any defect is noticed, the matter must be reported promptly to the official concerned for early action.

(vii)The SE/JE(C&W) in-charge while taking over the fire extinguishers from RMS Van, A.C. Coach, Inspection Carriage and Dining Car must examine the proper condition of the same and take immediate action in case any defect is noticed.

(viii) Provision of Fire Extinguishers in different locations:-

(A) DCPT fire Extinguishers to be provided in the trains in scale given below:-

(i) Each Elec./Diesel Loco: 4 Nos., (2 in each Cabin Elec.)

(ii) Each brakevan (Fornt and rear) : 2 Nos. each.

(iii) In AC Coaches: 2 Nos.

(iv) Each Pantry Car: 4 Nos.

(v) Each Generator Car: 4 Nos.

(vi) Each Motorman Cabin of EMU Coaches & MEMU coaches: 2 Nos.

(B) The provision of Fire Extinguishers at static locations:-

Nature of occupancies have been classified into LH-Low Hazard, HH-High Hazard and SH-Spl. Hazard and OH-ordinary Hazard categories and fire risk have been classified into A, B, C and D categories. As per these classifications the recommended scale of equipment to be installed at different locations is as follows:-

Class of fire risk	Nature of occupancies	Typical examples	Scale of equipment to be installed
A	NE	(i) Loading Houses, Private Dwellings, Dermitories. Apartment Houses. Filats, Hotels, etc. (II) Vocations! Training Institutes. Commercial Institutes. (iii) Small printing presses. (iv) Exhibition Halls, Club rooms, Restaurants. Assembly Halls, having accomodation of less than 300 persons.	One 5 kg capacity DCPT extinguisher for every 600 sq. meter of floor area or part there of with minimum of 2 extinguisher per compartment or floor of the building. These should be so located as to be available within 25 meters radius.
	HO	(i) Multistoried Buildings, High Risk Buildings, etc. (ii) Schools and Colleges. (iii) Hospitals (iv) Theatres, Assembly Halls, Exhibition	Two 5 kg capacity DCPT extinguisher for every 600 sq. meter of floor area or part there of with minimum of 4extinguisher per compartment or floor of the building these should be so located

Class of fire risk	Nature of occupancies	Typical examples	Scale of equipment to be installed
^		Halls, Museums, Resturants, Places of Worship, Club Room, Dance Halls, etc. having seating capacity of less than 1000 persons.	as to be available within 15 meters radius.
m		(i) Theatres, Assemply Halls, exhibition Halls Museums, Restuarants, Places of Worship, Club Rooms, Dance Halls, etc. having seating capacity of over 100 persons. (ii) Large Timber Yards, Godowns. Ware Houses storing combustible materials. Freight Depots, etc.	Provision as per OH occupancy, plus one 10-kg capacity DCPT extinguisher for every 100 sq. meter of floor area or part thereof.
o	SH	Office, Record Rooms, Archives, Libraries. DTP Centres. Computer Installations. Museums, etc.	One 5 kg capacity DCPT type extinguisher for every 100 sq. meter for floor area or part there of with minimum of 2 extinguishers

Class of fire risk	Nature of occupancies	Typical examples	Scale of equipment to be installed
			per compartment or floor of the building. These should be so located as to be available within 10 meters radius.
o	OH	Not concerned with railway locations.	
	HH	Storage and handling of gas cylinders in bulk.	Two 10 kg capacity DC PT extinguishers for every 100 sq. meter of floor area or part there of with minimum of 3 extinguishers of the same type for every room/ compartment. These should be avalable within 10 meters radius.
	SH	Not concerned with railway locations.	

Note : In case the area is more than specified, higher capacity extinguishers can be used on these minimum requirements, i.e. proportionately higher capacity can be used. In case of dry powder type, equivalent lower capacity can also be used.

(C)Power cars & Pantry cars of SECR are equipped with automatic fire detection and suppression system and non AC coaches are provided with anti theft fire extinguisher.

21.06. Custody and maintenance of fire fighting appliances:-

(i) Official-in-charge of offices, yards, sheds etc. where these appliances are provided will be responsible for the upkeep and safe custody of the fire appliances supplied to them. A proper account should be maintained in the "Dead stock register".

(ii) Cases of loss or theft of the fire appliances should promptly be reported to the RPF / Inspector, Officer In-charge/ RPF and GRP including the controlling authority of the respective department and the in-charge will, arrange to replace the same from his on hand stock or place indents to COS/BSP for replacement.

(iii) In case of any defect in fire fighting appliances is noticed the inspecting official and the controlling officer of the department to be informed and the in-charge should arrange repairing or replacement of the same.

(iv) Painting and numbering of the Fire fighting appliances shall be done by the in-charge of the department / shed / station / Yard and / or the custodian of the appliance. However, the procedure mentioned in rule 21.05 above should be followed as regards custody and maintenance of the Extinguishers for brakevans, RMS vans, Dining Cars, AC Coaches and Inspection Carriages except item(iii) which is to be replaced as follows:-

A register for the fire extinguishers should be maintained at the respective base stations/Sheds. The particulars of movement of fire extinguishers and servicing made should be entered in the register.

(v) Annual Maintenance Contract- Up keep and maintenance/ replacement of fire extinguishers as per

schedule (Quarterly) may be entrusted to Outside Agencies under supervision of Mechanical Department of division.

21.07. Arrangements necessary for effective fire fighting:-

(i) Sketch plan showing the arrangement of water supply should be exhibited at administrative buildings, stations, yards, sheds and offices.

(ii) Water supply arrangements should be made promptly as required by the fire service.

(iii) Water reserved for fire fighting must not be used for any other purposes.

(iv) The approach road to the water supply point must be kept clear.

(v) The water supply points should be inspected twice in a month by the SSE/SE/JE(Works) or his assistant. The hydrants inside the workshops should be inspected similarly by the foreman or his assistant.

21.08. Training in Fire Fighting:-

Staff attending Zonal Railway Training Institute/MDZTI/ Divisional Training Centre/ Divisional Traffic Training Centre and Electric Loco Centre should be imparted training on fire fighting though lectures and practical demonstrations. Principal/ZRTI/MDZTI/DTC/DTTC/ELTC shall co-ordinate with the Sr. DSO/DSO or Sr. DSC / DSC of division to requisition Civil Defence Instructors or qualified RPF staff, from the division to impart such training as per requirement. They should also nominate instructors to undergo training on fire fighting in nominated Training Centers, in co-ordination with Personal Department. These trained instructors shall conduct fire-fighting training for trainees. Necessary fire fighting equipment, for the purpose of practical demonstrations, shall be collected by Principal ZRTI /MDZTI/ DTC/DTTC/ELTC from the stores.

For the staff, who do not attend the Training Centers / Schools necessary training programme may be chalked out by concerned departmental officers of the division in co-ordination with Sr. DSO / DSO/Sr.DSC/DSC from time to time.

21.09. Fire Drill :-

(i) Fire drills will be held every Saturday in order to make the staff more disciplined, conversant with fire fighting technique and to infuse consciousness about fire hazards.

(ii) Station Masters and respective supervisors, will be responsible for holding fire drills.

(iii) The R.P. F: personnel must join the drill and assist with their technical advice to make the drill a success.

(iv) A record of each fire drill conducted is to be maintained in a register/diary by the Station Masters/Supervisors.

(v) Safety meeting will be organized once in a every month at all the stations to discuss on different safety issues among the staff. A record of each safety meeting is to be maintained in a register by the Station Master/Supervisorand acknowledgement of staff must be taken.

21.10. Fire alarms.-

A proper fire alarm is the quickest means to warn staff about the out break of fire. On noticing a fire, the alarm is to be rung or sounded at once. As soon as a fire breaks out, any of the following fire alarm as provided shall be used immediately:-

(i) Electric Siren	Should be sounded continuously for 5 minutes.	
(ii) Shed Hooter	-do-	-do-
(iii) Engine Whistle	-do-	-do-
(iv) Hand Bell (made of B.G. Rail piece)	-do-	-do-
(v) Electric Fire Bell	Button should be pressed to 'ON' to ring the fire alarm bell continuously for 3 minutes.	

21.11. Action to be taken in case of fire:-

(a) *Any staff whether on or off duty noticing fire shall:-*

(i) Raise the fire alarm immediately.

(ii) Take all possible action to extinguish the fire without any loss of time.

(iii) Use the available fire extinguishing appliances properly and promptly.

(iv) Inform the nearest "Civil Fire Station" by the quickest means about the exact location and type of property involved.

(b) Immediate information should also be given to police Station, RPF post, SSE / SE (Works) and concerned Railway officials of the department whose property is involved in the fire.

(c) The senior most Railway official present at the site of fire shall see that every action is being taken to extinguish the fire also to prevent theft and other miscreant activities. RPF /Police official present at the site of fire will be responsible to guard the property during the occurrence and after. The senior most fire fighting official present at the site of fire, will ensure proper utilization of the Fire fighting facilities.

(d) As faras practicable, the documents and all moveable property adjacent to the fire, should be removed to a safer place under the direction of the responsible staff of the department concerned. A list of the property/documents so removed should be prepared in duplicate.

(e) In case of fire in a sealed wagon, the seals, locks / rivets should be immediately broken (in absence of key of the lock) and the door opened in presence of Station Master /Yard Master/ Goods Supervisor/ Goods Clerk as the case may be or in presence of Guard when fire on a wagon is in mid-section.

(f) As soon as fire breaks out in the yard, all shunting operation in the vicinity of the affected area should be stopped except *for* removal of all coaches and wagons *from* either side of the affected wagon(s)/ Coaches(s). Wherever possible, the affected wagon(s)/ Coach(s) should be immediately drawn out and placed under the water column or nearest to the hydrant.

(g) In case of fire on train or on sleeper, the train staff and Station Master on duty shall also take the action as mentioned in GR 6.10, SR 6.10.01 or SR 6.10.02 as the case may be.

(h) In the event of fire on any part of traction electrical equipment or electrical engine, action as indicated in GR 6.10, SR 6.10.03, 6.10.04 & 6.10.05 shall be taken.

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CHAPTER - XXII

DUTIES AND RESPONSIBILITIES OF STAFF

22.01. Introductory-

In addition to such duties and responsibilities as may be entrusted to individual Railway staff under G & S R, Block Working Manual and such other Rule Books and instructions as may be in force from time to time, the Railway staff will also be responsible for observing the instructions contained in this Chapter.

22.02. Wearing of Uniform -

(a) Every Railway servant who is provided with uniform must appear in full uniform when on duty and attending any enquiry or Training School or appearing before selection Board. Those who have not been supplied with uniform must come on duty properly and clearly dressed.

(b) Guards of all trains before coming on the platform/ yard for taking charge of trains shall wear their uniforms as prescribed by the administration.

(c) Station and other staff must be neatly and cleanly dressed in full uniform particularly at the time of passing trains of any kind.

(d) It is the duty and responsibility of each Railway servant to get their uniform properly cleaned and ironed before use.

22.03. Attendance of Guards-

(a) It must be distinctly understood that Guards are liable to be called upon for duty at any time.

(b) The plotting of the names of Guards in the Station Roster will be considered sufficient intimation that their services are required at short notice.

(c) Guards, though they may be scheduled to work a certain train, should not absent themselves from Railway Quarters or their fixed residence on the strength of such schedule without giving the Station Master/Chief Controller/ Yard Master (who may be controlling the Guards) notice of where they may be found if required in any emergency. The

Guard booked for any train should be prepared to work any other train, should it be necessary.

(d) Booking of Guard shall be done two hours before completion of their Headquarter/Outstation rest through SMS instead of Call Book serving. When unable to go out with a train for which they may be in turn owing to sickness, they must give timely notice (at least four hours before completion of rest) of the fact to the Station Master/Yard Master/Lobby In-Charge/Chief Crew Controller in order that arrangements may be made to fill their places.

The SMS call shall be sent to Guard on his/her mobile no. mentioned in the CMS bio-data CUG number field from the Combined Crew Lobby. The Guard shall acknowledge receipt of information to confirm the delivery of the message. If the Guard acknowledges the SMS by replying back as YES, then the status of the Guard shall be changed to BOOKED from CALLED and the Guard can then Sign ON into the crew console. The SMS is retried every 5 minutes two times. The Guard can acknowledge the call in any of the time slots. If the end of 15 minutes no acknowledgement is received from the Guard the message appears as a failed message and then Guard would be treated as not turned up for duty.

In case of CMS failure the call shall be served through mobile phone.

(e) (i) All T.O.'s should be conveyed through CMS/FOIS by Divisional Control Office to the respective lobbies. In case of failure of CMS/FOIS system the T.O.'s may be conveyed telephonically to the lobbies by T.O. Clerk/TLC.

(ii) Use of CTR is dispensed with and entries filled in 'Trip Sheet' including shunting hours and shunting kms to be fed in to CMS directly at the time of 'Signing Off' by concerned running staff. This would interalia also include the Energy Meter readings and the use of Diesel Locos the HSD consumption as well as refueling details if any. Detailed procedure for conveying the T.O.'s to the lobbies will be issued separately as a JPO by CELE and CFTM.

(iii) All running staff will 'Sign On' and 'Sign Off' in CMS as well as in Chalak Dal App only. If CMS and Chalak Dal App are failed then 'Sign On' and 'Sign Off' may be done manually.

(f) Guards absent from duty without leave or medical certificate from a Railway Medical Officer will render themselves liable to punishment.

22.04. Guard's responsibility regarding equipment.-

(a) Every Guard before taking over a train shall ensure that his equipment and brakevan equipment (in case of train carrying Passengers) are complete and in good condition. The loss, damage or deficiency of any item as mentioned in G.R. 4.19 and SRs thereto must be promptly reported by the Guard to the Chief Controller / Station Master/Chief Yard Master/ Yard Master concerned.

(b) It will be the personal responsibility of the Guard to keep his Rule books corrected upto date.

(c) List of Brake Van equipment for Coaching trains is as follows:-

Sl. No.	Item	No.	Item
1	Portable Control Telephone	2	Jr. Eng. (Tele)
2	Portable Trains Lighting Equipment	1	Jr. Eng. (Elec. G)
3	Portable Fire extinguisher	2	Jr. Eng. (C&W)
4	Wooden wedges/Skids	2	Jr. Eng. (C&W)
5	Stretcher	1	SS/SM
6	Rope ladders with suitable hooks	2	Jr. Eng. (C&W)

Equipment would be loaded and run on end to end basis and will be kept in the Cup Board provided in the Brake Van in locked condition by universal key.

No Coaching train shall start without full complement of Brake Van equipment.

Proper arrangement in the form of closed Cup Board would be provided in the SLR by Mechanical Deptt. for keeping the Brake Van equipment in locked condition.

In case of non-availability of Guard in the front Guard Van it would be pad locked and the key should be kept with the Guard of the train to avoid application of Brakes by outsiders.

22.05. Duties of Guards when taking over charge of a train.-

All Guards while taking over charge of trains in addition to the stipulation in GR 4.34 and SRs thereto shall ensure that-

(a) The vehicle guidance/Wagon Way bill of the train is collected and personally satisfy by actual check that the vehicles/wagons as per vehicle guidance/wagon way bill are correct on train and lablels of wagons, seals and rivets of sealed wagons 'are intact.

(b) The doors of all goods wagons are properly closed / secured and fastened.

(c) All the screw couplings on train are tightened properly without slackness.

(d) The brakevan is fitted with air pressure indicator and pressure available as mentioned in Para 17.02 of this Manual.

(e) The train is provided with prescribed brake power as indicated in Para 17.04.

(f) The train is not wrongly marshaled. In case of any defect or deficiency with the train or wagon/ vehicle, it must atonce be brought to the notice of the Station Master or Yard Master as the case may be and the defect/ deficiency made good. If the defect or deficiency is such as would interfere with the safe running/working of the train, the train shall not be allowed to leave the Station/Yard until the defect/ deficiency has been removed or the wagon/vehicle concerned has been detached. Refer GR 4.35 and SRs thereto.

22.06. Guard's duties in regard to lost articles.-

(a) On arrival of a Passenger train at its destination, the incoming Guard or Assistant Guard shall, in company with the RPF examine all carriages to see if any property has been left behind by passengers, and, if so, hand it over to the Station Master, who must give the Guard a receipt for the same, which will be attached to his Train Report. In the case of Goods

vehicles all locks, seals and rivets must be carefully examined and necessary seal memo obtained from the RPF staff.

(b) Whenever any lost property is found in a carriage on a train at a road-side station, it is the duty of the Guard in-charge of the train to report the matter to the Station Master in writing, and then take the article in his van to the next Guard-changing or terminal station -where it should be handed over to the Station Master who will enter it in the Station Lost property Register, and get the signature of the Guard against the entry.

(c) Guards working sidings in the colliery or industrial areas and on other sections of the line must pick up and make over to the nearest Station Master and articles of Railway material that may be found lying around the sidings and all such materials must promptly be forwarded to the nearest " Train Examiner. The train should not, however, be stopped out of course for the purpose except in the case of materials of great value. Information, in other cases, may be given to the Station Master of the next station for advising the Permanent Way gang.

22.07. Guard's duties in respect of vehicles/ wagons attached / detached.-

Guards in charge of trains shall enter the number, owning Railway and description of all vehicles/wagons attached to their trains and the names of the stations to and from which booked, in their Guard Memo Book. Those particulars must be taken by Guards direct from the labels affixed to the vehicles/wagons on their trains and not merely copied from the Wagon Way bills prepared by the Trains Clerk. Guards shall further carefully check the entries in the Wagons Way bills with the particulars shown in the labels and see that the labels contain necessary particulars and that there is a label on each side, and that the door seals and rivets on both sides of sealed wagons are intact. Should any mistake or deficiency be discovered the Station Master or the Trains Clerk shall be asked to rectify the same and until this is done the train must not be started. Similarly, the Guard must record in the Wagon Way bills the particulars of wagons detached and also record the same on the Guard Memo Book.

22.08. Guards, responsibility in respect of train papers.-

(a) The Guard in charge of the train will be responsible to maintain the Guard Memo Book and keep it up-to date during the journey of the train. At guard-changing station, the Wagon Way Bill/Vehicle consists, DRS cards, Way-bills, Summaries etc, must be carefully examined by the Guards when handing over and taking over charge, and any discrepancy or remarks recorded should be jointly signed by the relieving and the relieved Guard.

(b) *Reports at destination-*

(i) Guards shall prepare and hand over at the end of their journey(before they go off duty) to the Control office, Station Master, Trains Clerk, Roster Clerk according to the local orders in force, the following train paper and obtain signature in Guard memo book :-

For Goods Trains	Wagon Way Bill/ Vehicle guidance consist, Train report.
For Tranship Trains	Wagon Way Bill/ Vehicle guidance consists, road van summaries and Tranship Guard memo book.
For Coaching Trains (viz, Mail, Express, Passengers, Mixed and Local Trains) ...	Wagon Way Bill/ Vehicle guidance coonsist, Train report.

(ii) In addition the Guards of coaching trains shall hand over the Summaries of Parcels and Luggage etc, to the Station Master/ Parcel Clerk/Booking Clerk at the destination station.

(iii) In case of local trains, such as those running between Raipur and Durg, Bilaspur and Korba or Raigarh or any intermediate station or any other trains tuned to make short trips, the train reports may be made out for each round trip.

(iv) While preparing the train report the Guard must also indicate if any special load on train, such as live stock, perishable or oversize, Inspection Carriage or reserved carriage etc.

or any unusual occurrence or any deficiency in rolling stock, weather, condition, shunting by train engine etc.

(v) The train report of material train should be prepared after a day's work is finished and handed over to the Station Master / Train Clerk / Roster Clerk as the case may be at stabling station.

(vi) At the close of each day these documents must be submitted duly entered in transmit memo to the official concerned. All concerned must take special care in preparing and submission of these documents.

22.09. Travelling on foot-boards of trains in motion-

(a) Under no circumstances is anyone to ride on or walk along the foot-board of any Passenger train when the same is in motion. The Train Guard and the TTEs on the trains and the Station Masters on duty at starting and stopping stations must ensure this.

(b) Staff and licensed coolies are forbidden to jump on to the foot-boards of carriages or to run along side trains entering stations; they must take up their proper position on the platform and wait there until the train comes to a stand. The Station Master on duty at the station will ensure this.

22.10. Attendance of Crew at Sheds-

(a) It must be distinctly understood that engine crew are liable to be called up at any time for duty.

(b) The booking of engine crew in the "Shed duty list" exhibited in the running shed, will be considered sufficient intimation that their services are required. In the case of illiterate staff, the SSE/ SE(Loco) or the Shedman must personally explain to him his position for duty as shown in the "Shed duty list".

(c) Engine crew, though scheduled to work a certain train, should not absent themselves from Railway premisesortheir fixed residence on the strength of such schedule without giving the SSE/ SE(Loco) or the Crew Controller or SSE/SE(Elect.) notice of where they may be found if required in an emergency. The Loco crew booked by a certain train should be prepared to work any othertrain, when called upon to do

so by the SSE/SE(Loco)/SSE/SE(Elect.), Crew Controller or the Power Controller on duty.

(d) Booking of crew shall be done two hours before completion of their Headquarter/Outstation rest through SMS instead of Call Book serving. When unable to go out with a train for which they may be in turn owing to sickness, they must give timely notice (at least four hours before completion of rest) of the fact to the Lobby In-Charge/Chief Crew Controller in order that arrangements may be made to fill their places.

The SMS call shall be sent to Crew on his/her mobile no. mentioned in the CMS bio-data CUG number field from the Combined Crew Lobby. The Crew shall acknowledge receipt of information to confirm the delivery of the message. If the Crew acknowledges the SMS by replying back as YES, then the status of the Crew shall be changed to BOOKED from CALLED and the Crew can then Sign ON into the crew console. The SMS is retried every 5 minutes two times. The Crew can acknowledge the call in any of the time slots. If the end of 15 minutes no acknowledgement is received from the Crew the message appears as a failed message and then Crew would be treated as not turned up for duty.

In case of CMS failure the call shall be served through mobile phone.

(e) (i) All T.O.'s should be conveyed through CMS/FOIS by Divisional Control office to the respective lobbies. In case of failure of CMS/FOIS system the T.O.'s may be conveyed telephonically to the lobbies by T.O. Clerk/TLC.

(ii) Use of CTR is dispensed with and entries filled in 'Trip Sheet' including shunting hours and shunting kms to be fed in to CMS directly at the time of 'Signing Off' by concerned running staff. This would interalia also include the Energy Meter readings and the use of Diesel Locos the HSD consumption as well as refueling details if any. Detailed procedure for conveying the T.O.'s to the lobbies will be issued separately as a JPO by CELE and CFTM.

(iii) All running staff will 'Sign On' and 'Sign Off' in CMS as well as in Chalak Dal App only. If CMS and Chalak Dal App are failed then 'Sign On' and 'Sign Off' may be done manually.

(f) Engine crew absent from duty, without leave or medical certificate from a Railway Medical Officer, will render themselves liable to punishment.

22.11. Time allowed to Loco Pilots for examining / making over engines.-

Loco Pilots must examine their engines before leaving the Shed. The time allowed to outgoing Loco Pilots for examining the engines before departure from shed and to incoming Loco Pilots to make over their engines after return to the Loco limits will be prescribed for each Shed by the Divisional Railway Manager. The Loco Pilots must ensure that the time is not exceeded. Refer S.R.4.04.03 in this connection.

22.12. Time allowed for the engines between Shed and yard.-

(a) Each Divisional Railway Manager will prescribe the time allowed for outgoing engine to travel from shed and the incoming engine to travel from the yard to the shed. The Loco Pilots must ensure that the time is not exceeded.

(b) It will be the responsibility of the Station Master/Yard Master on duty for movement of engine to ensure that an outgoing engine is taken out from shed immediately if it is ready and the incoming train engine is released for Shed without undue delay.

(c) The Loco Pilots must record detention in his diary, if any.

(d) The time ahead of the scheduled departure of trains by which the outgoing engine is to be ready at Shed. The Loco Pilots must ensure that the outgoing engine is ready within the time prescribed. Any failure of the engine, time must be recorded in his diary.

(e) The movementof engines in big yardswill be controlled by Shunt signals and other signals. The Loco Pilots must make themselves conversant with the same and move their engines accordingly.

Note : Further details about the duties and responsibilities of Loco Pilots have been given in Loco Pilots' Rule Book.

22.13. Attaching engine on train.-

Whenever any engine with or without vehicle / vehicles is/are to be attached on to a train enroute or during shunting at road-side station, care must be taken to come on to the train/vehicle with great caution and to avoid bump. Refer GR 4.32 &S.R.4.32.01 and S.R.5.13.04.

22.14. Warning bell and instructions to staff:-

(a) *Incoming train:-* As soon as "Line clear" has been given for an incoming stopping passenger carrying train, the Station Master on duty must get Warning Bell rung, and arrange for the description of the train (Mail, Passenger or Mixed) and the name of the station from which it has left to be called out loudly for the information of the public and the station staff. Warning Bell as per schedule codes should also be given when the train leaves the station in rear.

(b) Continuous Warning Bell will be sounded for the guidance of the public as soon as the incoming train is in sight.

(c) *Outgoing train:-In* the case of outgoing trains having halts of less than 10 mts. the Starting Bell shall be rung just before the departure to warn the passengers. At originating stations or at stations having halt of 10 mts. or more, Warning Bell (quick continuous beats for 2 seconds) will be sounded five minutes before the departure, and starting Bell shall be rung just before the departure of the train.

Note: (i) No bell required for non-stopping passenger carrying trains or special trains.

(ii) At stations having public announcement arrangements, particulars of trains leaving the station in rear, the time at which they left and the departure of outgoing trains shall also be announced through Loud speaker.

22.15. Station bell signal for incoming and outgoing trains:-

The following signals are to be given on the station bell fortrains carrying passengers:-

At stations not provided with PA system the following bell code should be followed.

The following signals are to be given on the station bell for trains carrying passengers:-

Activity	UpTrain	Dn Train
Line clear given for a train to the station in rear	Sharp continuous beats for 3 seconds followed by two strokes. (********** **)	Sharp continuous beats for 3 seconds followed by one stroke. (********** *)
Train left station in rear	Two stoke pause two strokes. (** **)	Three strokes. (** *)
Train approaching	Sharp continuous beat for a second. (********** ***)	Sharp continuous beat for a second. (********** ***)
Before starting	Two stroke pause two stroke pause two strokes. (** ** **)	Three stroke pause three stroke pause three strokes. (** ** **)

22.16 Points not to be altered under moving vehicles.-

Station Master/Yard Master must carefully train their staff like Pointsmen, Points Lockers, Token Porters, Cabinman and Cabin Master etc. and impress upon them that they must not alter the points, even if they have set the points wrongly, while vehicles or engines are moving over them, but must show a danger signal to warn the Loco Pilot and the Guard so as to bring the engine/Trains to a halt.

22.17. Inspection of Guards'/Loco Pilots' equipment by CSM/SM/CYM/YM/SSE/SE (Loco).-

(a) The articles of personal equipment in the possession of Guards must be carefully inspected at least once in three months by the Station Master /CYM/ Yard Master of their headquarters station and a report submitted to the Sr. Divisional Operations Manager / Divisional Operations Manager / Divisional Safety Officers by the 10th of the following month. Similarly the equipment of the Loco Pilots must be inspected once in three months by the SSE/ SE(Loco)/Crew Controller, SSE/SE(Elect.) and a report submitted to the Divisional Mechanical. Engineer/DEE (RS). Any deficiency must be made good immediately, raising debit against the staff at fault in case of loss or damage.

(b) Inspectors and Officers must check up the equipment of Guards/ Loco Pilots as frequently as possible and take up cases of deficiencies.

22. 18. Care of passenger carriages.-

(a) Station Master must see that carriages cut off at stations are swept and cleaned at once and the doors and windows are closed and locked immediately after they are vacated. The coaches detached or attached at a station shall not be allowed to be occupied by the passengers beyond the periods prescribed in local orders to be issued by the Divisional Railway Manager.

(b) The cleaning of all coaching vehicles must be done by the Train Examiner's staff and/or train cleaning staff (outsourced) but the Station Master must see that the work has been duly and efficiently performed, and must bring any case of neglect to the notice of the Divisional Mechanical Engineer and the Divisional Commercial Manager.

All refuse cotton, jute, hay etc. should be swept out of coaching stock properly before they are attached to train or before allowing the rake for outward movement.

(c) Carriage cleaners and fitters are deputed to travel by a few important trains. It is the duty of the Guard, Conductors and Station Master to ensure that they attend to the cleaning of carriages and minor repairs to carriages and electric fittings in coaches on the run and at stopping stations, as required.

(d) The C&W staff will be responsible for switching off the electric lights and fans, also for closing and locking of the doors and windows of empty/ coaching stock stable at stations or before allowing the empty stock to run. In case the passenger coach is detached or rake is stabled at a station not provided with TXR staff, the Station Master is responsible to ensure this. No person shall be allowed to stay in empty coaching stock or travel therein.

(e) Whenever any upper class carriage is not occupied the conductor and Traveling Ticket Examiner shall arrange to close the doors and windows and switch off the electric fans, and shall also see that no unauthorized person travels therein.

(f) RPF staff have been specially deputed on certain sections to guard the coaches and fittings on run and in stations yards.

22.19. Closing and securing of doors of goods stock.-

The main responsibility to ensure the closing and securing of doors of goods stock before any wagon is attached to train or shunted lies with the Station Master or Yard Master as the case may be. At a station or in a siding where goods Clerk or Goods Supervisor is posted, he will be responsible for ensuring that the doors of wagons are properly closed and secured immediately on completion of loading/ unloading. The Train Examiner will also be responsible to see before issuing the certificate at the examination point of the train that the doors are properly closed and secured. Guards before starting the train from the originating station must ensure that the doors of all the wagons are properly closed and secured. Guards of all pilots, work trains etc, before drawing out wagons from the siding shall also ensure that the doors are closed and secured. If any wagon(s) is/ are observed by the Guard in door-open condition after starting from a Station/Yard/Siding and likely to cause unsafe condition, the train should be stopped immediately and door(s) closed/secured. In case, closing/securing of door(s) is/are not possible, the train may be taken carefully with such restricted speed as considered necessary by the Loco Pilot and Guard to the next station where steps should be taken to have the door(s) closed/ secured properly.

22.20. Obstruction on running line.-

(a) Station Masters will not allow any packages or material to be so unloaded as to interfere with any signal rodding or wires or running line. Any consignment unloaded should be well away from the platform copying, running line and signal rodding or wire so that there is no chance of its infringing the moving dimensions either where unloaded or by shifting due to vibration. They will make the staff under-stand the importance of this precaution and ensure it. In Goods sheds and Parcels sidings the Goods Clark/Parcel Clerk will be responsible for ensuring this.

(b) In a Private siding where the Goods Clerk/ Goods Supervisor is provided, he will be responsible to see all the packages / materials are kept well away from the line so that

there is no chance of infringement of moving dimensions. The siding authority will be responsible to ensure this aspect in addition with Railway staff.

22.21. Responsibility of Station Masters and others for Railway property (Carriage and wagon materials).-

(a) Station Masters of stations where there is no Train Examining staff must be assisted by Goods Supervisor/clerk (where posted) in collecting all wagon materials that may be lying about their yards and forwarding the same with the least possible delay to the nearest Train Examiner.

(b) Wagon fittings or other Railway materials must on no account be sent to the Lost Property Office.

(c) In order to avoid loss in transit, Carriage and wagon materials picked up in yards or received from SSE/SE/ JE(P.Way) or Guards are to be dispatched to SSE/SE/ JE(C&W) under Free Service Way Bill.

(d) All inspectorial staff when visiting stationswill make it a special item of check to see that any rolling stock material or couplings which may be lying about on the platform or in the yard are sent to the nearest SSE/SE/JE(C&W) without delay.

(e) The Permanent Way staff and trolley holders will specially look for wagon fittings like brake blocks, dynamo, belts, etc. falling off on the run, while working / trollying, collect the same and make them over to the nearest Station Master to be disposed of as per sub-clause (c) above.

(f) All Railway staff must do all in their power to stop theft of fittings of vehicles/wagons/Track/and to prevent trespassers from entering yards and station limits. The assistance of the RPF / Police should be taken whenever required.

22.22. Safety of passengers.-

(a) The Station Master must impress upon their subordinate staff as far as possible, the urgency of advising the passengers not to entrain or detrain when the train is in motion.

(b) Passengers must be prohibited from crossing the line in the face of an approaching train. At stations having over-bridges / subways, crossing the lines must not be allowed. At stations not having over- bridges / subways, only the "authorised crossing place" at the end of the platform ramps where sleeper- paths are provided shall be used.

(c) Announcement through Loud Speaker for the purpose of item (a) and (b) above should be done whenever such facility is available.

(d) A Railway employee must not, under any circumstances, assist in or connive at, any infringement. But all Railway employees must exercise discretion in interference is with persons who may appear to be about to place themselves in danger by breaking the rules laid down for the public safety. When any interfering likely to increase the risk to which they have exposed themselves, the action on behalf of the Railway servant must be confined to such precautions as will minimise the risk. But after the danger is over, steps should betaken, as far as possible, for the punishment of the offender.

For example, if a passenger about to enter a vehicle in motion has approached so near to it that interference with him seems to be dangerous, he must be left alone, but if he succeeds in entering the train unhurt, such particulars must be sent forward as will facilitate his detention and punishment.

It is noticed that a passenger, while attempting to enter the train, misses his footing or is otherwise in imminent peril, the train must be stopped immediately, and the passenger assisted, if possible, to a position of safety; but nothing must be done to confuse him or in any other way add to his risk.

Similarly, when prompt action will stop a passenger alighting from a vehicle in motion, without adding to the danger of his position, such action may be taken; otherwise he must not be interfered with till he has alighted, after which steps must be taken for his prosecution.

(e) Whenever platforms, buildings, approach roads, etc. are under repairs, and there is any possibility of passengers or others failling into openings or against temporary

obstructions, red lamps should be placed around those parts by the staff employed on the work. The openings should be fenced around. The area should be adequately lighted. Under no circumstances should trolleys, ladders or other things likely to interfere with or injure the passengers moving on the platforms be kept collected at a corner away from the place where the passengers entrain or detrain. The Station Master will remove the parcels/goods unloaded from trains promptly to the shed or else keep them stacked in one corner away from the portions of the platforms, used by passengers for entraining or detraining.

(f) The Conductor and Travelling Ticket Examiners of the trains must keep a vigilant look-out at all halting station on upper class carriages, especially at night, and any suspicious characters found loitering on the platform or off the platform should be tactfully and politely questioned, their tickets checked, etc. to find out their bonafide. In addition, the Conductor should also occasionally peep out on the side opposite to the platform through any of the compartments of the train and satisfy himself that there is no doubtful character loitering about.

(g) The Station Staff, Assistant Station Masters, Trains Examining Staff and other staff of the station should also be on the look out and defect doubtful characters loitering either on or off the platforms. No persons other than the Railway staff on duty should be permitted at night time to be on the off side of the train.

(h) The Guard, Loco Pilot, Fireman and other Railway staff working the train should also keep a vigilant look out in this respect as far as possible and without any detriment to their normal duties.

(i) At stations having GRP out posts, it is the duty of the GRP in-charge to post constables to guard the off-side of stopping Passenger trains. The Station Master should follow up with the officer-in- charge if this is not being done.

(j) Attendants have been provided in Air- conditioned and corridor coaches. The Conductor, Guard, Station Master and other supervisory staff, Inspectors and Officers must ensure

by frequent checks that they are vigilant and do not allow any unauthorized person to travel in the compartments.

(k) All supervisors should emphasize upon the station staff at stations and upon the running staff of the trains concerned that it is the duty of every Railway staff to do everything possible to ensure the safe journey of the passengers.

22.23. Safety of Female Passengers.-

(a) Gurads of Passenger carrying trains will examine fastenings of windows and doors of 'LADIES' compartments when taking over their trains and will ensure that any defects observed are brought to the notice of the Carriage Staff, and put right or secured in a manner to ensure safety before the train starts.

(b) Guards of trains are required to pay special attention, whenever time permits, to all 'LADIES' compartments, and at the request of the occupants, to lock the doors of such compartments at night, and be on the alert to open the same when required. The Conductors by Mail and Express trains must pay particular attention to the ladies compartments at stopping stations.

(c) Guards shall inform the Travelling Beat Constable if any, in the train by making an entry in his beat book about the train number, date and the number or numbers of carriages in which accommodation is reserved for ladies and initial the entry so that the constable can keep special watch over the same. The Guard must similarly advise the RPF staff, if any, escorting the train of the ladies compartments on the train and advise them to keep a special watch. The Guard should also advise the constable or RPF staff to keep particular watch on the ladies' compartments if any safety fitting of any such compartment is defective or not working properly.

(d) The Travelling Ticket Examining staff will be particularly vigilant to ensure that no male person entres or travels in the ladies' compartment.

22.24. Passengers to be courteously treated.-

(a) All passengers shall be treated with utmost courtesy and every assistance and protection afforded to them while

on Railway premises. Every supervisory staff must impress upon his subordinates the importance of this and take stern action against any staff failing to comply with the same.

(b) Public complaint books have been provided at stations and also with the Conductor Guards. The same should be made available to the public as required. The complaints recorded should be attended to at once and causes of complaints removed. It must be the endeavour of every Railway employee to avoid public complaint, but should an occasion arise for any passenger to record a complaint, he must be given all facilities to record the same and the complaints recorded dealt with as per extent, orders issued by the Chief Commercial Manager.

(c) Railway employees shall give their names and designation when asked to do so. The staff scheduled to wear badges or scrolls must have them on without fail when on duty. The staff dealing with the public must be in prescribed uniform.

(d) Station Masters shall see that each member of the staff under their control having dealings with passengers is acquainted with the times of arrival at and departure from their stations of all Passenger trains and also stoppages enroute and instruct them that they should answer any query on the subject by the public in a prompt and courteous manner. The Passenger Guides posted at the station must specially look to the difficulties of lower class passengers confused in the maze of multiple trains by moving up and down at busy stations. All supervisory staff, Inspectors and Officers must pay particular attention to ensure that the staff perform the duties enumerated above creditably.

(e) The Station Masters shall ensure that the Railway staff vendors or licensed porters do not make any unnecessary noise on platforms, particularly at night.

(f) The Station Master on duty and the Guards of the Passenger carrying trains shall see that specified stopping time is allowed at the stations to enable Passengers to alight and entrain safety. In case the specified time is considered insufficient, they should submit a special report in this regard

to the senior most Divisional Operations Manager of the Division.

22.25 - Display of new signals and sectional gradients-

Divisions shall ensure display of the location of new signals and sectional gradients in the crew booking offices, so that running staff will get prior information about the new infrastructure in the section with augmented sections, such as $2^{nd}/3^{rd}/4^{th}$ line and automatic sections in small stretches.

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CHAPTER - XXIII

INSPECTION

23.01 Objects of Inspections :

The Railway network is spread over a vast area. It is estimated that for running a train over a section, cooperation and co-ordination of about (2000) thousand Railway staff is essential. A vast organisation, such as the Indian Railway system functions on the basis of a carefully arranged system of selective Autonomy, Accountability and Responsibility. Rules and instructions lay down the procedure of work and the staff are properly trained and the officials at various levels monitor, supervise and direct the staff from time to time by different means. Inspection is an important function of management, particularly in the field of Railway Operations to ensure efficient working at all levels.

Following objects shall be borne in mind while conducting inspection:

1 .Verify whether every Railway employee is fully conversant with rules, instructions and procedures relating to his duties.

2. Ascertain that the staff is performing their duties according to rules, instructions and the procedure in force.

3. Detect undesirable shortcuts, irregularities or unsafe practices being resorted to by the staff taking remedial action which may be:-

(a) Educative, in case these are resorted to out of ignorance.

(b) Corrective, if there is something wrong in the working conditions, or there are system deficiencies.

(c) Punitive, if resorted to wilfully or negligently and persisting even after repeated guidance and counselling.

4. Observe the conditions actually prevailing at the work spots to understand the difficulties experienced by staff including their personal grievances and seeking on the spot redressal.

5. Ensure that full complement of staff and equipment is available and staff have knowledge of its operation.

6. Ascertain that registers, documents and other records are being maintained and preserved according to instructions.

7. Monitor the behaviour of staff towards customers, particularly promptness of response and willingness to help.

8. Assess as far as possible that the interest of the public and the Railways are kept in view and afeguarded.

9. Inculcate discipline and build up the morale of the workers.

10. Check the compliance of previous inspection reports.

11. Analyse efficiency targets vis-a-vis performance.

Inspections thus provide the means to achieve efficiency and effectiveness through spot checks and personal contact with the staff on line. In order to accomplish these objectives, inspections have to be carried out at officer's and Supervisor's level. The inspecting official has to command the respect and obedience of staff, for his inspection to be effective and beneficial and as such his conduct should be exemplary.

23.02 Types of Inspections:

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

(A) Regular Inspection (six monthly)-

Each station on the division must be inspected in details at least once in every six months i.e. January to June and July to December covering the various aspects of safety, operations and allied matters including staff matters. The inspection shall be carried out by the Sr.DOM/DOM/Sr.DSO/DSO/AOM/ARM/ SS/SM/DTI/TI etc. While minor stations are inspected by the TI concerned, the DRM will nominate important stations (including all such stations which do not fall within the jurisdiction of TI, that is those which have SS/ SM in grade equivalent to or higher than those of TI of the section)to be inspected by the nominate officers. Each officers will be allotted at least two such a stations. The officials concern shall also spend the night at the station. Regular inspections have to be comprehensive in nature.

Safety Inspections (monthly) -Safety inspections are basically meant to be preventive by detecting short cut methods and unsafe practices resorted to by train passing, running and

maintenance staff. The irregularities noticed must be personally brought to the notice of the Station Master and remedial measures initiated promptly. In case of any serious irregularity, the inspecting officials must at once inform Sr.DSO/DSO orSr.DOM/ DOM concerned personally or telephonically beside making a written report.

(B) Surprise Inspection (Monthly)

Such inspections must have an element of surprise. Officers and Inspectors may inspect a station eitherwhile passing through it or during the short time at their disposal or when they want to check some aspect at the station without prior notice. Apart from any special aspect, they intend to check; they must also observe and take note of the irregularities/ deficiencies or good work being done which may come to their notice. They may check as many items as possible as time permits. Minimum 6 such inspections in a month shall be conducted by the sectional TL

In the automatic signalling territory, besides surprise inspections, ambush checks should also be conducted to check whether the Loco pilots / Motormen are observing the rules regarding passing of automatic signal at 'ON' position etc.

Similarly loco pilots' whistling at whistle boards on approach of LC gates also needs to be checked

(C) Night Inspection (fortnightly) -

Night inspection must be carried out by the Officers and Supervisors frequently to appreciate the working conditions as well as to detect the irregularities.

Surprise night inspection may be carried out between 00 hrs. to 4 hrs. because during this period, the staff is likely to be lethargic and negligent in duties. Similarly, instances of staff sleeping on duty, dim signal lamps and indicators, unauthorized absence from duty and many other irregularities, unsafe and undesirable practices may come to notice between 00 hrs. to 4 hrs. Frequent night inspections are a must and SS/SM must conduct surprise night inspections fortnightly of their station between 00 to 4 hrs. and take remedial measures to rectify the irregularities and deficiencies noticed.

(D) Level Crossing Inspections -

Level crossing gates should be inspected in detail with a view to

ensure safety of rail and road traffic, availability of safety equipments, knowledge of Gatemen regarding rules pertaining to his duties and loco pilot's whistling while passing the LC gates.

(E) Surprise Inspection by Road -

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

(F) Footplate Inspections -

Footplate Inspections are carried out by travelling on the engine of running trains. These afford an opportunity to the inspecting official to observe and check certain aspect of working on the engine, along the track and at the stations which can not be checked otherwise. To achieve the purpose for which footplate inspections are carried out, it is essential that these are done by day and by night, in clear weather and when the visibility is poor due to thick, foggy or tempestuous weather.

(G) Joint Footplate Inspections -

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

(H) Surprise Speed checks-

In order to ensure the maximum permissible speed are not exceeded, permanent and temporary speed restrictions are correctly observed and limits of speed over turnouts and facing points are observed. Surprise speed checks should be conducted as per schedule.

(I) Running Rooms Inspections-

During regular, safety, surprise and night inspections opportunity should also be taken to inspect running rooms to ensure that running staff are able to get proper food and resting facilities. Running rooms should also be jointly inspected by the team of officers as nominated and prescribed.

(J) Ambush checks -

It is essential to ensure rigid observation of rules when automatic

stop signals are passed in 'ON' position.

The inspecting officials should carry out ambush checks with the help of signalling officials who will arrange to put an automatic stop signal to 'ON' position. Such checks should be arranged in consultation with Sr.DOM/DOM.

(K) Running Trains Inspections-

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

(L) Loco shed inspections -

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

(M) C & W Depots inspections - Each C & W depot shall be inspected once in 3 months individually as well as jointly.

(N) Accident Relief/Medical Equipment Scale I (ARME)-

Each Medical Van shall be inspected once in 3 months (see Accident Manual).

(O) Accident Relief Train (ART)-

Each Break down train shall be inspected once in 3 months (see Accident Manual).

23.03 Inspection Quota:

Monthly quota of inspections for Operating Officers at the Zonal Headquarter:-

- The above schedule should contain at least one night inspection.

Grade	No. of Inspection	Areas of Inspections
PHOD/CHOD	1	Station/Cabin/ LCs/Running Room/Foot plate, etc.
SAG	2	Station/Cabin/ LCs/Running Room/Foot plate
SG/JAG	3	Station/Cabin/ LCs/Running Room/Foot plate
SS/JS	4	Station/Cabin/ LCs/Running Room/Foot plate

Monthly quota of inspections for Supervisors at the Zonal Headquarter-

Type of Inspections	Departments					
	Optg	Meeh.	Elec.	S&T	Safety	Engg.
Detailed	2	2	2	2	4	2
Surprise	4	4	4	4	7	2
Night	4	3	3	4	4	4
Footplate	3	4	4	4	5	3

Monthly quota of inspections for Operating officers at Divisions:-

Designation	Station	LC	Footplate by		Surprise Road Inspection
			Goods	Coaching	
Sr.DOM/DOM	2	2	2	1	1
ARM/AARM/AO	3	3	3	1	1
AOM	3	3	3	1	-
Sr. DOM(G)/DOM(G) (Where available)	6	2	2	1	1

Monthly quota of inspections for Operating Supervisors at Divisions:-

Type of Inspections	No. of Inspection to be done
Station	4
Station Night Inspection	3
Cabin Inspection	4
Footplate	4
Crew booking Lobby	2
Running Room	1
Personal equipment of Guard & Equipment of Brake van	4
Manned LC Gate	2

Note The Inspection of Officers must include one surprise Night Inspection per month, i.e. the inspection should be conducted between 00.00 hrs and 04.00 hrs.

23.04 General Guidelines for Inspecting Official:

1. Before commencing the inspection all inspection books should be called for and the notes made by other inspecting official should be carefully perused to check whether the staff have complied with their instructions. If any of these instructions have not been carried out written explanation of the Station Master should be obtained.

2. It shall not be enough merely to point out the irregularity of the staff; matters must be put right personally while at the station to the extent possible.

3.All books and registers inspected must be initialed and dated.

23.05 Technique of Inspections:

It requires both expertise and experience to carry out intelligent inspections. To evolve a sound technique of inspections an inspecting official should:

1. Have a clear understanding of the station layout its signalling, special features of working and the instructions in regard to reception, despatch, crossing, shunting and running through of trains. For this he should have a good knowledge of not only General & Subsidiary Rules but also of Station Working Rules.

2.Select the feature of working which he intends to check during his inspection and should have a clear conception about them in his mind. For instance he may like to emphasise on the correct reception and despatch of trains and observance of safety rules by the staff or on utilisation of stock, detention to passenger or goods train, knowledge of staff etc.

3. Inspect the aspect of working by thorough inspection of books, registers, forms and equipments used for operations and secondly by means of personal observation of actual operations.

4. Be selective in choosing:

(a)The time and operations of personal observation.

(b) The documents, registers and forms for checks and cross checks.

(c) The equipments for checking, its availability, adequacy, maintenance and its use.

5. Select specific periods for checking registers books and forms keeping in view the purpose of inspection and time of inspections and time of disposal, should be subjected to concentrated, minute and probing checks and cross checks. It may be worthwhile to select two or more separate periods. One of these being that immediately preceding the day of inspection. This will help him in not only detecting the irregularities being committed but also whether these have been continuing for the past some time.

6. Discuss the irregularities or lapses noticed during inspection with the staff actually doing the work as well as those supervising their work. Such a discussion will prove to be educative and produce useful results.

7. Discuss, as far as possible, the points common to two or more branches, like the Signalling Interlocking branch or Loco Train Examining, Civil Engineering and Commercial Branches jointly for objectivity and acceptable solutions. This will help in not only arriving at correct conclusions and forming sound views but also in avoiding unnecessary correspondence.

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CHAPTER - XXIV

FRIGHT OPERATIONS INFORMATIONS SYSTEM (FOIS)

24.01 INTRODUCTION

In keeping with global trend, there has been a long outstanding demand of the industry trade for transparency in sharing of information to give the customers an up-to date business like environment. Railways in this millennium have decided not only to perform the traditional tasks of carrying passengers and goods efficiently, but also to change the mindset of working as a closed system. The great concern to improve on its market share has prompted Railways to have a multi pronged approach to its freight policy.

Continuous Cargo Visibility has always been a critical component of the Supply chain Distribution Management System.

To achieve this, out of the stated multi pronged new freight policy, a lot of emphasis has been laid on establishing a computerized FREIGHT OPERATIONS INFORMATIONS SYSTEMS (FOIS). The system indigenously developed is fully functional in the B.G. system of Indian Railways being the first of its kind in South East Asia.

24.02 Freight Operations Information Systems Mission - FOIS

To give a total transparent system with continuous Cargo visibility and an up-to date business environment to the Customers with instant access to information regarding their consignments in' transit for just in time inventory'.

FOIS is an On-line Real-Time system based on absolute current State of Art Technology and efficient Communication system.

A management tool to optimize utilization of costly assets and resources by improving the distribution of Rakes/Wagons & Locos, and also scheduling and Routing Traffic in an optimized cost effective manner.

Provides Continuous Cargo Visibility and enables the Freight customers to have instant access to information regarding

the current status of their consignments in transit for just in time inventory.

24.03 Strategic Advantages Derived From the FOIS System :

- Extension of the current business practice from bulk movement of freight traffic in train load formations to piecemeal traffic by clubbing and moving together similar type of stock in 'Hub & Spoke' arrangement to increase its market share by re diverting high profit yielding piecemeal cargo from road to rail.
- Global tracking of consignments in real time Rakes or individual wagons.
- The insight and pipeline ofconsignments thus captured on the entire BG network is made available for timely planning and just in time inventory management on a time span cargo movement which may extend to 2 to 5 days from origin to destination.
- Facilitate acceptance (customer's orders), billing and cash accountal of freight traffic from identified nodal customer centers which may not necessarily be the handling terminals.
- Extension of such facilities to customer's premises and introduction of e-commerce, benefiting both IRand the trade & industry, by eliminating manual transactions which necessarily add to the burden of logistics management.
- Providing requisite Foundation for a total logistics system furnishing real time information of the chain of physical distribution, an essential element in reducing inventory costs.

24.04 Scope of FOIS Systems

Presently two subsystems of FOIS are already in use after extensive field trials and validation.

RMS

TMS

a) Rake Management Systems -RMS

❖ Rake based consignment tracking and pipeline

❖ Train/Rake operation

- ❖ Stock Holding in terms of summary of wagon types
- ❖ Train and stock Interchange
- ❖ Terminal Handling performance
- ❖ Loco holding, outage and power on-line
- ❖ Reporting to take care of Train/Load on summary basis
- ❖ Invoice based consignment tracking
- ❖ Wagon wise Stock Holding
- ❖ Reporting of consist Wagon wise
- ❖ Invoice based loading originating tonnage and revenues.
- ❖ Wagon wise Interchange
- ❖ Statement of missing Wagons/wrongly delivered

b) Terminal Management Systems - TMS

- ❖ Computerized booking and delivery of consignment
- ❖ Station Accounting
- ❖ RR generation/Transmission
- ❖ Improved Customer Interface

C) Crew Management has been developed & is under implementation. Control charting of trains currently being done manually will also be integrated with FOIS.

The above two sub systems have been fully developed and tested and are ready for implementation.

24.05 FOIS Design Architecture

FOIS is designed and developed in conformity with the state of art technology which is scalable, aintainable, with open systems architecture and is based on the Indian Railways organizational hierarchy, its present and future requirements. Based on the business processes that are being adopted, the business model developed in the FOIS IT architecture is based on the assumptions: -

The current business practice of bulk movement in rake formation is the accepted norm for future also. Around 80 to 85% of traffic already moves in Rake, majority of which comprises similar type of rolling stock.

Global perception is more important, with respect to tracking of consignment and Rakes rather than of individual wagon, locomotive and train. The insight and pipeline of consignment and rakes should be seamlessly available. Railways would like to share information on booking and movement of consignments with individual customers also.

The operations and data capturing, will remain control centric fortrain, rake locomotive and stock management and terminal centric for booking, loading, unloading, and delivery. Taking Into account the spatial distribution of activities, which need to be captured?

Integrity of Operation and Commercial data is an- absolute necessity. RMS and TMS application are conceptualized, to provide the integration with the other subsystems as and when these are developed.

FOIS ultimately expects an event driven Integrated reporting in real time, beginning with the tendering of Forwarding note to loading and generation of invoice, followed by load consists, train ordering and departure/arrival of load destination, unloading and delivery. The data thus captured is used for generating associated managerial reports on-line information (MIS). The data will also be used for expanding the scope to cover other functional areas of the remaining modules and can easily integrate with RMS/TMS using appropriato middle ware Technology for sharing information locally. Therefore, a strategic approach has been adopted to computerize IR operations by implementing RMS/TMS systems in a phased manner using modular approach.

24.06 FOIS System Architecture

Key components of the System Architecture

Intelligent terminals will be placed at the field locations to capture the data from the place of activity namely control offices, yards, goods sheds, C & W depot, Loco sheds etc., and connected to the identified Application Server through reliable communication links for transaction processing.

Application servers are centrally placed at CRIS office. These servers are connected to the Zonal Hd. Qrs., Divisional Control

Offices, yards, interchange points, and good sheds etc., with a reliable and integrated network. The servers are networked among themselves and to the central server for global level transactions.

The central Server provides management Reports at board level and acts as repository of all the global data and also provides global services to maintain referential integrity of the data bases including master files.

24.07 Network Topology

In view of the Centralized application architecture, a star based network topology has been designed. However, in order to provide alternate paths (to meet the up time requirement of 99.9%) from reporting locations, a mesh has been created within each zone so that every location has at least two paths to reach CRIS. Each zonal HQ has been connected to central location (CRIS) on high bandwidth pipes. In addition to this, another zonal location has been connected to CRIS using high capacity link. Hence these two high bandwidth links shall cater to the entire transaction load generated by a zone. Railway telecommunication network, leased lines, DOT, VSAT Technology as communication media has been provided for reliable and fast means of data transfer.

24.08 Phased Implementation - Approach

i) In case implementation is attempted for events of all the functions to be reported in real time, concurrently from day one, then the reporting sites to be readied, the associated communication requirements and the number of staff to be trained assume enormous proportions. To ensure that the implementation effort is within manageable limits, one way is to take up, one by one, only limited portions of geographical territory for computerization at any given time. On the other hand, if the territory is small, instances of repetitive data entry increase; resulting in redundant expenditure on reporting infrastructure that will have no use as the territory expands. At the same time, if the MIS requirements are to be met in totality, the territorial expansion must ensure that a function is implemented on end to end basis as quickly as possible, otherwise only a truncated picture will be available to various

levels of users and the benefits of computerization remain postponed till the entire Indian Railways have been covered.

ii) The FOIS comprises several subsets of functions each meeting a distinct set of objectives. Certain FOIS subsets presuppose others to be operational before they can be implemented. Loco and wagon based functions presuppose load/train/rake functions to be operational. Goods shed functions expect wagon-based functions to be in place before they can be implemented. With these assumptions the FOIS / RMS systems have been designed in a modular structure which could be taken up for implementation in a phased manner.

For example:

Phase I (PI module)

Provides facility for reporting load summary with only wagon type and number of units. Phase II (PH module)

Provides facility for reporting the consists with details of wagon numbers. Phase III (PHI module)

TMS provides facility for good shed functions and generation of RR.

24.09 Implementation Strategy

Realizing that functional phasing is the only way to keep the implementation effort within manageable limit and yet remain meaningful at every stage, FOIS software has been developed as above in three modules such that functions of global utility are implemented faster from fewer sites. It also takes into account that the beginning is made from the control offices where computer awareness is of a high order. The implementation can grow on need basis driven by the Railways themselves.

For timely completion of field implementation, the total involvement and commitment of

Railways is very essential from day one. Therefore, COM's of Railways have been given

the total responsibility and charge of implementation of FOIS, to provide for the following:-

- ❖ Railways to get staff identified and train them to work on PCs
- ❖ Railways to prepare the sites for installation of hardware including provision of electrical and civil facilities.
- ❖ Maintenance of channels & data com equipment has been given to CSR of the zones.
- ❖ CRIS would provide specifications for the same.

For facilitating this process the organization of CAO/FOIS has been strengthened and made responsible for coordination, implementation on All - India-basis.

The software implementation and maintenance shall remain the responsibility of CRIS.

Pre implementation training of the required number of staff (consisting of Core Implementers and Telecom Inspectors from each of the divisions), in RMS - phase 1 has been completed by CRIS for all the zonal railways and their divisions. However, Railways will be required to make arrangements through the Zonal Training Schools to train the remaining staff of the concerned categories.

24.10 Benefits

i) Continuous Cargo Visibility

- ❖ Rake based consignment tracking and pipeline
- ❖ Invoice based loading -Originating Tonnage & Revenue
- ❖ Information on trains on the run, the ETA at next point and the work to be performed.
- ❖ Vehicle guidance of all trains on run.
- ❖ Daily report describing the performance of all through trains operated in a controlled territory for the day.
- ❖ Actual/Estimated arrival and departure particulars for a particular train at any or all the reporting points
- ❖ Yard or on the run delay information.
- ❖ Train & stock Interchange
- ❖ Wagon wise Interchange

ii) Optimised Asset Utilisation

- Improved Locomotive Utilization by reduction in Light Engine running and reduced in effectives
- Statement of missing or wrongly delivered wagons and finally its elimination.
- Elimination of unconnected wagons
- Increased Availability of Repair Capacity
- Stock Holding
- Loco Holding

iii) Increased Revenue

Savings in wagon fleet would result in corresponding saving in the recurring cost of maintenance of wagons.

- Reduced Locomotive power and Rolling Stock Maintenance Cost
- Savings in Time & Cost of handling in yards, cost of empty haulage
- Ensures optimal crew management and monitors statutory limits, for running duty and overtime payments.
- Reduction in staff cost per unit of transportation due to improved productivity of the available manpower

iv) Improved Productivity per/man Year

Accuracy of reporting -In the Head &Hand system collecting data on telephones results in sizeable error levels, which need to be reconciled &corrected periodically .FOIS data with built in validation systems has Zero errors.

- Drudgery of manual processes like maintenance of registers etc. is eliminated.
- Particulars of crew on train with hours spent on duty.
- Re-deployment of major portion of staff involved in wagon tracing and accounts checking activities. .
- Improved Customer service and satisfaction
- Facilitation of acceptance (customer's Orders), billing and cash accountalsfrom identified nodal customer services centers and not necessarily at the handling terminals

- E-Commerce will facilitate the customers to operate from their premises for the above requirements of billing and cash accountal and thus reduce the burden of logistics management, and in addition drastically bring down the inventory costs in the entire chain of physical distribution system.
- Quick settlement of Claims
- Just in Time Inventory

v) Goods shed Operations

- Arrival particulars of Wagons
- Placement and Release Particulars
- Infonnation on demands registered and pending indents
- Preparation of Railway Receipts
- Information on Demurrage and Wharfage
- Loading Particulars Information
- Goods Shed Earning
- Information on delayed wagons and Wagons awaiting Placement/Release

24.11 Application/Software

RMS module has been developed with GUI interface which is highly interactive, very user friendly. The software is totally menu driven and navigation is through logically linked tasks. The application and front end forms for reporting events has been developed in Visual Basic and resides in the client machine located at the reporting location. Data is stored in the central server locate at CRIS.

24.12 General Concepts

A Rake is a very generalized term, which refers to any set of wagons moving together and has been identified in the system as rake. Wagons can be attached/detached to a Rake. A Rake is identified by a uniquely defined ID number, which remains unchanged through various Load/Empty cycles & movements. A Rake, when given a destination, is known as a Load. ALoad, when given a loco, is known as a Train. Thus, there can be no Train without a Load & no Load without a

Rake (except where a load is mixed and is not identified in the system as a rake). With a clear understanding of these terms, you enter data through clearly defined "'tasks".

The RMS software has two identifiable cycles-

(i) Train cycle: It starts the moment a load is identified as a train and the following tasks are used for online reporting: -

Train Ordering: TO/Call between two crew-changing points.
Train Departure: reports departure.

Train Arrival: reports arrival.

Train Run-through: reports through runs Train rerouting

(ii) Yard Cycle: It starts as soon as a terminating load a terminating load arrives at its destination ora train is cancelled, (i.e. the load is sent to load planning)and the following tasks are used forvarious online reporting:-

Load Related Tasks

Inward Number Taking: destination validates consist.

Load Planning: initial activity, following rake assignment.

Load Stabling: run/ordering termination is reported through this.

Load Diversion/Termination/Extension: reports changes in planned load destinations

Load Yarding: takes a load-to-load planning screen, but will not reflect in stabled position.

Vehicle Guidance Related Task

Consist Reporting: originating station reports summary details. (Guidance is also called as Consist).

Rake Related Tasks

Rake Formation Details: form/modify rake consist.

Movement order: facility to give advance assignments to rake
Rake Placement/Release: reporting Load/Empty cycle.

(iii) Rake Dissipation: for generating piecemeal out of rake or for doing away with a rake which has no wagons left.

After a load is made ready, loco attached and train ordered

Again the train cycle begins.

Loco Related Tasks

Attachment/Detachment of Locos.

Loco Reporting: reporting shed activities of loco.

Light Engine: reports light engine movements

Given above is the list of tasks that are to be performed on real-time basis i.e. as soon as the event takes place.

(iv) Demand:- This function is to be reported at station where the party/consignor registers his Demand for supply of Rake/ Piecemeal wagon for loading of goods. The following tasks are used for reporting this activity:-

New demand

Modify demand

Add/delete demand

Fulfilling demand

Forefeiture/Withdrawl of demand

(v) Interchange forecast:- In the system as the trains are planned, a pipeline is generated from Originating Station to destination and the position can be viewed at any point in its route. Forecast can be reported by selecting trains from the pipeline shown at the interchange point. The task used is interchange forecast reporting task;

Given below is a summarized list of entity related tasks:-

Rake Related Tasks

Rake Formation Details: form/modify rake consist.

Movement order: facility to give advance assignments to rake

Rake Placement/Release: reporting Load/Empty cycle.

Rake Merging: moving wagons from one to another rake.

Rake Dissipation: for generating piecemeal out of rake or for doing away with a rake which has no wagons left.

Load Related Tasks

Load Planning: initial activity, following rake assignment.

Load Stabling: run/ordering termination is reported through this. Inward Number Taking: destination validates consist.

Load DiversionITermination/Extension: reports changes in planned load destinations Load Yarding: similar to stabling, but will not reflect in stabled position.

Cut-in by Anival/Departure: was useful when there were non-computerized territories also. Train Related Tasks

Train Ordering: TO/Call between two crew-changing points. Train Departure: reports departure.

Train Arrival: reports arrival.

Train Run-through: reports through runs. Loco Related Tasks

Attachment/Detachment of Loco: reporting loco failure on run.

Loco Reporting: reporting shed activities of loco.

Light Engine: reports light engine movements.

Roadside/Piecemeal Wagons Related Tasks

Attachment/Detachment of Wagons en route: load & consist are automatically modified in this task.

Piecemeal Placement/Release: reports piecemeal activities. Piecemeal Sick/Fit Reporting: reports sick/fit.

Clearance of Detached Wagons: clears detached wagons. Demand: reports indents for a good shed type of loading. Vehicle Guidance Related Tasks

Consist Reporting: originating station reports summary details. (Guidance is also called as Consist)

Detentions Related Tasks

Train Detention en route: reports unscheduled stoppages.

Pre departure Detentions: reports detentions suffered by loads/ trains at yards/stations. Other Tasks

Interchange Forecast: reports daily targets, which should be frozen by noon. BPC & Crew Details: reports these details.

Modify ETA: changes ETA for a train.

Re-routing: changes path of a train while on run.

As you realize, these are all routine tasks. Besides this the divisions have to carry out some systemic tasks which help in generating MIS reports (name for reports which are not generated on online data) and some time specific reports.

24.13 TSS (Terminal Sub-Systems)

TSS (Terminal Sub-Systems) is a generic word used in FOIS to refer to PCs, Printers & UPS. This PC is used for entering (and retrieving) data. Following are the important guidelines for users.

24.14 Power Connection:

Please make sure that a data entry PC or a "Reporting Terminal" is always kept in the "ON" condition.

The power feed required is met through a 5A dedicated socket.

Please make sure that all the different PCs & Printers have a separate 5A socket. Don't use multi-plug adapters.

Also check up with the Electrical personnel as to whether your sockets have Earthing arrangement. In absence of the same, your PC may get damaged. The earthing to neutral voltage not be more than 2-3V.

It is also better to have a MCB attached to main power supply point/board.

Your AC connection & PC supply must be on different phases. This saves from fluctuations.

Your PC is not connected to the mains directly. Instead, the Power supply is routed through a UPS (Uninterrupted Power Supply). Please ensure that this is always done.

This saves your PC from power fluctuations as well as gives a power from batteries for about 20 minutes, in case of power failure. There should be a power back up, either through AT (OHE) or through Diesel Generator. The change over switch should be close to you.(care to be taken that earthing is proper) It is a healthy practice to ensure that various power chords feeding your PC, Printer etc are neatly tied together, rather than strewn all over.

If you locate your UPS very close to your monitor, the display will wobble. Please ensure that UPS & Monitor are separated by at least 24 inches.

When the PC is ON, don't try to change any connection. This applies equally to not only power connectors, but also to various chords connecting different equipments, LAN Cables etc.

When turning the PC ON, (if need arises) follow this sequence MainsgllPS gMonitorgPrintergCPU.

The reverse is followed when switching off.

24.15 Environment:

If an AC is provided, make sure that it is working properly.

AC should be on a phase different from the one feeding your PC.

The room should be kept as clean as possible. Dust, smoke particles & moisture cause maximum damage to your PC. So, don't allow any smoking, eating or drinking at the workstation.

Never clean your PC using an organic solvent (such as Colin). Always use a soft, damp, dirt-free cloth.

When the PC is not in use, keep it covered with "Dust Covers".

Make sure that the Keyboard has been supplied with a "Skin" - a tight-fitting plastic covering for Keyboard, which does not stop usage.

Your PC should not face direct sunlight. Nor should it be placed so close to window where rains can affect it.

CPU (Central Processing Unit) & Monitor should not be placed in such a way that the fans/outlets at the rear of these equipment get blocked by walls/other objects.

24.16 Virus Protection:

Viruses come to you PC through pirated softwares of games & utilities that you load. Yet another source is downloading of files from Internet. Once a virus is on a single PC of a network, it spreads on its own to the entire network. Therefore, you must not load pirated software or download wallpapers etc from Internet. .

Make sure that Virus protection files are loaded on your PC.

Please enable virus scans on data transfers, floppy drive files & CD files.

Please schedule your Virus software to run every day at a fixed time. To do this, open "My Computer".

Double Click on "Scheduled Tasks" Folder. Double Click on "Add Scheduled Task". This will activate "Schedule Task

Wizard". Click next & select the name of the Anti-Virus program given to you. Keep following the simple steps to schedule your Anti-Virus to run daily. Once scheduling is done, your PC will automatically run the program everyday at a given time, as specified by you.

There is an arrangement whereby we get updated Anti-Virus files every 3 months. These CDs are available at your Divisional HQ through OCC. You must update your anti-virus programs to enable it to take care of new viruses.

There are tell tale signs of virus on your PC. Please be on lookout for these signs, which are listed below:

- Unexplained disk drive activity light or floppy drive light
- Reduction in RAM Availability
- "File Copied" message appears without copying anything
- Failure of a memory resident program to operate properly
- System behaves slowly or in a chaotic manner
- Bad clusters on the disk
- Increased number of files on disk
- Increase in size of executable programs
- Change in file's date and time stamp, without modification
- Program running slower; taking more time
- Program/Data file corruption/disappearance

24.17 Internet Connections:

There should be no Internet connection on your PC. This restriction is applicable to everything related with Internet - email, chat, surfing etc.

Further, your PC should not have access to another network - such as Railnet. This makes the network prone to hackers & Viruses. Since the information available on FOIS is confidential, therefore hackers have to be prevented from entering our network. This is the reason for having separate LAN and Routers for FOIS.

27.18 Important Files (Software):

You work with Windows 98 (Second Edition). A quick restore CD is also available with you, along with Anti-Virus software &RMS.

Also windows back up files are normally available in the cab folder. Please ensure that none of the following files are tampered.

COMMAND.COM

IO.SYS

MSDOS.SYS

Similarly, ensure that RMS file - which resides in Program Folder of your Hard Disk -is never tampered.

24.19 Data com Equipment & Connectivity

In this chapter, we shall deal with some pertinent issues regarding Connectivity. Your PC is connected not only to adjacent PC but also to each & every PC on FOIS. (Each PC on the network, therefore, has a unique identification or Address - known as IP address). This has been achieved by using leased lines, ISDN connections & VSATs for data transfer.

This data transfer rate is higher than PRS system. Also, unlike PRS terminal, your terminal is a full-fledged independent machine. The interface is Windows, unlike text type processing in PRS.

Your PC is connected to FOIS through a Router, which is a junction between LAN (Local Area Network - connecting all PCs in your premises) & WAN (Wide Area Network - a bigger network which connects all PCs on the system). A Router does this mostly through Channels - which are connected to it using Modems. (A channel has two ends. One end is connected to Routerthrough a Modem in your premises. The other end is again connected through a Modem to the equipment of Channel Provider, at his premises. This can be S& T or BSNL or any other telephone company). Finally, a Router will have connections with your LAN (through Hub/ Switch), Modems (one for each channel), ISDN Connections (directly to Router) & VSAT (directly to Router). All this equipment is collectively referred to as Datacom Equipment.

24.20 Routers:

A Router routes the data that you want to send/receive. It is an intelligent device, unlike Hubs & Modems. The data is sent

& received in data packets. A LAN works below a Router. Data sharing between various PCs connected on a LAN is automatic & Router has no role. It is only when the data requires being sent/accessed from a remote PC/ Server - i.e. accessing WAN terminals - that Router's role assumes significance. Its IP Number specifies each Router -like all intelligent devices on a network -. This IP Number actually identifies its Ethernet port. A Router may have WAN, LAN, & VOICE port. A port is actually a point where a channel (through Modem) or LAN or ISDN or VSAT connection can connect to Router. On Railways, we have two makes of Routers supplied - Cisco & Motorola.

Router has to remain "ON" at all times.

Also ensure that the power feed is having a proper earthing arrangement. The earthing norm of 2-3V to be maintained.

Power supply to Router should be routed through a UPS. Neveroperate a Router without a UPS. Also, wide fluctuations in input voltage can damage the Router.

There should be a power back up, in addition to Normal Power Supply. This could be through Auxiliary Transformers (AT) in OHE area or through a Diesel Generator Set (DG Set). The change over switch should be accessible easily.

The Router should be kept in a dust, smoke & moisture free environment. Please use Racks provided to house the Router. Since Router is expensive & sensitive equipment which does not require daily maintenance - therefore, it is better to leave the equipment undisturbed.

Essentially Provide Air-conditioning for routers.

A Router, along with Modems should be placed at a location where it is always accessible to the user. You actually don't have to do anything with Router, but just by looking at various displays & reporting the same, you will be participating in troubleshooting. Forthis reason, you must have Router under your control and not locate it in Test Room.

Some of the Routers have a specialized Port for ISDN. (Not all Routers have it). Unlike all other terminating leads on a Router, ISDN connection gives a higher voltage (H" 100 V)

Therefore, if ISDN lead is connected to any other port, that port will burn down. Be careful. Firm connections of all chords to Router are to be ensured.

Nothing should be placed on Router.

Router should not be dragged.

24.21 Modems:

Modem (Modulator/Demodulator) is the device through which a channel connects to your Router (& through it, to your PCs on LAN). It is a very sturdy & maintenance free device. It also requires a dust & smoke free environment. It is normally housed in a Rack along with Router. A lot of information is available on its front display.

We have two types of Modems on Railway - G703 (at service provider's premises) & V35 (at our premises, with Router).

When the channel connected to a Modem is working properly, you will find both "RD" & "TD" glowing & blinking. If it is not so, then there is some problem with channel.

As always, you have to ensure that Modem is always kept "ON".

Also ensure that the power feed is having a proper earthing arrangement.

Never use a metallic brush to clean the surface. Organic solvents are also not permitted.

Since one end of a channel always resides at the channel provider's premises, therefore you must also know some simple checks to analyses the channel position. Some of these steps you take in tandem with the operator at other end, who is observing his Modem. These steps, which are invoked when the channel is down (i.e. "line protocol" is down), are Make "LL" (Local Loop) switch "ON". This gives the status of the Modem & Router. If "TD", "RD" blinks, then local equipment is OK. If it doesn't, then the problem is with Modem/Router.

In the next step, we make "RL" (Remote Loop) switch "ON". This checks the local lead condition between Modems. However, to get the response of this action, there should be

an observer at the other end. If everything is OK, then at the remote end, “RD” & ”TD” will blink. Similarly, remote end can also give a “RL”, in which you will get blinking “RD” & "TD” on your Modem, if everything is OK between two Modems.

If both “RL” & “LL” give OK results, then the problem is beyond the Modem at service provider’s end.

You have to take a docket number after registering the fault with service provider (i.e. S& T or BSNL).

If Modem at the other end is not able to execute “LL” successfully then Modem at that end is defective/improperly connected.

If all loops show positive result & line protocol is still down, try initialising Modem by switching it off & then on.

If everything gives OK & data is still not able to pass through then there may be problem with Router, Inform divisional Control.

Always ensure that all leads are firmly connected. However, no lead should be checked with power at “ON” position.

24.22 Channels:

A Channel refers to a leased line dedicated channel for data transmission. You have two types of channels - Railway & BSNL. However, as a user you don’t see a difference.

Though technically a Channel refers to a leased line channel, in this section we will also cover ISDN & VSAT in it. A channel connects your system through Modems & Routers.

In addition to leased channels, you also have ISDN connections & VSAT (Very Small Aperture Terminal) connections to enhance your Connectivity. Connectivity refers to the immediate links that your PCs on LAN (at a Node) has with neighbouring nodes. It has been planned that ideally each node has a minimum of two links, each giving a different route to your data - so that data transmission can continue even if one link is down. This is technically known as Route Diversity.

Unless a Channel is available, data will not transmit. If your node is connected through two channels & one of them is down, you will not know the difference. However, with one channel down, you are in a very precarious position as data

entry will stop as soon as the second channel even flickers. It is therefore important for you to take active interest in knowing the state of a channel. This can be done through “pinging”. Pinging is the name given to sending & receiving a test data packet from one computer to another remote PC/ Router or to any intelligent device. However, you can ping only if you know the (IP) address of remote PC or Router. These are listed in Annexure I. You can ping by following command

Start g Run gPing [IP Address of Remote Router] g OK

Only an entry like “Request Timed our or ”ttl expired in transit” indicates failure.

VSAT connections can also be pinged. Some other important points for VSATs are as follows

The data is transferred directly to CRIS SERVER. This is a sturdy system, which once stabilized, works trouble-freely.

The earthing resistance should be less than 1 ohm. Neutral to earth leakage should be 2V.

It should never work without UPS&CVT

Air-conditioning is a must.

The antennae base structure should be firmly fixed and clamped. At the time of installation it should be ensured that ODU is having its protective laminated cover (to protect it from water and dust) OR at least the rubber cap of Radio Frequency (RF) unit is in place.

There should be one ladder for antennae access.

There should be a routine of checking the equipments. It should be ensured that rubber cap of RF unit is in place and the cord going to indoor unit is firmly in place.

Similarly, ISDN connections can directly pass the data, bypassing Router (or more accurately, bypassing Routerat that node but connecting to a remote Router). Only in such ISDN connections where Routers are not provided, you will not know the status of channel through pinging.

Please ensure that ISDN connections are always with power “ON”. Also ensure that ISDN connections are not STD barred.

Though it is not possible for you to know as through which particular channel your PC is transferring data, the same is always very accurately known to Router. Depending on the channel availability, it keeps on defining the route dynamically. Thus, if ISDN is available & all other channels are down, Router shall use ISDN to transmit data. (ISDN connection can also be assigned a higher priority by configuring the Router). As soon as any of the other channels becomes stable for a predefined time interval, it again resumes data transfer through that channel, shutting off ISDN. This is what is known as programming of Router.

ISDN is a secondary channel and since its usage is very expensive so it should be used very judiciously.

24.23 LAN:

LAN connects all your PCs available at a location. However, it need not be confined to a building. It can be extended to a few kilometers (up to 6 km) also. Such extension is normally through a LAN Extender. Even if PCs are connected through LAN Extender, there is no role of Router in sharing of data among these PCs.

LAN is achieved by using the network card available on your PC. An identical work group is to be defined on each PC on the LAN so that they are “visible” to all other PCs.

While defining Network Properties on your PC, make sure that only one Gateway (i.e. IP address of your Router) is defined. Disable DNS.

A PC may be visible on a LAN. However, other PCs can use only those files, folders, drives etc of that PC which the owner of that PC has decided to “Share”. To share a file, single click on the file name, followed by right click. Select “Properties”, followed by”Sharing” tab. Share to the extent you desire.

You can decide to allow other users to even write on your Hard disk. However, you cannot differentiate between your co-users on LAN & other users on WAN!

You can also share some scarce resources - such as Printers - through this scheme.

LAN wiring consists of two parts - first, a CATS structured

cabling from Router/Hub to 1/O box (a 3" x 3" X 2" white box) & second a flexible cable from I/O box to your PC. Please ensure that all PCs at a location are connected on LAN.

Ensure that CAT5 cable is mounted on wall properly & is not hanging loosely.

Ensure that flexible chord is not stretched. Also ensure that 1/O box is located close to your PC.

Hubs/Switches are devices for connecting additional PCs to Router's LAN port. Please ensure that these are properly mounted on wall.

24.24 Uptime:

It refers to the time when a node or a channel remains available for data entry. As explained earlier, it is of utmost importance to know the status of availability of equipment for user.

You should keep records both of Channel Uptime & Node Uptime. It is easier to maintain record of Node uptime. Simply record in a register the daily position of availability of a node.

(Along with the reasons of failure for doing analysis.) It is very essential to keep check on the health of secondary channel when primary channel is up. Give summary position of the entire day to your Zonal OCC at odd hours. For finding the channel uptime, you have to schedule task of pinging, even if your Node is up. Ideally, every 4 hours, you should ping to adjacent Routers & note the result. This, compiled over entire day, will give channel availability of each channel at your Node. Record this also in a register, giving message to Zonal OCC through Messaging Feature of RMS.

There should a fixed regime of reporting of failure to be in place so that in case of a failure trouble shooting is fast.

A list of phone numbers of service provider should be readily available both at div headquarters and zonal head quarters.

You also have to keep tab on the time taken by various service providers to attend to your reports of breakdowns of Routers, Modems, UPS, Printers, PCs etc. This should be in a separate register, which is not to be reported daily to your headquarters.

24.25 Other Applications:

Do not use your FOIS network for any other regular data transfer programs. This can cause virus threats, slowing down of application, vitiate OCC tasks & mis-programming of Routers.

Within LAN, you can share information occasionally. However, running regular & heavy program may reduce the availability of system for data entry to FOIS. Please don't run any heavy or regular programs on your LAN.

Unless you procure genuine copies of software that you intend to use on a single PC, please don't load it. In any case, this should never be done on a "Reporting Terminar.

24.26 Other Networks:

Your PC should not have access to another network - such as Rail net. This makes the network prone to hackers & Viruses. Since the information available on FOIS is confidential, therefore hackers have to be prevented from entering our network. This is the reason for having separate LAN and Routers for FOIS.

Do not allow any Internet connectivity.

24.27 SYSTEM ADMINISTRATION

(A) Operational Control Center (OCC)

For successful implementation of FOIS over Indian Railways each zone shall have to undertake following responsibilities towards FOIS.

Real time updating of system data

(B) Management of Network

Maintenance of equipment - PCs, Printers, UPS, RAS, LAN extender, Routers, Switches, Hubs and associated accessories

Replacement of manual information system

(C) In service training

To achieve this each zone should deploy personnel to set up an Operational Control Centre (sufficient work charged posts have been provided and adequate staff has been trained by

CRIS). OCC will be the empowered body for prescribing and enforcing working procedures. It will also monitor performance and take appropriate (pre-emptive and remedial) measures to ensure cent percent availability of system.

OCC shall be manned round the clock to operate NMS and to provide proactive support to field reporting units (help desk) in every respect. It will have additional functionaries during day shift for management support for maintenance, analysis of system efficacy, up gradation of procedures, and escalation as may be required.

24.28 Real time updating of system data

Procedures, rolesand responsibilities should be prescribed to ensure that data is entered Into the system as soon as the physical event has occurred but definitely before the next event takes place these delays can be monitored with help of Transaction log.

(Query g Operation Control gException task g Transaction log)

Procedures should be location specific and further device specific i.e. functionary specific. Specific office orders to be issued covering every possible eventuality on a given territory with the sole objective of not allowing any data element to escape.

Participation of train staff to deliver data though train documents for both normal and abnormal working will be prescribed as local procedures. In case, when abnormal working has been introduced on account of failures, OCC to co-ordinate for proxy reporting and restoration of normal working.

Each division should nominate a Sr. supervisorwho shall be responsible for timely update over his division and accountable to OCC. Reporting terminals have been provided at divisional and sub control offices, in yard locations, (terminals are provided at the place where all the information required to be input is available). Control Office will report for non device locations. The entire gamut of reporting to the system is to be engineered around these terminals, which must be manned round the clock.

Procedures should also be prescribed for reporting in case any failure affects data entry from the nominated device beyond two hours.

Each division shall have a predetermined reporting regime in case of failure. In such cases data should be entered from a pre-defined alternative device at that location/site or from the reporting devices at another location by following the mechanism of proxy reporting. Proxy reporting will be possible through the permission of zonal OCC who will enable the nominated device to report for the failed location/site. Proxy reporting regime can be devised on the following lines:

a) If at a location, terminal/s have failed, reporting will be done through remaining terminals at that location/site.

b) At a location there may be several sites. If a particular site has failed, proxy reporting will be done through a nominated site.

c) In case offailure at yard -Divisional Control or sub control office will report

d) In case of failure at Division - Zonal OCC will report

e) In case of failure of complete Zone - Disaster management will come in use.

24.29 Management of Network: -

Having route/media diversity and adequate spare equipment has provided sufficient redundancy. It should always be ensured that redundancies are always in working order. Monitoring the functioning of Network with the help of NMS software installed is also the function of zonal OCC that has to be manned round the clock on a continuous basis. It will include-

Ensuring that primary and secondary data and voice channels are in working condition. If your node is connected through two channels & one of them is down, you will not know the difference. However, with one channel down, you are in a very precarious position, as data entry will stop as soon as the second channel even flickers. It is therefore important for you to take active interest in knowing the state of a channel. This can be done through “pinging”. Pinging is the name given

to sending & receiving a test data packet from one computer to another remote PC/Router or to any intelligent device. However, you can ping only if you know the (IP) address of remote PC or Router, list of IP addresses of your zone should be available with OCC. You can ping by following command

Start gRun g Ping [IP Address of Device] gOK

For finding the channel uptime, you have to schedule task of pinging, even if your Node is up.

Ideally, every 4 hours, you should ping to adjacent Routers & note the result. This, compiled over entire day, will give channel availability of each channel at your Node.

Registering complaints for channels that are not working and following up for rectification. Liaison with both BSNL and railways for the above.

Routers have been configured to route data on a predetermined priority. Rerouting and load balancing will have to be done through OSPF (Open Shortest Pathfinder) on the NMS and need basis.

Analysis of network failures for identifying problematic links for up gradation.

Monitoring payment processes of rentals of communication channels.

Trouble shooting for other equipment failures in association with central OCC and ordering its replacement from the spares:

24.30 Maintenance of equipment:

Regarding maintenance of equipments, OCC shall keep a record of hardware components provided at each locations/ sites and their failures at zonal headquarters and its division. Repairswill be through maintenance contracts.

A PC breakdown (either Monitor or CPU or UPS) is crucial as it affects data entry. However, you must first make sure that there is no such problem, which cannot be fixed locally. Please check for power chord, operating system & RMS program. (A step-by-step procedure is given in Annexure -III. If all of these are there & still your PC does not respond, bring it to

the knowledge of Divisional HQ. At each site you have one extra PC, complete in all respects, to take care of such eventuality. Replace the defective PC with this stand-by. Finally, report the failure to concerned vendor or as prescribed by the maintenance practice of that div/zone . Addresses of vendors should be readily available.

OCC should prescribe spare maintenance practices on their respective zones.

The following points should be kept in mind before prescribing any spare maintenance practice: -

I Uptime requirement of location

I Accessibility of vendor from a location

I Sourcing of spares may be done from a central point ideally a big city were vendor services are available readily.

In house skills would be confined to troubleshooting and to replacement of equipment out of spares. NMS software also helps in troubleshooting. Vendors with whom AMC has been drawn and entered can then repair defective pieces.

24.31 Replacement of manual Information System:

Suspension of parallel manual system will be the biggest challenge. It has to be gradual. First of all it will have to be explained to operations managers that value lies in using application in an interactive mode. Dependence on fixed time reports should be minimized. Fixed time reports should be more in the nature of exception reports to reflect failures.

It would be prudent to prioritize this effort in the following order.

Interchange

Stock and Demand

Loco inventory

OCC will in consultation with COM prescribe a schedule for identified manual reports and bring systems stability in terms of data capturing in those areas first.

OCC will also evolve a mechanism to analyze systems usage at every step and match it with expected returns. Returns can be in terms of savings in efforts, accuracy of information, avoidance of disputes, less correspondences and cross references, more time for planning operations, resultant

customers satisfaction, enhancement in business achievements and productivity (redeployment achieved, overtime curtailed), reduction in work pressure amongst staff, less diversions etc.

From the analysis of application by OCC, it is expected that items for up gradation of application further will get identified. However before undertaking development OCC will weigh every new requirement for its return justifies it and then only forwards it to agencies responsible for application development.

24.32 In service training:

It is very essential that concurrently a programme be made by each railway to disseminate the learning to rest of the cadre. The training should be institutionalized taking the help of zonal training schools. The components of training will comprise exposure to revised ground procedures for data collection and maintenance, reporting tasks of the application and OCC functions.

The participation of all those in the field who are associated with operations taken together will only ensure sustained upkeep and usage of the system. The FOIS training should be made a part of the induction and refreshers courses of TNC, GC, SM, TXR, Trains, Power, C&W and Commercial Controllers, Guards, and Loco pilots.

There will also be an element. This training is essentially for understanding of procedures and application tasks.

In case of those who have to man OCC and perform its functions an extended module will be prescribed in addition to training in procedures and application tasks.

OCC of each railway will nominate trainers from their existing cadre strength who in turn will be trained by CRIS to establish training processes on their railways and train others. OCC will thereafter monitor progress of training on their railways and ensure that regularity is maintained.

24.33 Miscellaneous Issues

(i) Printing Reports:

All reports, which are available on display, can also be printed.

You should decide as to which reports are most useful & which require printing.

You can print either the view shown (through F7) or you can choose which columns & rows you want (by clicking them) & then print your selection by pressing F11.

For printing, you should have a Dot Matrix Printer attached either to Network or attached to a PC & “Shared”.

You must plan in advance for your requirement of paper & ribbons.

(ii) Messaging Feature :

This is a very powerful communication tool that should be used for meaningful works only. Don’t allow it to become a general-purpose e-mail feature. Since the addressee is not a filter, the entire list of messages for a station increases exponentially. However, use it freely & liberally for communicating messages related to freight operations, FOIS messages & emergent non-personal messages.

(iii) PASSWORDS:

The RMS package has a concept of passwords. For each user, who enters data, such passwords can be defined. Once a password is given by CRIS, you can change your password on your own by going to Access> Password. As a supervisor, you must also ensure that anyone who is going away from FOIS work (on transfer etc) should be struck off from user list & his password is disabled by CRIS.

Assigning passwords gives responsibility to user. This password helps in keeping the security trail i.e. the reporting done carry the id of the user.

Password management task is being passed on the zones so that they can manage password on their own without getting CRIS involved. Besides RMS) password there is Windows password, which you use at the time of logging in your PC, if you are using this password then all the users of that device should know it.

Reports available in RMS module:

24.34 CONFERENCE SET

(a) Interchange forecast summary: gives desktop summarized view of forecast interchange of current date. It is updated by 1/C forecast and arr./dep reporting task.

(b) Running Interchange: gives detailed view of forecast & interchange and also gives running position of trains forecasted. It is updated by 1/C forecast and arr./ dep. reporting task.

(c) Current Interchange: gives summary information of interchange with break-up of empties and loaded stock, stock (4w) interchanged. It also provides summary of jumbo and box rakes interchange. It is updated by 1/C forecast and arr./ dep. reporting task.

(d) Likely shortfall: gives summarized view of interchange along with trains likely to shortfall along with the reasons of their shortfall. It is updated by 1/C forecast and arr./dep. reporting and 1/C shortfall reporting task.

(e) Train Interchange shortfall: gives shortfall/excess of yesterday interchange along with reason of shortfall in despatch. It is updated by 1/C forecast and arr./dep. report task.

(f) Stream wise pipe line: provides pipeline between two nominated stations and also pipeline for a via. It is updated by Load planning, Train ordering, arrival/departure reporting tasks.

(g) Loads on run: this is an unstructured query for all loads on run in the system. There are different filters available for viewing loads according to users requirements.

It is updated by Load planning, Train ordering, arrival/departure reporting tasks.

(h)Traffic flow : gives information regarding likely traffic flow interchange points upto 3 days in advance.

It is updated by Load planning, Train ordering, arrival/departure reporting tasks.

(i) Outward train railway wise: gives division wise destination railway wise view of all outward trains on a zone. Filters for rake types, commodity is also available.

It is updated by Load planning, arrival/departure reporting tasks.

(j) Terminal position: displays total rakes at the terminals as well as the insight forthose terminals. On selecting a cell relevant details rake wise are displayed.

It is updated by arrival/departure reporting, l/W no. taking, Rake placement/rel tasks.

(k)Terminal performance: gives terminal performance for a selected period. It is updated by arrival/departure reporting, l/W no. taking, Rake placement/rel tasks.

(l) Terminal history: gives details of individual rakes handled at the terminal for a selected period. It is updated by arrival/ departure reporting, l/W no. taking, Rake placement/rel tasks.

(m) Terminal performance and running position: gives status of load at terminal along with its insight. It is updated by arrival/departure reporting, l/W no. asking, rake placement/ rel tasks.

(n) ODR wise rake outstanding (details): gives ODR wise outstanding demand details. It is updated by demand reporting task.

(o) Rake performance: gives performance of rakes for the period they were in the division / zone along with total kms ran in the division.

It is updated by arrival/departure reporting, rake Formation/ dissipation, l/W not taking, Rake placement/rel tasks.

(p) Rake position: gives break up of rakes over a division/ zone Underfollowing heads: U/R, U/L,O/W,I/W and Empty. It is updated by arrival/departure reporting, l/W no. taking, Rake placement/rel tasks.

(q) Rake Integrity: gives details of all attachment/ detachment/sick reporting on a individual rake on the selected zone. The examination & dissipation if done) is also shown. Further details can be seen after selecting a cell and pressing enter.

It is updated by all rake reporting, consist reporting, and TXR examination.

(r) Current traffic flow: holding of each railway is shown in terms of l/W, O/W and empties.

the flows between the railways are shown by arrows for both loaded & empty rakes.

Details of individual rakes can be seen on selecting the desired cell and pressing enter. It is updated by all rake & load reporting

(s)Terminal management planning: for a selected group rake type, division wise, outstanding rake demands, rakes on hand and pipeline of terminating loads are displayed.

On selection of cell & pressing enter, details relevant to that cell are displayed. It is updated by Demand, rake placement/ rel and arrival/departure task.

(t) All stock: current rake holding of zone is shown division wise, specifying loaded empties, at terminal, cross traffic (through), originating for foreign railway, local and terminating received from other Railways.

Facility to see details of individual rakes on selecting any cell is also available, other stock icon in the conference set run on the same query BCN,BCX, CRT,BOXN,BOX,SHERPA SHERPAN, CONTAINER, TANKS)

It is updated by load planning, consist reporting, Placement / release tasks.

(u) Loco position: this query displays all the locos for the selected Division, location wise. A type wise summary is also displayed.

It is updated by loco reporting, arrival/departure, loco attachment/detachment task.

24.35 MANAGERIAL REPORT

(i) Interchange

(a) Yesterday :

Yesterday Interchange: This query displays the information of the trains actually interchanged in terms of the Loads and Light Engines at the divisional interchange point., The shortfall and excess columns display direction wise summary of loads that were short or excess vis.a vis the forecast for the previous

day. Receipts and dispatches are shown separately for each of the 1/C point.

It is updated by the Interchange forecast and Arrival/Departure Reporting tasks.

(b) Current :

Interchange monitoring this query gives view of, current 1/C, giving the Status of forecasted trains and also the trains, which are not forecasted, but are likely to go in the 1/C. It is updated by train forecast, arrival/dep. tasks.

(ii) Rake & Terminal Position

(a) Yesterday :

24:00 Hrs Terminal Position: gives status of load at terminal alongwith its insight at 24 hrs. It is updated by arrival/dep. reporting.

I/W no. taking, Rake placement /rel tasks

(b) Current:

(i) Optimised movement of rakes: This query displays movement of rakes originating from the logged in zone and available in the database till the queried date. It shows empty and loaded runs of the rakes and the kms clocked by them and time taken for a run. It has the facility for displaying the detention details of the rake .Filters are provided to view details of specific commodities and stock types. This information is updated by the arrival/departure, rake formation /dissipation, placements/release reporting tasks.

(ii) CC rakes BPC Position: this query gives running details of close circuit rakes which are running in the system on the logged in date for the logged in Zone/div.or selected BPC station of that zone. Option is available for selecting a rake type also if the rakes of a specific rake type are to be seen.

It is updated by BPC details, train arr/dep rake formation/ dissipation tasks.

(iii) Movement of a rake: It shows empty and loaded runs of the rake on entering the ID of the rake the kms clocked by them and time taken fora run. It has the facility for displaying the detention details of the rake .Filters are provided to view

details of specific commodities and stock types.

This information is updated by the arrival/departure, rake formation/dissipation, placements, release reporting tasks.

24.36 Demand & Loading

(A) Yesterday:

(i) Commodity wise loading and outstanding: This query displays loading Information for a Division/zone against particular station in terms of the no. of rakes 4w, piece meal, 4w,

and the total tonnage and freight. The user can use options for (a specific consignee or all consignees or excluding a consignee) and for a (specific commodity, or all commodities, or excluding a commodity).These options are mutually exclusive and can be used in any combination.

Load Planning, Consist Reporting, Loading tasks, updates this query. Yesterday Loading:

(ii) Terminal wise loading of rake demand: This query gives the terminal wise rake loading performance of a zonel/div. along with demand details and handling activity details. Views of commodity wise and destination Rly wise summary are also available.

Option is also available for viewing terminal wise unloading details in term of balances. Arrival/departure, rake formation /dissipation, placements/release - reporting tasks updates this query.

(iii) Loading performance: This query displays loading information for a Division/zone against particular station in terms of the no. of rakes 4w, piece meal, 4w, and the total tonnage and freight. The user can use options for (a specific consignee or all consignees or excluding a consignee) and fora (specific commodity, or all commodities, or excluding a commodity).These options are mutually exclusive and can be used in any combination.

In this query there is submenu for O/S loading division wise and commodity wise loading and 0/S.

Demand reporting and placement/rel tasks, update this query.

(B) Current :

(i) Type wise stock position: this query gives break up of all rake types or selected rake type over the zone (in terms of rake/pm).on selecting a row and pressing enter Details of the highlighted wagon type are shown.

This query is updated by arrival /departure, rake formation, dissipation, and consist reporting tasks.

(ii) Piecemeal outstanding summary: gives destination wise details of piecemeal o/s over a zone with ODR. Demand reporting and Piecemeal/placement/release tasks update this query.

24.37 Loco

Power Interchange gives summary of Zonal loco 1/C and also a summary of holding of locos type wise over a zone.

Arrival/departure and loco reporting tasks update this query.

24.38 OPERATIONS CONTROL

(i) Interchange

Yesterday

(a) Train wise Interchange: This query displays 1/C load wise of a division 1/C point wise for specified date. View is available for specified 1/C point and direction. The details of loads, like load name, L/E, type, loco, unit, 1/C date/time for handed over and taken over is listed separately. This information is updated by load planning, arrival/departure tasks.

(b) Load Interchange analysis: This query displays 1/C load wise of a division 1/C point wise for specified period. View is available for specified 1/C point and direction. The details of loads, like load name, L/E, type, loco, unit, 1/C date/time for handed over and taken over is listed separately. There are filters provided for originating zone/div/station and terminating zone/div/ station so that various analyses can be done on 1/C data. This information is updated by the arrival/departure and 1/C reporting tasks.

(c) Stock Interchange load wise: This query displays summarized information of receipts and dispatches of stock

at divisional level for a specific type of stock. Loaded stock classified in terms of through and terminating. Empty stock is shown separately. This query displays and distribute output fields like No/units for each classification with total (No/ Unit), for both receipts and for every 1/C point.

This Information is updated by the arrival/departure and 1/C reporting tasks.

(ii) Current

(a) Stock forecast: The query displays summarized information of receipts and dispatches of stock at Divisional level for a specific type of stock. Loaded stock classified in terms of through and terminating. Empty stock is shown separately. This query displays output fields like No/Unit, for both receipts and dispatches for every 1/C point. The train 1/C forecast reporting task updates this information.

(b) Stock Interchange (summary): An online query which gives forecast and actual trains ran till the time of viewing the report, along with stock interchanged in terms of L/E in 4- w units 1/C point wise. Summary of 1/C is also given rly wise.

1/C forecast and arrival/dep update this query.

24.39 LOAD & PIPELINE

(i) Yesterday

(a) Change In load destination: The query gives information on the loads for loaded/empty/ mixed/AII within Zone/Division with revised change of destination and the station where the change was effected with the message No. and the functionary who authorized the change of destination. The reports can be obtained selectively for a specific commodity, for consignee or for a specific destination. This information is updated by the change in Load destination tasks. .

(b) Stabled loads at 24.00 hrs. : This query gives information on the loads for both loaded empty stabled with date and time, reason as at odd hrs. This information is updated by load planning arr/dep and train stabling tasks.

(ii) Current

(a) Type wise Terminating load in sight: The query gives information of terminating loads for a station/division. The

loads details along with the current location and status with the expected arr/dep time and date at the 1/C station and destination are displayed. This query is updated from Load Planning, train ordering, Train Arrival/Departure tasks.

(b) Outgoing loads: gives details of loads which have originated from the logged zone/div / station. It also gives the 1/C time of that load and also its expected time at its destination. Load planning, placement/release, arrival/dep, tasks update this query.

(c) Running position optimized destination wise: This query displays rakes loaded from a zone and are running on that date. It gives loading details and 1/C date and time, its current status. Filters are provided for stock type commodity and unloading zone. Load planning, placement/release, arrival/dep, tasks update this query.

24.40 STOCK

(i) Yesterday

(a) Rake performance: gives performance of rakes for the period they were in the division / zone along with total kms ran in the division.(query picks rake from their date of exit from zone/div). It is updated by arrival/dep. reporting, rake Formation/dissipation, I/W no. taking, Rake placement/rel tasks.

(b) Stock holding: The query displays yesterday position of the total holding for the zone for all Wagon types, loaded and empty, separately for piecemeal, Rakes and DVS Stock. Details of a stock can be seen by selecting that stock type by clicking and pressing enter. This query is updated by Inward No. taking, departure, consist reporting, rake formation/dissipation,and attachment/detachment of wagons enroute reporting tasks.

(c) Rakes at 24 hours: The query displays information of rakes at 24 hrs on yesterday. Rakes group type wise or rake type wise for a specific commodity included, or commodity excluded, or all types and for a specific consignee included, or a specific consignee excluded or all consignees for a zone. This query is updated by Inward No. taking, arrival/ departure,

consist reporting, rake formation/dissipation and placement/ release tasks.

(ii) Current

(a) Rake Position: The query displays information of rakes on real-time basis. Rakes group type wise or rake type wise for a specific commodity included, or commodity excluded, or all types and for a specific consignee included, or a specific consignee excluded or all consignees for a zone. Inward No. taking, arrival/departure, consist reporting, rake formation/ dissipation and placement/release tasks.

(b) Destination Rly Wise Outstanding: displays demand details of a zone, division wise, clubbed on destination railway basis. Gives details of commodity and no. of units indented .filters are provided for viewing rake/piecemeal wise demands, commodity and consignor can be selected.

This query is updated by demand and placement /release tasks.

I/W traffic shows handling details of inward loads of a specified terminal on current date basis. Arrival/departure and placement/release tasks update this query.

O/w traffic shows handling details of outward loads of a specified terminal on current date basis.

Arrival/departure and placement/release tasks update this query.

24.41 MISCELLANEOUS

(i) Load Wise Route: This query gives the complete route details for the selected load (selection is made by entering the load name) like load from-to, load direction, load type, units, stn, Arr/Dep. Date/Time, Inward Direction, Outward Direction of the selected load.

This information is updated by the load planning Train ordering, arrival/departure tasks.

(ii) Load Wise Train Details: This query gives the details of all the trains ordered for a particular load's journey (selection is made by entering the load name). The load is recalled by giving departure time from the originating station details of

each train leg are also available including the Loco details.

The train details show all the stations en route and the reporting, if any, made during that run. This information is updated by the Train ordering and arrival/departure tasks.

(iii) Train Schedule: This query shows all train schedules in the system between any pair of stations. The details show all the stations in the train schedule, including indicators for zonal, divisional and sectional interchange. This information is updated by static database in the system.

(iv) Route display: This query shows the default load route between any pair of stations. The Inward and outward details are shown against each Interchange station on the route. This information is updated by static database in the system.

(v) Invoice details: gives details of invoices made generated in a division/station for a period. This query gives RR details and freight and weight of loading done.

This information is updated by demand registration, placement/release and RR reporting tasks.

(vi) Station Help: This Query provides help regarding station code or name In case only part of either station name or station code are known, the system shows all stations in the database having the input name as a part. This information is updated by static database in the system.

Booking profile this query gives the booking profile of the selected station as given in the Alphabetical List of IRCA This information is updated by static database in the system.

24.42 EXCEPTION TASKS

Transaction log this task is provided to monitor the delay in reporting Taking place. This can be viewed for a date and for a division/station. There are filters to view, train and rake reporting tasks separately. Train and rake reporting tasks update this.

24.43 Statistical Report (Reports)

(i) INTERCHANGE

1/C Summary gives 1/C summary in terms of no. of loads Interchanged vis a vis forecast and shortfall Forecast and arrival/dep tasks update this query

(ii) LOAD" PIPELINE

Reason wise stabling gives details of load stabled during a specified period along with load details, reasons of stabling and the time when that load was lifted Stabling, load planning and arrival/dep tasks updates this query.

(iii) Diversion register: gives diversion details fora specified period. Filters available for originating station commodity, i.e. Diversion task updates this query.

(iv) Maintenance procedures for FOIS:

CHECK LIST FOR DAILY MAINTENANCE OF HVNET VSAT PREREQUISITES

1. Minimum 1 KVA On line UPS - dedicated to VSAT

2. Dedicated Electronic earth less than 1 ohm

3. Earth to neutral Voltage should be less than 2 volts

4. Air-conditioned dust free environment with clearance of at least 8" in front and rear of indoor unit. This provides airflow and prevents overheating.

5. AC input requirements-230v+ 10% V VAC 47-63 Hz for PES

6. Grounding of VSATs antenna and unit is a must resistance should be less thanl 0 ohm

7. AC Input voltage to PES must be derived from UPS output only (Live to neutral 230 VAC Live to Earth 230 V Neutral to Earth OV)

8. Do not allow moisture to enter in the RF unit. Plastic tape should be put on all the Connectors at the ODU. A properly designed rain protection over can also be used to prevent the same.

9. ON-OFF PROCEDURE

(i) Do not put off the power supply. Keep it continuously "on" because Hub is always polling each location for status and control signals must be received at any time from the Hub.

(ii) If PES is switched off and subscriber switches it on, in this case PES will take nearly 40 minutes to get ready for

normal working provided it is ON continuously forthat period.

(iii) Observation of the LEDs should be recorded during this period and it may be conveyed to HUB if PES does not come to normal position i.e. dots do not flash on all cards of PES.

(iv) Single phase 230 ohms 50Hz with input circuit breaker of 3amps for protection.

10. PRECAUNONS

(i) Do not disconnect the IFL cable from DIU without switching power supply off. This may damage equipment.

(ii) Protect your antenna/FL cable/ODU from tampering by unauthorized person.

(iii) To prevent damage to the DIU turn power off before connecting/disconnecting any telephone failure to remove power may damage the VDPC card.

(iv) Do not use rotary telephones with VSATs. Use only Touch tone (DTMF) telephones.

(v) Do not place equipment, which produce dust near the DIU (Certain copier of computer primers produce carbon dust, which can cause malfunction.

(vi) Prevent moisture from getting inside DIU

(vii) Limit the distance between VSATs DIU to telephone instrument 15 meter for proper operation.

(viii) For normal operation the VSATs should be displaying, flashing dots in all the cards i.e. IFM, VDPC and MPC. Any other display is an abnormal condition. In case of difficulty contact HUB numbers: (To be taken from CRIS)

Specify the display of all the three PES cards

PES= Power Earth Station

ODU= Outdoor unit

DIU= Digital Indoor Unit

IFM= Intermediate Frequency Module

VDPC= Voice Data Port Card

MPC= Multiport Port
Control

24.44 INTEGRATED COACHING MANGEMENT SYSTEMS - AN OVERVIEW

1. MODULES IN ICMS

1) Punctuality Module (PAM):For Post facto analysis of punctuality loss and its causes (not an on-line system), Captures train running at Originating! Terminating and interchange points and the causes of detention. Data input predominantly at Divisional HQ level. Status: Implemented.

ii) Coaching Operations Information System (COIS): Captures events on Coaches/ Rakes, Generates Reports for Management of Coaching Stock. Data input predominantly at Station/Coaching Yard level. Status: Implemented.

iii) COIS Data Entry Module: Support module of ICMS, to maintain database pertaining to the information of Rake Links, Yard Infrastructure, Coach Master, Train Schedules etc. Data input at Zonal HQ level. Status: Implemented.

iv) Coaching Maintenance Module: To capture depot activities related to coaching maintenance operations, Utility tool for managers looking after mechanical and electrical maintenance, Includes module for Material Management and Manpower data (gang strength per shifts etc), Data input at CDO level. Status: Under system study.

v) Time-tabling Module: For simulating the suitable timings for running of all kinds of trains, simulating the best available path for planning a train keeping in view all variables, simulating optimum utilization of rake link, generating all timetabling documents. Data input at Zonal HQ level. Status: Under system study.

2) ICMS-SYSTEM ARCHITECTURE

- User connects through browser interface (like Internet Explorer)
- Separate URL for PAMS, COIS and DATA modules (for ex: http/…/cois , http…/pam, http/…/data and so on)
- Users have thin clients at location
- Back-end: RDBMS (Oracle based)

3) ICMS-DATA FEEDING

i) Master Data: Common Master database for PAMs and COIS, includes Infrastructure data: (of more permanent nature like List of Stations, Platforms, washing lines) and Other Master Data: (of less permanent nature like Rake Link Data, Time Table data, Coach Master etc)

ii) Running Data: Separate and independent running database for PAMS and COIS

a) PAM:

- Feeding mostly at divisional level, Interchange owning division controls the data feeding for handing over or taking over, Zonal client does the responsibility fixing(deciding the trains “lost in. punctuality”)
- Activities include:
- Originating terminating, interchange timings

II DetentionReports

- Cause wise logging,
- Fixing Responsibility

b) COIS:

Unlike PAM - no concept of data “feeding” in COIS. Instead working on the system at station/yard level leads to generation of required data (and memos for the operator).This works as input for MIS.

All station/yard activities from arrival to departure of rake are captured:

Yard stock entry	Dispute Resolve
Yard Position	Sick Marking
Rake formation	Sick line Placement Sick line Operation
Modify consist	Shop Marking
Movement	Shop Placement
Movement (Yard to yard)	Remove fit available coaches
Rake Examination	Search Feedbacks
Departure Reporting	Send Feedbacks
En route Attachments/Detachments	Generate memo
Arrival Reporting	

(iii) ICMS-MIS-REPORTS

a) PAM: Reports for Management at Divisional Level, HQ level, Board level like:

- Railway Punctuality Performance for a date for a Division
- Movement of Trains (Division wise) in a Zone
- Punctuality percentage of Mail/Express
- Cause wise/Gauge Wise breakup of Lost Trains between dates
- Division wise analysis of Cause of Lost Trains on Date in a Zone
- Railway Punctuality performance for a date in a Zone
- Cause wise breakup of Trains lost in a period
- Summary of Monitored trains daily Run and Lost
- Section wise/Cause wise analysis for all trains on a date
- Zone wise/Cause wise analysis for all trains on a date, etc

b) **COIS:** Reports for Management at Station Level, Divisional Level, HQ, RB level like:

- Yard Stock Position (Line position)
- Vehicle Guidance
- Zonal Stock Balance sheet (type wise details of Bare Requirement, allotment, running in service, ineffective etc)
- Coaches on way from/to shop
- Foreign Railway Coaches
- Ineffective Coaches
- Coach History
- Rake Link Information Zonal/Divisional Coaching Stock allotment/ availability, etc.

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CHAPTER - XXV

CONTROL OFFICE APPLICATION (C.O.A)

25.01 Introduction - General Information

What is Control Office Application?

Control Office Application (COA) is comprehensive software for the automation of Control Charting at a railway divisional control office. COA is intended to replace the tedious manual plotting of running trains on a chart. The core functionality of the control charting with ergonomics is intended to provide the Traffic Controllers would look- and- feel and user- friendly environment. The benefits of COA would include better planning and decision - making in train operations and thus contribute to increase operational efficiency.

COA is designed to form the core application to drive the existing allied systems like FOIS, NTES and COIS. The integration with allied systems will be facilitated through a Central Application Serverat CRIS.

The flow of data on real time basis to adjoining divisions will mark a significant breakthrough in the train operations without dependency on human interference.

25.02 Scope of COA

COA covers the following core functionalities Control Office Operations. They include:

- Train Ordering
- Maintain Train Information
- Manage Train Movement (Abnormal Working, Stabling, Banker Movement)
- Report Unusual Occurrences.
- Management of Maintenance Blocks
- Caution Orders
- Plot Graph
- Advance Plotting _ System/Manual
- Maintain referential data
- MIS Reports

- Yard Management Siding
- Miscellaneous Functions
- View Station Layout

The application will have interfacing capability with Data Logger to capture data pertaining to train movements in the final version of the product.

25.03 Intended Audience

- Operations Managers
- Train Controllers
- Key functionaries of sister departments.

25.04 Benefits:

- Fully Automated work environment
- As an aid to the controller in terms of efficiency, precision & time management.
- Leverage to Controller's Experience in decision making through manual forecast
- Real time information on train operation without human dependence
- To serve as a backbone system for sharing of data between allied systems

25.05 ANTI COLLISION DEVICE (ACD)

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

ACD is a Network of Anti -Collision Devices (ACDs) comprising of a variety of devices such as onboard (Mobile). ACDs for Locomotives and Guard vans and track-side (Stationery) ACDs, Level Crossing ACDs, Loco Shed ACDs, Sensor based ACOs andACO Repeaters. All these work on

the principle of distributed control systems. All ACDs along the ACD route communicate with each other through radio communication when they are within a radial range of at least 3 kms. On board computers use inputs from Global Positioning System (GPS) for determination of train location, speed, course of travel and time. Both mobile and stationary components of ACO system exchange information and take decisions based on train working rules and embedded software to apply brakes automatically without any input from the users. If two ACOs are deemed to be at a risk of collision, the ACD system activates automatic braking operation to prevent collisions. Loco ACO is designed to interface with various types of braking system of locomotives.

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

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

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CHAPTER - XXVI

CREW LINKS, LOCO LINKS AND POWER PLAN

26.01 Time of attendance for train crew - Every Guard, Loco Pilot & Assistant Loco Pilot shall be in attendance for duty at such place and at such time as may be prescribed by special instructions.

26.02 - Every Guard, Loco Pilot, Assistant Loco Pilot shall report for duty at such place as a may be ordered by the Divisional Railway Manager or by an officer on his behalf.

26.03 (a) Every Guard of passenger train shall be in attendance 30 mts. before the scheduled departure and 30 mts. after the arrival of the train.

(b) For trains other than passenger the Guard shall in attendance in accordance with instructions issued by the Divisional Railway Manager.

26.04 - Engine Attendance -

(a) Every Loco Pilot and Assistant Loco Pilot shall "Sign on" at such time in advance of the starting time of their trains, as the Divisional Railway Manager will notify. In the calculation of the time required, the following shall be allowed for: -

(i) 45 minutes for multiple Unit Electric Engine and 30 minutes for Diesel, single Unit Electric Engine, EMU and MEMU for examining and taking over the Engine in the shed after "Signing on" duty.

(ii) Time as may be required for the journey between the shed/ Lobby and the train departure point.

They shall also remain with their Engines on arrival at the shed for the purpose of examining their engine, booking repairs etc, as follows:-

(i) 15 minutes for diesel, Single Unit Engine, EMU and MEMU.

(ii) 30 minutes for Multiple Unit Electric Engines.

(b) In case of Multiple Unit/Single Unit yard pooling trains or Yard Pooling Engine, every Loco pilot and Assistant Loco pilot shall 'sign on' at such time in advance of the scheduled departure time of trains, as the Divisional Railway Manager will fix.

26.05 Procedure for calculating crew requirement of a division using crew links :

1. Running staff review should be carried out after every six months i.e. on 15th Jan. and 1 st July by STA (senior technical assistant) of the division.

2. Before preparing review, loco pilot links of all the sheds should be got prepared and vetted by personnel branch.

3. Statement of avg. hours on road and no. of goods trains ran during last six months for each section should be ready, duly approved by Sr DOM/DOM. A list of shunting points and DMTs running to be prepared and signed by Sr DOM/DOM.

4. Mail Express/Passenger Loco Pilot's requirement to be worked on the basis of loco pilots crew links.

5.The method of progressive crew hours based on peak six monthly review, i.e, 12 fortnights for the preceding year should be followed for calculating the bare crew requirement and;.

6. 30% leave reserve and 10% trainee reserve should be demanded forthis requirement.

7. Shunters should be demanded @ 1 against 8 hrs. point. Also rest giver @ 1 for 6 shunters to be demanded. Leave reserve and trainee posts to be demanded separately.

8. Requirement of DSL assistants should be same as that of loco pilots (Excluding motormen where no assistant loco pilot is required).

9. Running staff review duly signed by Sr DME/Sr DEE should be put up to Sr DFM for vetting.

10. After accounts vetting, sanction of DRM be taken and Sr DPO will issue circulars of revised sanction.

+ Running supervisors review should also be made with staff review @ 1 loco Inspector against 25 Loco Pilots or 50 Shunters. No rest giver is allowed. Leave reserve is 12.5%.

26.06 Points to be kept in view while preparing Loco Pilot links:

1. Loco Pilot Crew links are prepared by CPRC/CTLC and got verified from the Personnel Branch. The objective of crew links is to ensure optimum utilization of crew.

2. Train timings to be checked from the latest time table.

3. Links to be prepared before promulgation of new time table.

4. Average duty hours in a fortnight should not exceed 104 hours.

5. Minimum number of rests in a month should be 5 of 22 hrs., or 4 of 30 hours, including night in bed from 22 hrs. to 6 hrs. from sign “off” to sign “on”.

6. Efforts should be made to include all the sections in the link to avoid giving learning road again and again.

7. Minimum out of station rest in case of less than 8 hrs. duty in the previous trip should be 6 hrs from sign “off” to sign “on”. In case duty is 8 hrs or more than 8 hrs, then 8 hrs. rest to be given. In case of short trips of less than or equal to 5 hours then duty performed plus 1 hr. will be sufficient.

8. Minimum home station rest should be:

(a) If duty performed in the last trip is less than 8 hrs., then 12 hrs.

(b) If duty is 8 hrs. or more, then 16 hrs.

(c) If staff is required to work train with less than the stipulated rest, then breach of rest allowance is payable to running staff.

9. Link having the maximum earning kilometerage should be worked by senior most loco pilots and so on.

10. Separate links should be prepared for superfast trains such as Rajdhani, Shatabdi Exp. Chronic late running trains should be kept in view to avoid link failures.

11. (1) Wherever “EOL” operation system has been notified for a siding/terminal a rest room is provided by siding/terminal owner, fortaking of rest by Crew & Guard, Sr.DOM & Sr.DEE (OP) or officials nominated by them shall inspect jointly, then notify the Rest Room. Thereafter, the same will be re-inspected jointly once in a quarter.

(2) The Crew/Guard shall “Sign On/Off” through Chalak Dal App at sidings where CMS is not available. If Chalak Dal App at sidings is not working, then Crew/Guard shall Sign On/Off through proxy feeding at their home lobby, Rake placement time shall be treated as “Sign Off”. Similarly, when rake is

ready for drawn out, then rake ready time shall be treated as "Sign On" time.

(3) Crew/Guard shall be available as per following rules:

Minimum out station rest in case of less than 8 hours duty in the previous trip should be 6 hours from "Sign Off" to "Sign On". Incase duty is 8 hours or more than 8 hours, then 8 hours rest to be given. In case of short trips of less than or equal to 5 hours then duty performed plus 1 hour will be sufficient.

(4) Following facilities would be available at sidings as per Rly. Board's Freight Marketing Circular no. 05 of 2013:-

(i) Suitable resting facilities shall be provided to the train crew by the siding owners in their premises.

(ii) Siding owners will also permit the train crew to avail the facilities of staff canteen in their premises on payment of charges as prescribed for their own staff.

(5) CGS/CSM will be responsible for attesting the CTR at the time of departure from the siding/terminal along with date/ time and rubber stamp of the attesting official. Specifying "Sign-Off" and "Sign On" timings also.

(6) The entries made in Chalak Dal App shall be cross checked at the home lobby from the attested entries in the CTR as referred to in para (5) above.

(7) Whenever a Crew/Guard is booked as pilot, the station where they detrain shall make an entry in the CTR form and attest the same certifying the date/time of arrival and the train by which they arrived and affix their rubber stamp on the same.

Similarly, for return trip back to their home/outstation lobby as pilot similar procedure would be followed. The entries so made shall be entered in the CMS to compute duty hours.

(8) Whenever Crew/Guard is booked as pilot a cheque pass in the prescribed form shall be issued to them to perform theirjourney.

26.07 Points to be kept in view while preparing Locomotive Links:

1. Loco/Power links are prepared by HQ's office and circulated to the divisions. The objective of power links is to ensure optimum utilization of powers.

2. Train timings should be checked from latest time table.

3. Links to be prepared before commencement of new time table.

4. Efforts should be made to send the loco to home shed for servicing within the stipulated schedule time.

5. Minimum possible out station halt should be provided.

6. Ensure loco is permitted to run on the sections at the max. permissible speed of the train.

26.08 Power requirement (power plan) :

1. To be prepared once in six months.

2. Average number of trains run on each section per day and average hours on road for last six months, duly signed by Sr. DME(P) and Sr.DOM, to be prepared.

3. Formula: Section wise average freight POL forthe last six months to be calculated as under: Bare POL = PDD + HOR + PAD (POL= Power On Line; PDD = Pre Departure Detention; HOR= Hours On Road; PAD= Post Arrival Detention)

4. 3.5 % further growth and 10% Bunching allowance to be demanded on Bare POL.

5. Loco‘s requirement for DMT, ART and other locos which remain in outage but are not added in POL forthe purpose of calculation of average kilometers to be added in the bare requirement.

6. To arrive at total POL, last six month’s average POL of shunting loco link WDS-4, WDS-5 pilots and Mail lie over to be added in the POL calculated above.

7. Mail/Exp./Pass. Loco requirement to be worked out on the basis of loco link. Add 10% for major repairs.

8. For shunting services, work out number of points for 8 hours shunting, demand 0.33 POL. Add 1 loco as overlap against 06 loco. Add 10% for major repairs.

9. Kms formula: Total kms earned on the average per day during last six months divided by average loco utilization.

26.09 : PERIODS OF DUTY AND REST OF RUNNING STAFF :

1. Running Staff (Traffic & Loco):

(a) As a general rule, running staff should be classified as "Continuous"

(b) Running staff can also be classified as "Essentially intermittent", if their work load warrants such a classification.

2. Limitations of hours of work: The statutory limit for the hours of employment of running staff classified as "Continuous" has been fixed at 54 hours a week on the average in a month.

3. Duty Hours: (i) In the case of Loco and Traffic running staff duty hours should count from Signing 'ON' to Signing 'Off'.

(ii) In severe operational exigencies, the controller should suitably advise the staff that they may be required to work beyond the limits prescribed.

Subject to exigencies of service, maximum limit of 125 duty hrs. per fortnight should be laid down for all running staff.

4. Waiting at a place of duty: The time during which an employee is waiting at a place of duty and not resting should be included in the hours of employment since the employee is waiting for such suitable work as the administration may assign to him.

5. Away from Headquarters: (i) Loco and traffic running staff should not normally be away from headquarters for more than 72 hrs. at a stretch.

(ii) Stay of running staff away from headquarters be limited to 3 days which may work to their staying in 3 running rooms, e.g. one on the way up, one at the end and one on the way back.

(iii) The crew shall bypass Head Quarter as and when demanded on account of operational requirement.

6. Periodic and compensatory rest: The Loco and Traffic running staff may be given 4 periods of rest of not less than 30 consecutive hours each or five periods of not less than 22 consecutive hours each in a month in partial modification of the weekly rest of 30 consecutive hours recommended for continuous workers. Such rest should be given at

Headquarters and should always include a night in bed. It should be given as far as possible once every 10 days. To enable staff to make advantageous use of periodic rest, it is desirable that they should be advised of this before its commencement as far as possible.

7. Rest of running staff: Rest for running staff should be based on total duty which should be reckoned from signing 'ON' to signing 'Off" and should be as under:

(i) Rest at Headquarters.

a) For duty of less than 8 hrs. - 12 hrs.

b) For duty of 8 hrs. or more - 16 hrs.

(ii) Rest at out station: They should be allowed 8 hrs. rest of running duty of 8 hrs or more. (Staff may sign for rest to the extent of 6 hrs, if they so desire).

NOTE : (i) "Running duty" means duty performed from the actual departure of the train from the starting station till the actual arrival of the train at the destination.

(ii) In either case a person should not be called upon to work under 6 hours of rest, except when unavoidable necessity arises, as in the case of accidents or breakdown.

(iii) When a Railway servant performs duty of less than 8 hours referred to in (i) (a) above and the duty performed is less than five hours, the Minimum outstation rest may be less than 6 hours but should not be less than the total duty plus one hour.

8. Rest at Headquarters and out-station when working short trips: The interval between trips shall be treated as "duty", if it is equal to or less than one hour plus time allowed for train or engine attendance after the last trip plus time allowed for train or engine attendance before the next trip, this period being increased at the discretion of the Railway Administration, where local conditions, such as distance of running room from the traffic yard, etc. warrant such an increase.

9. Duty at a stretch:

(i) Total duty at a stretch (from 'sign on' to 'sign off') for the Running staff should not exceed 11 hours.

(ii) Running duty at a stretch should not ordinarily exceed 9 hours. Such duty may extend further provided the Railway Administration gives at least 2 hours notice before the expiry of 9 hours to the crew that they would be required to perform running duty beyond 9 hours, with the stipulation that the total duty from 'sign on' to 'sign off' shall not exceed 11 hours.

(iii) In case the train does not reach its destination, normal crew changing point or the point where the reliever has been arranged, within the overall limit of 11 hours, and such a point is approximately one hour journey away, the Running Staff shall be required to work to that point provided the maximum hours in that trip does not exceed 12 hours.

(iv) For Loco Pilots of all Mail/Express trains, the running duty (for the purpose of preparation of links only) should not exceed 8 hours. However P&C time shall not be included within 8 hours.

(v) The above provision for running duty hours and total duty hours shall be applicable to all Running Staff including Loco Pilots (Mail/Express), Loco Pilots (Passenger), Loco Pilots (Freight), Motormen and Guards except wherever stated otherwise.

(vi) Subject to exigencies of service, Headquarter rest of all Running Staff will be 16 hours irrespective of the duration of their incoming trip. Further, in exigencies of service, the existing provision will continue to be the minimum condition.

(vii) Continuous night duty for Running Staff should be limited to 4 nights with fourth night towards Headquarters.

10. Permission to Leave Headquarters Station:

(i) No essential staff, whether "Off" duty on weekly rest or on leave, should leave their Headquarters station without the permission of their immediate superior. Staff connected with the working of trains are liable to be called on duty at anytime and before leaving their home they should, therefore, leave intimation behind as to where they may be found in the event of necessity.

(ii) The grant of periodic rest does not include permission to leave station. Such permission must be applied for in the usual manner and will be subject to such restrictions as are

considered necessary by the immediate superior in the interest of work.

(iii) All cases of absence of more than 36 hours should be monitored closely with a view to restrict such absence within reasonable limits.

11. Calculation of hours of duty when booked for other than regular work: The running staff, when booked for the under-noted duties, should be credited daily with the number of hours as shown below in juxtaposition against each duty in the running staff hours of duty register:

a)	Vision Test	7 hrs. 26 minutes (default)
b)	Attending Enquiries	-do-
c)	Attending Court	-do-
d)	Attending School for Refresher Courses/ Safety Camp	-do-
e)	Attending Divisional Office	-do-
f)	Booked off for clearing correspondence	-do- (Credit should be allowed if booked staff are not working on that day. Such cases should be very rare)
g)	Attending meetings of institutes, Welfare and Debt Committees, Staff Benefit Fund and Staff Load Fund Committees and Staff Council	7 hrs. 26 minutes(default)
h)	Learning Road	Actual period from "Signing On to Signing Off"
i)	Station duty	Actual period for which Kept on waiting duty
j)	Territorial Army	7 hrs. 26 minutes(default)

12. Booking:

Running staff must, as far as possible, be booked for duty on the principle of 'first in first out' due regards being paid to the class of trains which they are qualified to work. Each station where Guards are Headquartered and each Crew lobby must forthis purpose maintain a roaster in which running staff must, on arrival with their trains or engines sign their names and enter the time of their arrival.

13. Changes in booking :

(a) Running staff shall not exchange their duties without first obtaining permission from the competent official in-charge.

(b) Should a member of the running staff fail to report for duty in time or be taken ill after being booked, the Station Master or Lobby In-charge, as the case may be, must send for the man next in turn for duty according to the roster and recast the roster.

(c) At stations where Station Duty Guards are posted, the Station Duty Guards must be ordered to take the place of an absentee Guard and the Guard next for duty on the roster be placed on station duty.

(d) Whenever a roster has to be re-cast, all concerned must be advised in good time of the revised bookings.

14. Duty Roster and Duty Lists :

(a) Duty rosters showing the train each Guard is to work, must be kept in the Station Master's office every morning and evening. Similarly, duty rosters for Loco Pilot and Assistant Loco Pilot must be pasted every morning and evening in Crew lobby.

(b) Duty rosters relating to running staff whose headquarters are at other stations must also be pasted up in the Running Rooms.

(c) Fixed links of Guards, Loco Pilots and Assistant Loco Pilots working trains according to such links as prescribed by the Divisional Railway Manager shall be displayed in the Station Master's office/Crew lobby and Running Rooms. Any temporary change in the fixed link shall be notified to the

Guards, Loco Pilots and Assistant Loco Pilots by the Station Masters and Lobby In-charge.

15. Running Allowance for staff performing running duties

1. Running Allowance Rules are called "The Rules for the payment of Running and other Allowances to the running staff on the Railways" coming to force with effect from 1-8-1981.

2. In the provision of these rules, the following terms shall have the meaning assigned to them for the purpose of payment of Running and other Allowances to the running staff:—

(i) "Competent authority" means the President of India or any authority to whom the power to amend or interpret these Rules may be delegated or any authority in whom powers are vested by or under these Rules.

(ii) "Day" means a calendar day beginning at midnight of a day/date and ending at midnight of the following day/date. The concept of "Rostered Day" as existing hitherto shall be abolished with effect from 1-8-1981.

(iii) "Running duties" mean duties directly connected with the movement of trains and performed by running staff while employed on moving trains or engines including shunting engines.

(iv) "Running staff" performing "running duties" shall refer to Railway servants of the categories mentioned below :

Loco	Traffic
(a) Drivers, including Motormen & Rail Motor Drivers but excluding Shunters.	(a) Guards
(b) Shunters	(b) Assistant Guards
(c) Firemen, including Instructing Firemen, Electric Assistant on Electric Locos and Diesel Assistant/Drivers. Assistants on Diesel Locos.	

(v) "Running Allowance" means an allowance ordinarily granted to running staff in terms of and at the rates specified in these rules, and/or modified by the Central Government in the Ministry of Railways (Railway Board), for the performance of duties directly connected with charge of moving trains and

includes a “Kilometrage Allowance” and “Allowance in lieu of kilometrage” but excludes special compensatory allowances.

(vi) “Terminal” means station/yard from which trains start after formation or the station/yard at which they terminate and does not include Roadside stations.

(vii) “Shunting (Section or pick-up) train” means a scheduled goods train regularly run for picking up and detaching wagons, either loaded or empty, at roadside stations.

(viii) (a) “Emergency shunting” includes attaching/detaching of all wagons which have developed hot axles or wagons which are not fit to run.

(b) “Occasional shunting” includes all attaching/detaching of inspection carriages.

(ix) “Through Goods Trains” means a train which is scheduled to run from one terminal to another (including those stabled en-route and stabled trains which are picked and cleared) and which ordinarily has shunting planned at only one station/ point with one emergency or occasional shunting, with provision for shunting at one or more station/point in exceptional circumstances. It includes light engines run on traffic account.

(x) “Transship (van) train” means a scheduled goods train regularly run for picking up and delivering consignments of smalls at stations. SQT/ASQT services which were hitherto covered under this category shall be discontinued with effect from 1-8-1981.

(xi) “Shunting/Van Goods /Works train” means a goods train which is run to perform scheduled sectional work and which is required to do shunting at more than one station/point and which may also be required to do emergency/occasional shunting.

(xii) “Ballast, Material and Crane Specials” means trains working on departmental account for the carriage of ballast or material or for the haulage of cranes,

(xiii) “Breakdown and Medical Relief train” means train working on departmental account on breakdown duties or for providing medical relief on account of accidents etc.

(xiv) “Light engines on mechanical account” means light engines proceeding for repairs to shops/sheds after repairs in shops to sheds and after temporary repairs to shops when they are unfit to work a train.

(xv) “Departmental train” means a train working on departmental account and includes ballast trains, Breakdown relief trains, material trains and light engines on mechanical account. It also includes the following services:

(a) unloading coal or pump boiler at the pump houses while working light engine ortrain;

(b) light engine ordered with engineering representatives to certify the track;

(c) light engine ordered with water tender from one station to another.

The following services are to be treated as ordinary services:—

(a) Inspection specials or specials with Railways Officials in cases of emergency e.g. GM’s Inspection specials, Divisional Inspection Specials;

(b) ’’Damaged rake specials and trial rake specials”.

(xvi) (a) “Stationary posts” refers to all posts excluding those specified under item (iv).

(b) “Stationary duties” refers to duties performed other than running duties specified under item (iii).

(xvii) “Regulations” means the Hours of Employment Regulations in so far as they apply to running staff.

(xviii) “Signing on” and “Signing off” shall have the same meaning as in Hours of Employment Regulations.

16. Pay element in running allowance:- 30% of the basic pay of the running staff will be treated to be in the nature of pay representing the pay element in the Running Allowance. This pay element would fall under clause (iii) of Rule 1303-FR- 921 (a) i.e. “emoluments which are specially classed as pay by the President” of IREC.

17. Dearness Allowance on the pay element of Running Allowance:-The running staff shall be paid Dearness

Allowance, at the appropriate rates sanctioned by the Government from time to time, on their basic pay plus the pay element of Running Allowance i.e. 30% of the basic pay.

18. Types of Allowances admissible to Running Staff:- Running staff shall be entitled to the following allowances subject to the conditions specified by or under these rules :—

(i) Kilometrage Allowance for the performance of running duties, in terms of and at the rates specified in these rules.

(ii) An allowance in lieu of kilometrage (ALK) for the performance of stationary duties such as journeys on transfer, joining time, for attending enquiries or law courts on Railway business, attending departmental inquiries as Defense Counsel or witness, Ambulance classes, volunteer duty in connection with Territorial or other similar Fund and Staff Loans Fund Committees, meeting of Railway Institutes, Welfare and Debt Committees, Staff Benefit Fund and Staff Loan Fund Committees, Staff and Welfare Committees, for attending the meetings of Railway Co-operative Societies in cases where special casual leave is granted for doing so, medical and departmental examinations, participating in recognized athletic contests and tournaments, scouting activities and Lok Sahayak Sena Camp, representing recognized labor organizations, attending periodical meetings with District Officers, Heads of Departments and General Managers, attending First-aid classes, undergoing training in carriage sheds and as worker teacher under the Workers' Education Scheme attending training schools for refresher and promotion courses, undergoing sterilisation operation under Family Planning Scheme appearing in Hindi Examination Guards booked on escort duty of treasure and other insured parcels on trains, Loco Pilotsand Firemen when kept spare for a day or two to enable them to examine and clean the engines thoroughly before being deputed to work special trains for VIPs, or any other duties which may be declared in emergencies as qualifying for an allowance in lieu of kilometrage.

(iii) **Special Compensatory Allowances**

The running staff are eligible for the following compensatory allowances under the circumstances and at the rates specified in these rules:—

(a) Allowance in lieu of Running Room facilities.

(b) Breach of rest allowance.

(c) Outstation (Detention)Allowance.

(d) Outstation (Relieving) Allowance.

(e) AccidentAllowance.

(iv) An Officiating Allowance when undertaking duties in higher grades of posts open to running staff or in stationary appointments.

19. Kilometrage Allowance

1. The rates of Running Allowance for every 100 kms. shall be as specified by the competent authority from time to time.

2. The dual rate system of payment of Kilometrage Allowance (III A and III B rates) as in vogue prior to 1-8-1981 shall be abolished w.e.f. 1-8-1981. Accordingly, with the commencement of these rules, no distinction shall exist among the running staff working different types of trains, in the matter of payment of Kilometrage Allowance. The rates of Kilometrage Allowance for the performance of running duties shall, however, be different from those applicable for shunting duties performed by shunting staff. The rates of Kilometrage Allowance shall be admissible as per current rate prescribed by competent authority.

Employed for shunting duties on shunting engines, the rates prescribed above shall be applied after equating each hour's work (from 'signing on' to 'signing off') to 15 kms.

3. Kilometrage shall be calculated according to the distance shown in the Working Time Tables in vogue in the Railways from time to time on the basis of the actual or computed kilometrage performed.

4. Except as otherwise specified by or under these rules, the rates shown above are inclusive of all duties performed from time to time of 'signing on' to the time of 'signing off',

including engine ortrain attendance, all incidental detentions and all other items of work related to or incidental to running duties.

20. Allowance in lieu of Kilometrage (ALK)

1. When running staff are engaged in or employed on non-running duties as specified in Rule 3 (ii) of Running allowance rule 1981, they shall be entitled to the payment of an allowance in lieu of Kilometrage as indicated below for every calendar day for such non-running duties as may be required to be performed by them :

(a) When such non-running duties are performed by the running staff at their headquarters, they shall be paid the pay element of the Running Allowance, namely, 30% of the basic pay applicable for the day.

(b) When such non-running duties are performed by the running staff at outstations, they shall be paid as per current rates prescribed by competent authority.

Provided that, if during the same calendar day, a member of the running staff is engaged in running as well as non-running duties and if the non-running duties are of four hours duration or more, he will draw both the kilometrage Allowance for the trip performed as well as the Allowance in lieu of Kilometrage, in full, for the non-running duty performed.

NOTE : 1. Allowance in lieu of kilometrage shall also be admissible forthe intervening

Sundays/holidays while undergoing training for promotion/ refresher course at outstations.

2. When running staff attend training schools for refresher and promotion courses and Lok Sahayak Sena Camp at a place outside their headquarter and where free messing is provided, they shall be entitled to payment of ALK at half the normal rates specified at Rule 20(b) above.

3. Guards undergoing training as Section Controllers and Loco Pilots undergoing training as Power Controllers in Zonal Schools or in Control Offices, before promotion as such and provided they are not accommodated against non-running posts during the period of training are entitled to ALK

at half rate or full rate depending on whether free messing is or is not provided to them.

21. Allowances in lieu of Running Room facilities

(i) At outstations where running rooms are not provided, running staff may be paid a compensatory allowance known as "Allowance in lieu of running room facilities" at the rates specified for every 24 hours or part thereof reckoned from the time of "signing off" at the outstation subject to the period of rest exceeding four hours between train arrival and train departure timings. This allowance shall be admissible as per current rate prescribed by competent authority.

(ii) This allowance shall be admissible at roadside stations irrespective of whether the train terminates there or not.

(iii) In respect of running room where cooks are not provided, the allowance shall be admissible at half the rates specified in para (i) above.

(iv) In the case of Ballast and Material trains and trainsship Goods Vans, the staff taking rest in Crew Rest Vans may be paid on allowance at half the rates of the Allowance in lieu of Running Room facilities during the halts as cooks are not provided in the rest vans.

(v) The allowance shall not be payable if rest facilities are made available even if running rooms as such do not exist.

(vi) This allowance shall also not be admissible to running staff who are not sent to outstations on stationary duty.

22. Breach of Rest Allowance

(i) Breach of Rest Allowance shall be granted to running staff who are detailed for running duties in the following circumstances :—

(A) When running staff who work a train to an outstation and return to their headquarters are detailed for running duty:—

(a) Before completion of 16 hours rest at headquarters when the total period of duty immediately before the rest was for 8 hours or more; and

(b) before completion of 12 hours rest at headquarters when the total period of duty immediately before the rest was for less than 8 hours.

(B) When running staff like Shunters and staff manning suburban services, who avail of daily rest at headquarters are detailed for running duty :

(a) Before completion of 12 hours rest when the total period of duty immediately before the rest was for 8 hours or more; and

(b) before completion of 8 hours rest when the total duty immediately before the rest was for less than 8 hours.

(ii) The allowance shall be payable as Overtime Allowance under Hours of Employment Regulations at the rate of 2 hours for every hour by which rest falls short of the prescribed hours of rest, periods of less than half an hour being neglected and those of half an hour or more shall be rounded off to one hour on each occasion of breach of rest

(iii) The scale of rest applicable to running staff on rostered duty at headquarters (like shunting duty etc.) would remain unchanged. However, suburban staff performing "double details" with rest in a running room/rest room between the two details shall be given liberalized scale of rest of 12 hours or 16 hours depending on whether the total duty hours is less than 8 hours or 8 hours and more. They will however, not be entitled to be paid any Breach of Rest Allowance.

Note:-

(a) In no case shall running staff be called upon to go out under 6 hours rest except when unavoidably necessary as in the case of accident or breakdown.

(b) When a member of the running staff, after performing a short trip, is again called on fresh duty within one hour, the interval should be treated as running duty for purposes of determining whether he is entitled to Breach of Rest Allowance in case he is called back to duty before completing 12 hours rest.

(c)Duty on ballast, departmental trains etc. is to be treated as running duty in accordance with the definition given in Rule 3 (iii) of Running allowance rule 1981.

23. Outstation (Detention)

(i) When running staff are detained at outstations for more than 16 hours from the time they sign off duty, they shall be

credited with 70 km. for every 24 hours or part thereof after the expiry of 16 hours from the time of "signing off."

(ii) At an outstation where running rooms are not provided, running staff shall be entitled, in addition, to Allowance in lieu of Running Room facilities at the rates specified in Rule 9(i) of Running allowance rule 1981.

24. Outstation (Relieving) Allowance

(i) This allowance shall be payable to running staff deputed to work temporarily stations outside their headquarters either on running or stationary duties. Payments will be made as the rates specified in Rule 11 of Running allowance rule 1981, for Outstation (detention Allowance for each day reckoned from the date of arrival at the outstation).

(ii) The allowance shall be regulated in the following manner:—

(a) When the running staff are sent to an outstation to officiate in higher posts, allowance shall be paid for a period of 14 days only.

(b) When running staff are sent to an outstation in the same capacity, the allowance shall be paid for a maximum period of 2 months.

(c) The period of journey to and from the relieving station shall be treated as duty, either spare or running and the allowance paid accordingly.

25. Accident Allowance

Running staff who are held up at any station otherthan their headquarters due to an accident for a period exceeding 8 hours, shall be paid an Accident Allowance at the rate specified in Rule 24 above for Outstation (detention) Allowance for every 24 hours or part thereof reckoned from the time of commencement of detention. If the period of detention does not exceed 8 hours, no payment will be made but the hours for which the staff are detained shall be counted towards hours of duty.

26. Officiating Allowance

(i) The officiating allowance in respect of running staff officiating in running post shall be regulated as under: —

(a) ''When running staff are put to officiate in a "running post" for 30 days or less, they shall be entitled to pay as admissible in the lower grade plus Running Allowance at the rates and on the condition applicable to the higher grade in which they officiate enhanced by 15% (except in the case of Second Firemen put to officiate as First Firemen and Engine Cleaners put to officiate as Second Firemen forwhom the enhancement will be by 30%) of the kilormetrage actually performed for every such higher grade."

(b) When running staff are put to officiate in a "running post" for more than 30 days, their pay in the higher post shall be fixed underthe normal rules.

(ii) (a) When running staff are put to officiate in a stationary post for more than 30 days, their pay will be fixed on the basis of their pay in the lower post plus 30% thereof representing the pay element of the Running Allowance.

(b) The fixation of pay of running staff put to officiate in a stationary post for a period of 30 days or less, shall continue to be regulated in terms of rule no. 24 (ii) (a) above.

(iii) In cases where the officiating arrangement is initially approved for periods exceeding 30 days the normal rules of fixation of pay will apply; where the period is initially for 30 days, the enhanced kilometrage allowance drawn upto 30 days should be allowed to stand but payments for periods beyond 30 days should be in accordance with the rules for normal-fixation of pay on promotion.

27. Minimum Guaranteed Kilometrage Allowance

(i) The existing system of payment, as a rule, of a minimum guaranteed kilometrage in all cases where the kilometrage earned in a day falls short of a prescribed level, shall be discontinued with effect from 1-8-1981.

(ii) However, each Railway shall identify such sections and circumstances which do not have the potential for enabling the running staff to earn adequate kilometrage within the stipulated duty hours. For these identified sections and circumstances, the running staff shall be paid at the rate of 120 kms. for the full stipulated duty hours.

NOTE : The concept of rostered day shall be abolished w.e.f. 1-8-1981.

28. Incentive scheme forthrough Goods Trains

(i) An incentive scheme for through goods-trains working on sections and in circumstances other than those identified as per Rule 15 of Running allowance rule 1981, shall be introduced w.e.f. 1-8-1981 and regulated as under:—

(a) Steam traction:

Total Kilometrage Actually performed by the running staff	**Kilometrage to be paid for**
0 to 60	Actual Kilometrage performed.
61 to 100 .	Do. +40% thereof
101 to 150.	Do. +50% thereof
151 and above	Do. +60% thereof

(b) Diesel and Electric Traction :

Total Kilometrage Actually performed by the running staff	**Kilometrage to be paid for**
126 to 175	Do. +20% thereof
176 to 200	Do. +30% thereof
201 and above	Do. +40% thereof

(ii) Inflation of kilometrage as indicated above will be applied with reference to the kilometrage actually performed during one prescribed schedule of duty from “signing on” to “signing off”. It will not be related to either trip or rostered day, which concept has been abolished in terms of Rule 15 of Running allowance rule 1981.

NOTE : (a) The inflation of kilometrage shall not be applicable to ghat sections for which a separate method of computation is provided for in these Rules.

(b) The distance, as a whole, has to be taken into account while giving the weightage according to the slabs.

29. Computation of Kilometrage for slow move Trains

(i) Running staff working shunting and Van Goods trains will continue to be paid at double the kilometrage for the first 60

Kms. and at three times the kilometrage beyond that distance.

(ii) In the case of Ballast and Material Trains, Crane Specials and light engines on mechanical account, the computation of kilometrage shall be at the rate of 20 kms. per hour subject to a maximum of 200 kms. for prescribed hours of duty, the period being reckoned from "signing on" to "signing off".

(iii) In the case of Breakdown specials and Medical Relief Trains the computation of kilometrage shall be at the rate of 25 kms. per hour from "signing on" to "signing off".

NOTE : The inflation of kilometrage of slow moving trains in the above manner would not be applicable to ghat sections, for which a separate method of computation of kilometrage is provided for under these Rules.

30. Computation of Kilometrage for Passenger Services -

In the case of running staff working Passenger Trains, the kilometrage shall be computed on the following basis:-

Hours of Duty from "Signing on" to Signing off Kelometrage to be paid for

Hours of Duty from "Signing on" to Signing off	Kelometrage to be paid for
(a) Upto 4 hours	Actual kilometrage subject to a minimum of 120 km.
(b) 4 hours and above but less than 5 hours.	Actual kilometrage subject to a minimum of 130 km.
(c) 5 hours and above	Actual kilometrage subject to a minimum of 150 km.

31. All SGT/ASGT services shall be discontinued w.e.f. 1-8-1981. However, Guards who were working SGT/ASQT services and were confirmed in their respective posts at the time of discontinuance of these services shall be granted protection of pay in the grade in which they were confirmed.

32. Running Staff Working Pilots -

(i) In the case of running staff manning the Coal Pilots of Eastern and S.E. Railways, the target time for completion of trips shall be fixed on the following basis :

(a) From bahar line to bahar line and in those cases where the crew is taking over charge at outstations, it shall be fixed from the time of taking over charge of the engine to the time of handing overcharge of the engine.

(b) In the case of engines, the target time shall be reckoned from train departure to train arrival.

(ii) The Trip Allowance to the running staff working the Coal Pilots shall be paid at the rate of 160 kms. for eight hours.

(iii) In addition to the Trip Allowance, the running staff working the Coal Pilots shall be paid at bonus equivalent of 50 kms., if they perform the complete trips within the stipulated target time.

(iv) The Coal Pilot Guards of Eastern and S.E. Railways who perform commercial duties also, shall be paid commercial Duty Allowance of Rs. 50/- p.m. further revised to Rs. 100/- p.m. w.e.f. 1-1-1987. In the case of Guards who are engaged in this job allow the part of the month, the Commercial Duty Allowance shall, w.e.f. 1-5-1982, be granted at the rate of Rs. 1.70 for each day on which commercial duties are performed, subject to a maximum of Rs. 50/- p.m. with effect from 1-1-1987, this daily rate has been revised to Rs. 3.30, subject to a maximum of Rs. 100/- p.m. or rates prescribed are as per competent authority from time to time.

(v) The provisions contained in sub-paras (i), (ii) and (iii) above shall be extended to the running staff working all Pilots and also to the loco and traffic running staff working in "Delhi Area" w.e.f. 1-8-1981.

NOTE : In the case of jugglers which are utilized for picking up loads from adjoining yards/stations, the running staff who are booked for them for 8 to 10 hours, shall be paid at the rate of 120 kms. for the stipulated duty hours in terms of Rule 15 (ii) of Running allowance rule 1981.

33. Shunting Duty Allowance:

(i) Running staff working through Goods Trains and Shunting Van Goods Trains shall be paid shunting duty allowance to the extent and at the rates indicated below:

(a) For through Goods Trains—For shunting from 3rd station/point in one trip.

(b) For Shunting/Van. Goods trains—For shunting from the 4th station/point in one continuous spell of duty.

The rates of the allowance for shunting shall be admissible as per current rate prescribed by competent authority.

(ii) When the main line crew is utilised for shunting duty at the terminals, which is preceded by or followed by train working, such shunting duty shall be paid for at the rate of 15 kms. per hour.

34. Waiting Duty Allowance

Waiting duty allowance at the rate of 15 kms. per hour upto 10 hours shall be paid to the running staff in the following cases :—

(a) Waiting/Stand-by duty as per roster.

(b) Station duty including detentions on account of cancellation of the trains or cancellation of booking of the staff after they have reported for duty.

(c) Running staff kept back in administrative interest, such as booking for President's Special, Relief Trains etc.

(d) Waiting in steam in the case of President's Special.

35. Ghat Sections

(i) The following criteria shall be adopted for declaring a section as Ghat Section for the purpose of payment of running allowance on the basis of computation as indicated in sub-para (ii) below :

(a) The ruling/gradient of a section shall be the determining factor.

(b) Sections with a ruling/gradient of 1:40 or steeper shall be classified as Class I Ghat Section and those with a ruling gradient of 1:80 or steeper but less steep than 1:40 shall be classified as Class II Ghat Sections.

(c) The distance between two adjacent block sections shall be treated as a section for this purpose.

(d) The total length of the stretches in such a section having the gradients specified in sub-para (b) should have at least one third of the length of the section concerned.

(ii) Computation of kilometrage for the purpose of payment of Running Allowance to the running staff working trains on a Ghat Section shall be made on the following basis :—

(a) In the case of running staff working trains on all Ghat Sections where the banker is actually employed in assisting the train, the computation of kilometrage shall be five times the actual distance travelled.

(b) In all other cases (including those where the banking engine is run as a light engine or assistance is not required), the computation shall be five times the actual distance travelled in the case of Class I ghat section and three times the actual distance in the case of Class II ghat section.

36. High Speed Trains

The following criteria shall be adopted for classifying a train as 'High-Speed-Train' for the purpose of payment of Trip Allowance to the running staff working such trains :

(a) The maximum permissible speed should not be less than 110 kms. in the case of B.G. and 100 kms. in the case of M.G.

(b) The aforesaid limits of maximum permissible speed should obtain over at least 50% of the total run of the train.

(c) The average speed should not be less than 66 kms. on the B.G. Section and not less than 60 kms. on M.G. Sections.

(d) (i) The minimum distance between terminals of the trains should be 400 kms. on B.G. and 300 kms. on M.G. sections.

(ii) A trip allowance as per current rates prescribed by competent authority shall be paid to the running staff working High-Speed Trains and Rajdhani Express for completion of trips.

(iii) The Co-Loco Pilot in respect of Rajdhani Express will be in the grade of Mail Loco Pilot i.e. Rs. 1640-2900 (RS) and

the Co- Loco Pilots in respect of all other High-speed trains will be in the grade of passenger-Loco Pilot viz. Rs. 1600-2660 (RS).

37. Reckoning of Running Allowance as pay :

(i) 30% of the basic pay of running staff shall be reckoned as pay for the following purposes :

(a) Entitlement to Passes and P.T.Os.

(b) Medical attendance and treatment.

(c) Educational assistance.

(d) Fixation of pay in stationary posts.

(e) Compensatory (City) Allowance,

(f) House RentAllowance.

(g) Entitlement to quarter.

(h) Recovery of rent for quarters.

(i) Dearness Allowance/Addl. Dearness Allowance.

(j) Overtime Allowance,

(k) Leave

(ii) For the purpose of educational assistance, 30% of the basic pay shall be reckoned as pay for determining the eligibility for all the scheme of assistance given to Railway employees for the education of their children/ward viz. reimbursement of tuition fees, children's educational assistance and subsidized hostels.

(iii) For the purpose of retirement benefits, 55% of basic pay shall be taken into account in the case of running staff retired/ retiring on or after 1-4-1979. 55% of basic pay shall also be reckoned as pay for the purposes of recovery of subscription towards Provident Fund.

(iv) When running staff are on leave (including casual leave) they shall be paid their leave salary based on their basic pay plus 30% thereof and the other allowances including Dearness Allowance/Addl. Dearness Allowance due on such basic pay plus 30% thereof.

(v) For the purpose of deduction of Income-Tax, 30% of the actual Running Allowance earned by the running staff shall

be reckoned as pay and the balance 70% of the Running Allowance shall be exempted under section 10(14) of the Income-Tax Act, 1951, with effect from the financial year 1982-83 (Assessment Year 1983-84).

(vi) The pay element in Running Allowance viz. 30% of basic pay is also reckoned as pay for the purpose of grant of Interim Relief in terms of Board's letter No. PC-III-83/PC-IV/3(IR) dated 2-8-1983.

NOTE—

(a) While 30% of the basic pay of running staff will be taken into account for the purpose of determining entitlement to Passes and PTOs, the members of the running staff who were already entitled to a higher class of Passes/ PTOs on regular basis as on 31-7-1981, shall continue to be eligible to such Passes/PTOs.

(b) For the purpose of retirement benefits, 55% of basic pay shall count as pay for calculating pension and DCRG as well as for special contribution to PF Rules.

(c) While determining the emoluments for the purpose of calculation of retirement benefits, Dearness Pay as admissible from time to time, shall be calculated on basis of pay plus 30% thereof in the case of running staff retired/retiring on or after 1-8-1981.

38. (i) Running staff learning the road shall be paid for the total kilometrage actually run instead of for three-fourth of the distance.

(ii) Inflation of kilometrage on account of incentive scheme, ghat sections etc. is not admissible to the running staff learning the road.

(iii) Not more than 3 trips in the up direction and 3 trips in the down direction shall be allowed for learning the road on each section.

39. (i) Running staff traveling as passengers on duty before or after working trains or when they are called upon to work a train at outstations but have to return without working the train due to its cancellation shall be treated as performing "light duties" and shall be paid at half the kilometrage actually travelled.

(ii) In the case of trains which are provided with double sets of crew, the spare crew traveling in the crew Rest Vans shall be paid half the kilometrage admissible to the crew on duty.

40. When running staff cannot be allowed running or other duties on account of:

(a) occurrence of natural calamities like breaches due to flood etc; or

(b) coal shortage, they shall be paid Allowance in lieu of kilometeage as admissible at Headquarters in terms of Rule 20(a) above.

41. The total kilometrage earned by the running staff during a month shall be rounded off to the nearest 50 kms, i.e., 1 to 24 kms. will be disregarded 25 to 74 kms. shall be rounded off to 50 Kms and 75 to 99 kms. shall be rounded off to 100 kms.

42. With the commencement of these Rules namely with effect from 1-8-1981, the provisions relating to Running Allowance in Chapter V of the Indian Railway Establishment Code Vol.1 and in Chapter IX of the Indian Railway Establishment Manual shall stand modified to the extent and in the light of the provisions enumerated in these rules.

43. (i) The power to amend these rules shall vest in the President.

(ii) The power to interpret or clarify the provisions in the application of these rules shall be exercised by the Ministry of Railways.

44. Allowances for Loco Inspectors

(1)Running Allowance shall be admissible to the Loco Inspectors drawn from the Loco Running Staff for the performance of duties directly connected with the training and monitoring of loco running staff on foot plate of the locomotive cab of the moving trains.

(2) Types of allowances:

1. The Chief Loco Inspectors shall be paid:

a. A Kilometreage Allowance (KMA) for actual Kilometreage travelled on foot plate while employed on foot plate duties

indicated in Rule (44)(1) above. KMA shall be paid at the rate applicable to Loco Pilot (Mail/Express) as notified from time to time for these categories of staff.

b. An Allowance in lieu of Kilometreage (ALK) at the rate of 160 kilometres per day while employed on other than foot plate outside their headquarters beyond a radius of 8 kilometres.

c. Where the Loco Inspectors are deployed for foot plate duties indicated in Rule (44)(1) for part of the day and for other than foot plate duties in the moving train or at outstation for the remaining part of the day, the payment of Kilometreage allowance shall be made either in terms of (a) or (b) above, whichever is higher.

2. No other special allowance shall be admissible unless specifically sanctioned by Railway Board.

45. Allowances for Loco Pilots drafted to perform the duties of Power Controllers/ Crew Controllers.

1. Allowance in lieu of Kilometreage of 120 kilometres shall be admissible to Loco Pilots drafted to perform the duties of Power Controllers/Crew Controllers at the rates applicable to them.

2. No TA/DA or Special Pay shall be admissible to the Loco Pilots drafted to perform the duties of Power Controllers/ Crew Controllers.

3. No other special allowance shall be admissible unless specifically sanctioned by the Railway Board.

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CHAPTER - XXVII

ROLLING BLOCK PROGRAM

Rolling Block Program: "Rolling Block Program" means advance planning of traffic blocks/disconnections (civil/ electrical/S&T etc. including Non-Interlocked work) over a specified duration up to 52 weeks, required for maintenance and asset repair/replacement/creation works, to be prepared on a rolling basis by adding one week plan every week by reviewing the output of the immediate preceding week and planning forthe remaining weeks ahead.

Details of the "Rolling Block Program":

1. The "Rolling Block Program" incorporating the annual maintenance program shall be prepared in advance in the month of March for the next Financial Year.

2 The Rolling Block Program shall be prepared in advance, eventually for 52 weeks with requirement of each week to be submitted in the preceding week in the Division and approved by DRM. It shall be reviewed weekly for output of immediate preceding week and another one-week planning will be added every week.

3. Rolling Block Plan shall fulfil the requirement of traffic/power block for renewals, maintenance, new asset creation work, disconnections, movement of track machines, inspection vehicles and RMG etc. including blocks committed for outsourced track machines. Mega blocks may be planned once in a week or as per the requirements of major infrastructure works or Non- Interlocked works.

4. The Rolling block programs should integrate planning for all type of works e.g. civil, electrical, S&T and projects for creation/modification/rehabilitation of all types of infrastructure assets requiring blocks.

5. Non-Interlocked works should be incorporated in the Rolling Block Program to improve the utilization of blocks in a section.

6. Requirement of block by different stakeholders shall be assessed and dovetailed in a joint manner. With integrated

planning, separate blockin same section for work of different departments/agencies can be avoided in the planning horizon.

7. Sr DOM shall indicate a suitable corridor for giving the blocks demanded taking into consideration the integrated maintenance corridor block provided in the working time-table, historical data and operational patterns.

7.1. For maintenance/repair/replacement on emergency crossovers (i.e. UP and DN lines), provision of 1 hour disconnection (including half an hourtraffic/power block) on both main lines shall be incorporated in working timetable for station yards.

7.2. For major yards, corridor blocks for each line/cluster of lines shall be identified day wise by Operating department and indicated in WTT so that blocks/ disconnections may be suitably incorporated in the Rolling Block Program.

8. An empowered team of all concerned branch officers shall be nominated on each Division to review and finalize the Rolling Block Plan with repercussions on train operations - mobility, loading and punctuality.

9. The weekly block planning will be finalized jointly by concerned branch officers and approved by DRM. Grant of blocks & output of block shall be reviewed by DRMs regularly and the review of grant and utilization of blocks in the previous week shall be part of Rolling Block Program.

9.1. Subsequent week's block plan must be ensured by every Saturday so that concerned department can plan manpower and material in advanced, for effective utilization of block from first day of upcoming week i.e. Monday.

10. Requirement of blocks/disconnection shall be calculated based on maintenance schedules incorporated in respective manuals as per the rated output of the manpower/machines. A periodical benchmarking exercise should be done to incorporate best rated outputs of manpower/machines and proliferation of best practices.

11. The record of block demanded, granted, actual duration and output should be updated, as usual, in Control Office

Application (COA), Track Management System (TMS), Traction Distribution Management System ODMS) etc. for log. The planning, execution and internal communication for Rolling Block Program may be done as deemed fit by the division.

12. Rolling Block Program is for planned works. Activities requiring emergency blacks will continue to be governed as per the existing practices/provisions.

13. Appropriate and adequate resources should be mobilised to optimise the productivity during these blocks. Proper planning and resource mobilisation should be ensured to complete the planned work within planned block time with required quality.

14. Planning for blocks of mega and Non-Interlocked works necessitating cancellation/ rescheduling/diversion of trains, should be made adequately in advance in the Rolling Block Plan.

14.1. Approval of the Competent Authority for blocks for mega and Non-Interlocked works, including the date(s) and time slot(s) of the works, should be taken before the commencement of Advance Reservation Period (ARP) of the affected trains and in no case such approvals, including any modifications in date(s) and time slot(s), shall be granted less than 4 weeks before the scheduled departure of the affected trains.

14.2. Mega and Non-Interlocked works at stations near Zonal boundary should be planned consulting with the adjoining Zonal railway such that the blocks for Mega and Non-Interlocked works at two nearby stations in two different zonal railways be taken up in tandem/shadow to minimize repercussion on coaching and freight trains.

14.3. In case blocks for such Mega Non-Interlocked works involves inter-zonal train repercussions, consultation with concerned zones should be done before sanctioning the block, Further, when such repercussions are expected to be substantial, involving cancellation of inter-zonal Mail/Express

trains, Railways Board to be advised to issue orders for cancellation of trains well in advance as per 14.1

15. For increasing the maintenance corridors, intra-zonal trains can be rescheduled with the approval of GM under information to Railway Board.

16. For increasing the maintenance corridors, trains involving only 2 zones can be rescheduled by the zones concerned with mutual consultation & approval of GMs under information to Railway Board. If agreement is not reached between the two zones, matter may be referred to Railway Board.

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