

CHAPTER V

EQUIPMENT OF TRAINS I Automatic Vacuum Brake

5001. Principles :- (a) This brake obtains its power from atmospheric pressure which is the pressure exerted by air against a body from one side of which air has been withdrawn either in part or in whole.

(b) Atmospheric pressure, which is 14.7 lbs. per square inch at sea level, progressively decreases on higher altitudes. For the purpose of the Automatic Vacuum Brake, however, atmospheric pressure is roughly taken as 15 lbs. per square inch.

(c) This brake stops the train by the application of the brake blocks to the wheels tyre just as is done with the ordinary hand brake, but the power which operates the brake is derived from the pressure of the atmosphere acting on one side of a piston in a cylinder, against a partial vacuum on the other.

5002. The Train Pipe :- (a) The vacuum is created by the Locomotive and the train pipe is connected to the bottom of the Ejector and runs underneath the engine and every other vehicle on the train. The train-pipes of the engine, the tender and the vehicles are coupled together by means of rubber hose pipes and universal coupling, the rear hose pipe of the last vehicle and the front hose pipe of the engine being sealed off by placing them on the dummy plug. The joints between the couplings are made air-tight by means of rubber washers.

(b) **The Vacuum Brake Cylinder.** (i) The vacuum Brake cylinder of each vehicle is connected to the train pipe by means of cylinder hose pipes which are very much like the train hose pipe but smaller in diameter. The piston is loosely fitted in the cylinder and is fitted with a rubber ring known as the Rolling ring which rolls between the piston and the cylinder when the piston moves up or down, making a frictionless air-tight joint. Three small holes are drilled through the wall of the piston and on the passage connected with these holes is a small Ball-Valve which permits air to be drawn out of the space above piston, i.e. from cylinder Barrel & Vacuum chamber space, but does not permit any air to get into this Barrel. The piston rod extends through the base of the cylinder where the air tight packing and guiding arrangement is provided, and works the brake blocks through a brake shaft to which it is connected.

(ii) The space below and above the piston is connected to the train pipe through a release valve and hose pipe syphon. This valve (called Release valve) contains two passages, one large and one small. The large passage, which is always open, leads to the space below the piston while the small passage, which is normally closed by a rubber diaphragm attached to release valve spindle leads to the space above the piston. A spindle (called release valve spindle) extending outside the Release Valve body, permits the rubber diaphragm to be lifted from its seat by the operation of a lever attached to it to equalize the top and bottom pressure in the cylinder.

- (iii) An improved type of Brake cylinder known as the 'F' type has been designed to facilitate the examination and renewal of the rolling ring etc., and is fitted with a double Branch Release valve. It functions in exactly the same way as the 'E' type cylinder does, but instead of a dome on top there is a separate reservoir connected to cylinder serving as vacuum Reservoir. A bottom pan enables the piston to serve as vacuum Reservoir. A bottom pan enables the piston to be removed from the cylinder without its body being dismantled.
- (c) **The Driver's Vacuum Gauge :-** This gauge has two pointers. The one on the left indicates the amount of vacuum in the train-pipe which runs the whole length of the train and the other on the right, the amount of vacuum in the vacuum chamber of the engine and tender only. When the brakes are applied only the left hand pointer indicates a drop in the vacuum. Any fall in the right hand pointer indicates that there is a leakage of air either from outside into the chamber space or there is a leak from the train side to the Chamber side in the engine and tender Brake-cylinders.
- (d) **The Guard's Van valve and vacuum Gauge :** (i) This valve is fitted on a vertical extension of the main train pipe in the Guard's compartment. It consists of a round Dome and a double head valve which has one top head fitted with a diaphragm, the head resting on the vertical extension of the train-pipe. Through the stem of the valve runs a small hole establishing communication between the brake pipe and the round dome.
- (ii) When the driver makes a gradual application of the brake, the vacuum in the round dome is destroyed as quickly as that in the train pipe and the valve remains seated on the vacuum gauge pipe. When, however, a sudden application of the brake is made, vacuum is destroyed quickly in the brake pipe, but owing to the small hole in the double-head valve, the vacuum in the round dome is not destroyed so quickly. The momentary higher air-pressure on the train pipe side, therefore, lifts the valve admitting air into the train pipe and augmenting the braking action at the rear end of the train, as soon as the pressure in the train pipe and the round dome become equalised, the valve closes by gravity.
- (iii) The valve is also fitted with a hand-lever (called Van Valve Handle) so that the Guard can, when necessary apply the vacuum brake from his compartment. The Van valve handle when operated lifts the valve from its seat and allows the air to enter and destroy the vacuum. In the Westing/house type the van valve handle operates the valve through a rotating perforated disc which regulates destruction of vacuum.
- (iv) The round dome is fitted with a vacuum gauge which has a pointer indicating the amount of vacuum in the train pipe.

5003. Applying the brakes. - To apply the brakes, the Driver moves his handle from the 'Running' position towards the 'ON' position, thus admitting as much air as he considers necessary through the air disc to the train pipe and thence to the bottom of each cylinder. This air lifts the piston and causes the brake blocks to be pulled against the wheel. For a quick emergency stop, the handle is moved to the place marked "ON". As long as the Driver's handle is between the "Running" and 'ON' position, the brakes will remain on.

5004. (a) Releasing the brakes - To release the brakes the driver first pushes his handle into the position marked 'OFF'. When about 10" of vacuum has been created, the Driver puts his handle into the "Running" position.

(b) The handle of the empty/loaded boxes on Box wagons should be set against the "empty" position when the wagon is empty or when it is loaded partially or when it is loaded with light materials like bamboo etc. so that the gross weight of the Box wagon is not likely to exceed 50 tons. The handle of the Box wagon should be set against "loaded" position when the Box wagon is fully loaded or if the gross weight is above 50 tons.

(c) The Station Master or the commercial staff responsible for unloading or loading of the wagons should also ensure that the handle of the empty/loaded box is correctly set after unloading or loading.

5005. Releasing brakes of a detached vehicle. - When a vehicle is detached from a train, the brakes remain 'on' due to there being air below the piston and vacuum above. In order to release the brakes, the release valve lever is pulled so that communication is established between both sides of the piston. This equalises the air pressure on both sides of the piston which, there upon, falls to the bottom of the cylinder by gravity.

5006. Train parting - (a) If a coupling breaks and the train parts, the hose pipes become uncoupled. When this happens, air rushes into the train pipe and thence enter the bottom of the cylinders and the brakes are fully applied, bringing both parts of the train to a stand. It is on account of this action that this brake is called "Automatic".

(b) When engine and the tender part, the train and the Chamber pipes also get uncoupled at the universal couplings. The air enters freely in the train pipes but cannot enter into the chamber pipes as the ball valve provided in the chamber pipe couplers prevent the air from doing so.

5007. Passenger communication. -see para 2004 and 2005.

5008. Brake power. - (a) Every vehicle on a Mail, Express and passenger train must be fully vacuum-braked with the vacuum brake system in working order, and the minimum percentage of effective brake cylinder on any one train formation should be 90.

(b) All vehicles on mixed and Goods trains must be equipped either with vacuum brakes or with train pipes and the proportion of piped vehicle including those with ineffective vacuum cylinders must not exceed the following percentage piped vehicles must be so marshalled that there is at least one active vacuum braked vehicle between every two piped vehicles.

Maximum permissible percentage of piped vehicles and those with ineffective vacuum cylinders :-

Mixed Trains	B.G. Goods Trains	M.G. Goods Trains
10%	15%	15%

5009. Amount of Vacuum to be maintained :- Except on ghat section for which special rules are laid down, the following amount of Vacuum Air pressure should be maintained in trains fitted with vacuum brake and Air brake respectively throughout.

S. No.	Type of service	vacuum/Air Pressure unit			Minimum B/Power in train
		In Engine	B/Van	Average	
1	Mail/Express (BG) Vacuum Brake. Passenger mixed (BG)	53Cms 50Cms	47Cms 44 Cms	50Cms 47Cms	100% coming from pit & on run minimum 90%
2	Mail/Express/Passenger / Vacuum Brake mixed (MG)	46Cms	38Cms	42Cms	100% coming from pit & on run minimum 90%
3	Goods train (BG) load 70 or less than 70 More than 70 wagon Vacuum Brake.	46 Cms	38Cms	42cms	85% For more than 70 loads, brake should be in working order in first and last 3 wagons
		42 Cms	34Cms	38Cms	
4	Goods train (MG) 70 or less than 70 wagons More than 70 wagons	38Cms	23Cms	30.5cms	85%
		38Cms	20Cms	29Cms	85%
5	Mail/Exp/Passenger Air Brake	5±0.2Kg/Cms ²	4.8±0.2 Kg/ Cms ²	-	100% after pit attention and 90 % on run
6	BCN/BOXN Goods Train Air Brake upto 70 unit More than 70 unit	5±0.2Kg/cms ²	4.8±0.2 Kg/ Cms	-	100% at originating point
			4.7±0.2 Kg/ Cms ²	-	90% minimum on run

5010. Precautions before starting- (A) Check of Locomotive brake system :- The Shed incharge must satisfy himself before leaving shed that Expressor/exhauster and the Locomotive brake system are in good working order. Expressor/Exhauster is tested by means of a testing disc placed against the rubber washer of hose pipe on either end. This disc has a perfectly round hole of 5/16 "(0.79 cms.) diameter in the centre. This hole should permit the following amount of vacuum to be maintained by Diesel Elec. and Electric locomotives hauling all type of trains.

- (a) Diesel electric loco with engine idling and handle in release position
For all trains irrespective of booked/maximum permissible speed. 53 cms.
- (b) Electric loco with single exhauster For all trains irrespective of booked/
Maximum permissible speed. 53 cms.

Note :- The above test should be conducted for both the exhausters separately in case of electric Loco. If the Expressors/Exhauster/Remora creates more than 53 cms. Vacuum adjustment should be made on Loco by shed/output staff.

- (B) (i) At the originating or engine changing station, where there is no JE/SE(C&W), the Guard and Driver must jointly check the brake power of the train and visually examine the load for detecting any unsafe wagon.
- (ii) At train examining stations, the JE/SE(C&W) shall ensure that the vacuum brake system is in working order and the brake power of the train is satisfactory and within prescribed limit. However, the Driver shall exercise vacuum leak test to safeguard against vacuum trouble on the run.

(iii) Loads stabled at road side station

- (a) Whenever a through goods train is stabled at a road side station where train examining facilities are not available, the Driver should hand over the brake power certificate to the Station Master for safe custody.

- (b) When the train is to be subsequently cleared, the brake power certificate will be handed over to the Driver of the outgoing train.
- (c) After that, it will be the responsibility of the Guard and the Driver working the train to ensure that the train has adequate brake power and is safe to run in all respects. They shall ensure vacuum or Air Pressure continuity and adequate brake power by counting operative and non operative piston before starting.
- (d) For this purpose the driver will create at least 45 cm. of vacuum on the engine and 35 cm. in the brakevan. The Guard on seeing 35 cms. of vacuum in the brakevan shall show Red Hand signal to the Driver to destroy the vacuum.
- (e) Thereafter the Guard and Driver shall jointly ascertain the adequacy of the brake power by walking along the length of the train on either side of the train.
- (f) At the originating or engine changing stations, where there is no JE/SE(C&W), the guard and driver must jointly check the brake power of the train and visually examine the load to ensure that there are no loose fittings in the under gear including brake blocks, safety brackets, track areapins, brake gear pins, which may endanger the safe running of the trains.
- (g) Thereafter the Guard shall prepare a memo in triplicate indicating the number of operative as well as inoperative pistons as also the number of piped vehicles which shall be signed jointly by the Guard and Driver, one copy of this certificate will be retained by the Driver, one by the Guard and one copy will be given to the Station Master for station record.
- (h) The station master shall not permit the guard and driver to start the train until he has received a joint memo from both of them to the effect that the train is fit to proceed.

(iv) Load stabled in Yard

- (a) At train examining points, if a goods train which has been examined by C & W staff, does not leave within 24 hours of examination and certification, the load should be again re-examined by JE/SE(C&W) and discrepancy advised if noticed for remedial action.
- (b) The brake test should be carried out again on re-examination by vacuum exhaustor/train engine and fresh certificate issued before departure.
- (c) Timely advice of re-ordering should be given to JE/SE (C&W) and all concerned will ensure that the train re-starts punctually at the re-ordered departure time.

(v) Change in Composition

- (a) Whenever, wagons are attached to or detached from a train at a station, the Guard and Driver should check the train after such change, to ensure adequacy of brake power.
- (b) If the number of wagons to be attached is 10 or more, they should be examined by the train examining staff before attaching and a fresh brake power certificate should be issued.

(vi) In case the requisite amount of vacuum is not available the Driver and the Guard must try to locate and rectify the leaks on the vacuum system of the train. Leaks are usually traceable to:-

- (a) Damaged hose pipes.
- (b) Hose pipe coupling not properly connected.
- (c) Hose pipe couplings of the last vehicle and the front hose pipe of the engine not properly placed on the dummy plugs.
- (d) Damaged or deficient rubber washers.
- (e) Loose clips holding hose pipes on Swan Necks.
- (f) Junctions of iron pipes secured by means of worn out threads.

(vii) **Checking Brake Power of Trains Before Starting :-** OPRS-22 shall be maintained separately for Guards and Drivers for goods trains only. These forms shall be prepared in duplicate by carbon process by the train examining staff and presented for signatures to the Guards and Drivers of all trains at :-

- (a) Starting stations.
- (b) Engine changing stations and;
- (c) Train Examining stations where the Driver makes a specific complaint on the reverse of OPRS-22 in his possession, issued to him by the JE/SE(C&W) station with regard to the working of the vacuum brake.

Note :- (1) For passenger trains; one book should be maintained for Guards and Drivers, OPRS-22 should be prepared in triplicate on prescribed format by carbon process.

(2) In case of change of train crew en route the Driver/Guard taking over the train must take over OPRS-22 relating to his train under acknowledgement to the Driver/Guard who is being relieved.

(viii) Particulars of vacuum recorded on OPRS-22 shall be obtained from an actual vacuum test conducted either with the train engine or a vacuum exhauster.

(ix) The JE/SE (C&W) shall, prior to the arrival of the train engine, fill in the following particulars in the OPRS-22 books and sign in full -

- (1) Serial No.
- (2) Train No.
- (3) Date
- (4) Load.

The three columns relating to active cylinders, rolling cylinder and piped vehicles should be filled at the time of testing the train with vacuum exhaustor or as recorded at the time of its incoming Examination (Passenger rakes only) or as noted when test, by the train engine. The Guard and the Driver shall ensure (from the entries of OPRS-22) that the number of active cylinders and piped vehicles are within the prescribed limit.

(x) After the creation of the required amount of vacuum, the OPRS-22 book will be presented separately to the Guard and Driver, who will fill in the following particulars and sign both copies of the form :-

1. Engine No.
2. Time of attaching on load.
3. Time vacuum ready, and
4. Amount of vacuum on the gauge (Guard will mention the amount of vacuum in the rear brakevan while the Driver will mention the amount of vacuum on engine gauge).

(xi) Both the Guard and Driver will retain the carbon copy of OPRS-22 and return the book with pencil copy intact to JE/SE (C&W)/TXR staff.

(xii) The Guard and Driver's copy of the OPRS-22 will be attached to the Joint Train Journal.

(xiii) If a Driver or a Guard after leaving the originating station or at engine changing station experiences any vacuum trouble, he should record the complaint on the reverse of the form OPRS-22 in his possession and make it over to the JE/SE(C&W) at the next train examining Station. The JE/SE(C&W) will record the defects rectified and carefully file the same. A fresh certificate on form OPRS-22 shall be issued by the JE/SE(C&W) to the Guard and Driver as detailed in earlier paras.

(c) Check of the number of Vacuum-braked vehicles :-

(i) At train examining stations, the JE/SE(C&W) shall be responsible for ensuring that the number of vehicles with active brakes operative from the engine is in accordance with para 5008. At stations where JE/SE(C&W) are not provided, this responsibility shall devolve on the Guard and the Driver.

(ii) The Guard must record in his Journal as well as in the engine ticket the number of vehicles fitted with automatic brakes operative from the engine and the number of piped vehicles.

(D) The Guard shall not give the signal to start unless he has satisfied himself regarding the brakes of his train, and the Driver shall not start unless he is satisfied that all the brake blocks are not binding on the tyres.

(E) At train originating station or engine changing station where JE/SE(C&W) is available, the brake continuity test is to be carried out by JE/SE(C&W) otherwise by Driver and Guard. Whenever there is change in train composition by attaching or detaching of Rolling stock at road side stations or a stabled load is started, the Driver and Guard should test the brake continuity and prepare joint certificate in 3 foils i.e. one for Driver, one for Guard and other for station record.

- 5011. Precaution during the journey.** - (a) **Defective Vacuum Brake.** - If the Guard of a train fitted with vacuum brakes finds that the gauge on his van shows less than the required vacuum (unless he is satisfied that such is caused by an application of the brake), he must be prepared to apply his hand-brake, and advise the Driver of the defect at the next stopping station. He must also report the incident in the journal and send a wire to the next train examining station ahead to rectify the defect on arrival of the train.
- (b) **Failure of Vacuum Brake** - In the case of failure of the Automatic Vacuum Brake during the journey, when the defect cannot at once be remedied, the train may proceed cautiously to the next convenient station where the defective vehicles can be remarshalled, detached or otherwise dealt with, the speed of the train being so regulated as to enable the Driver to have full control of the train by using the hand-brakes. In all such cases, the Guard must be on the alert, and assist in stopping the train, with the hand-brake, when necessary. The Guard must also send a message to the next train examining station ahead for the JE/SE (C&W) to attend to the defect.
- (c) **Defective Brake Cylinder.** - If a vacuum cylinder becomes defective during the journey, and it is inconvenient to detach the vehicle, the cylinder should be isolated by disconnecting the cylinder hose pipe from the release valve, plugging its mouth and tying it to the frame of the vehicle. If, however, by doing so, the brake power falls short of the minimum prescribed in para 5008 the Guard must be ready to assist the Driver in controlling the train by applying the hand brakes.
- (d) **Pinning down hand brakes.** - Whenever the Driver requires additional brake power, the Guard must pin down the hand brakes of as many pipe vehicles as the Driver may consider necessary.
- (e) **Checking of Vacuum Brakes after detaching and attaching :-** Before starting from a station where any vehicle has been attached or detached, the Driver and the Guard must satisfy themselves that the Automatic Vacuum Brake is in proper working order and is operative on the requisite number of vehicles.
- (f) **Check of Brake Power on run :-** Every Driver after leaving an engine changing or train examining station or whenever shunting operations have been done on the train should make a service application of brakes by destroying a few inches of vacuum in order to get the "feel" of the brake power of the train and he should take into consideration this available brake power while controlling his train. Time lost due to this check application of brakes should be made up on the run.
- (g) **Testing Vacuum Brake before descents and stoppages.** - Drivers must test the vacuum brake before descending steep inclines.
- (h) **When descending gradients.** - In controlling trains on descending long and heavy grades, Drivers are cautioned against allowing the vacuum above the pistons, to fall too low, which it will do unless periodically restored by blowing up with the Large Ejector. The destruction of vacuum above the pistons, owing to leaks, is always taking place during the continuous application of the brake while descending long down grades, and it is of the utmost importance that the vacuum above the pistons should be restored by the use of the Large Ejector. But before using the Large Ejector, the speed should be reduced to allow for the increases of speed which will take place when the Large Ejector releases the brakes. Care

should be taken that the speed during the release of the brakes is not allowed to increase beyond a safe limit. Neglect of this rule may lead to run away.

- (i) **When standing on gradients.** - The fact that after the brake has been applied the vacuum above the pistons gradually decreases, owing to leaks, and that in less than half an hour the brakes may leak off together, must not be forgotten, when a train is brought to a stand on a gradient steeper than 1 in 200. In all such cases measures must be taken to guard against the possibility of a run away. All hand brakes must be applied and if the grade exceed 1 in 100, one pair of wheels of every third vehicle must be spragged. When ready to start a proper vacuum must be created and the vacuum brake applied before the hand brakes are released and the sprags removed. Guard should carry the sprags on steep gradient sections.
- (j) **Smooth stopping.** - When approaching a station at which the train has to stop, the Driver must destroy at least 5" of vacuum at once. Just before the train comes to a stand, however, the Driver should put his handle into the "Running" position to release the brakes slightly to prevent a sudden jerk.
- (k) **Guards applying Vacuum Brake.** - When a Guard has to apply brake in an emergency, he should operate his van valve handle in such a way that about 5" of vacuum is destroyed at once. Thereafter, if necessary, he should apply further vacuum gradually.
- (L) **When Double-heading or banking** - (i) When a second leading engine is employed to pull a train (and not a banking engine pushing it), the Driver of the first leading engine will be held responsible for the working of vacuum brake. The Driver of the second leading engine must, however, in case of emergency, assist in stopping or reducing the speed of the train by applying the steam or hand brake, as may be required but he must not maintain or re-create vacuum.
- (ii) When additional engines are employed to push a train the drivers thereof must not interfere with the working of the vacuum brake which shall be under the control of the leading engine Driver as laid down in sub-para (i) above except in case of a run back, when the rear most assisting engine Driver automatically becomes the leading Driver. In such a case, the Driver of the assisting engine which has become the leading engine, should open his small ejector while the leading engine Driver (which has become assisting) should close his small ejector, otherwise the assisting engine will be releasing the brakes applied by the leading engine.
- (iii) Whenever a ghat section comprises of either descending or ascending gradients only and not both in the same direction, the banking engine should be attached as under.
 - (1) On descending gradient - in front of the train.
 - (2) On ascending gradient - in the rear of the train.
- (iv) Drivers of all additional engines shall, at all times, keep the handle of the vacuum Ejector in the "Running" position, and the small ejector must be closed.
- (v) In case the Driver of the engine in rear requires in an emergency to attract the attention of the leading engine Driver, he shall give a whistle signal as laid down in General Rule 4.46.

- (m) When alarm chain is pulled or hose pipe is disconnected, the disc at the end of the coach should be returned to normal position (thereby closing the clappet Valve) by leading Asstt. Driver Diesel Assistant before train is restarted.

Similarly hose pipe disconnected should be reconnected by Assistant Driver/Diesel Assistant.

In coaches of long trains (over 12 bogies) where conductor Guard or Coach Attendants or TTEs are posted, immediate steps will be taken by them to set right the alarm chain apparatus. Assistant Driver will provide technical assistance to conductor Guard etc., if needed.

(Also see para 2004).

5012. Other Precautions. - (a) In all cases where the vacuum brake is displaced by the hand-brake and the train worked non-vacuum during the journey the change and the station where it took place must be noted by the Guard in his journal in the engine ticket.

- (b) It is the duty of JE/SE (C&W) to rectify any defects in the Vacuum Brake system of passing trains when requested to do so by Guards or Drivers. If the defect cannot be rectified, the vehicle or vehicles concerned must either be detached or labelled to the JE/SE (C&W) of the terminal station for attention.
- (c) When detaching or attaching vehicles, the Driver must destroy the vacuum in the train pipe in order to facilitate uncoupling and coupling.
- (d) Each electric engine Driver will carry five spare rubber washer and Diesel Driver will carry one spare hose pipe (complete with clamps). He must make them over on request to the JE/SE (C&W), Guard or Station Master and obtain a receipt for them. This receipt shall be given to the C&W incharge, Shed Incharge who shall recoup the number shown thereon.
- (e) Each Guard incharge of a wholly or partially vacuum braked train must carry two spare rubber washers.
- (f) Staff disconnecting or connecting hose pipes must not have in their hands any waste or cloth which might be drawn into the hose pipe by suction.
- (g) Hose pipe couplings must be properly secured on the dummy plugs provided for the purpose.
- (h) Vacuum brake cylinders are to be considered effective only if the travel of the piston is within the limits of 9 cm. and 12.5 cm. when a full application of the brake is made. If the travel is less than 9 cm., the brake blocks will not clear the wheels properly when the brake is off and if it is more than 12.5 cm., the reduction of Vacuum above the piston will weaken the brake power.

NOTE:- Piston travel of BCX/BOX when empty is 13 cm. and when loaded is 18 cm.

5013. Examination of trains before starting. - (a) The station or Yard Master at all coaching and goods maintenance stations must not give permission to start any train originating from and marshalled at those stations until they have received report on Form T431'C' from the JE/SE (C&W) to the effect that the train is fit to proceed. In order to obtain this certificate Station Master or yard master will issue from T/431 containing 'A' 'B' and 'C' portion to

JE/SE(C&W) who will, after examining the train, return Part-C to the Station Master. He will retain Part-B of the form as his record. The SM will attach Part-C of the form to the corresponding counterfoil from Part-A.

- (b) In case of coaching stock shuttling between two points less than 240 kms. apart from each other, issue of T431 will not be necessary on each trip and in such cases the stock will be offered for TXR Examination on Form T431 at the maintenance station on the trip just prior to the trip after which the total kilometrage after the last examination would exceed 480 kms. Safe to run examination will, however, be given to the coaching rake after about every 160 kms.
- (c) JE/SE(C&W) at other examining stations will not issue fit to run certificates for vehicles damaged and repaired at those stations and for vehicles attached at such stations.

5014. Description of air-brake system.

(A) General.

- (i) Diesel/Electric locos equipped with pure air brake or dual brake system shall be used for operation of air braked passenger/goods train. The coaching stock is fitted with graduated release twin pipe air brake system while goods stock is worked on single pipe (Brake pipe) system.

(ii) The main equipments fitted in this system are :-

Distributor valve, Brake cylinders, check valve, dirt collector, isolating and angle cocks, auxiliary and control reservoirs and passenger emergency alarm valve. Except passenger emergency alarm signal device, all other items are mounted on the underframe. The brake pipe and feed pipe are painted in green and white colour respectively. While the brake pipe controls the application and release of Brakes, the feed pipe continuously refills the auxiliary reservoirs with charged air which makes it possible to obtain shorter release timing and complete in exhaustibility of the brake system.

(B) Working of the air-Brake system :-

(i) Charging

The brake pipe is charged to 5 kg./CM² by the Driver's automatic brake valve (A-9) in the locomotive. The auxiliary reservoir is charged by the Feed pipe, which is set at 6 kg./CM² through a check valve and check. The Brake cylinder is connected through an exhaust port in the Distributor valve when Brakes are in the released condition.

(ii) Application

To apply Brakes, the driver moves the automatic Brake Valve (A-9) handle which causes reduction in Brake pipe pressure. Since the movement of the Brake valve handle is in steps for graduated applications (or in one stroke for emergency application), the intensity of the braking is in proportion to the degree of movement of the valve. The brake pipe pressure is reduced and the pressure differential is sensed by the distributor valve. Air from the auxiliary reservoir flows into the Brake cylinder and Brakes get applied.

(iii) Release.

At the time of release, the air in the Brake cylinder is vented progressively depending upon the increase in Brake pipe pressure. When the Brake pipe pressure reaches 4.8 kg./CM^2 the Brake cylinder is completely exhausted and the Brakes are fully released.

(iv) Automatic air Brake valve (A-9).

This valve is self-tapping valve with five positions :-

(a) **Release** : In this position, the brake pipe is fully charged to 5 Kg./CM^2 and the train brakes are released.

(b) **Minimum Application**

This position provides a reduction of Brake pipe pressure by 0.22 kg./CM^2 to 0.50 Kg./CM^2 .

(c) **Full service application**

In this position the Brake pipe pressure is reduced by 1.6 Kg./CM^2 to 1.8 Kg./CM^2 .

(d) **Over-reduction**

In this position, the brake pipe pressure is reduced by 2.5 to 2.6 Kg./CM^2 .

(e) **Emergency application**

In this position, the brake pipe pressure is discharged/reduced abruptly to zero.

(C) Twin-pipe colour coding.

Feed pipe (FP)	-	Painted white
Brake pipe (BP)	-	Painted Green

(D) Continuity of Brake pipe pressure.

BP and FP hoses of locomotive are to be coupled to BP and FP hoses of the train load. Any misconnection of BP and FP anywhere on the rake can lead to Brake failure.

It should be clearly understood that the coaches/wagons are provided with air brakes and there may not be any vacuum pipes running along the length of the train.

The angle cocks in the BP and FP of all the coaches or in case of goods trains that of BP (except those at the trailing end of the last vehicle) should be kept in the open position i.e. parallel to FP/BP pipe to ensure continuity from the Locomotive to the last vehicle. Closure i.e. perpendicular to FP/BP pipe of any BP angle cock would result in Zero Brake power in the rear of it. Closed angle cock of the BP would, therefore, result in a disastrous situation during operation of the train and utmost care is, therefore, required to be exercised to ensure continuity of the Brake pipe pressure.

5015. INSTRUCTIONS FOR OPERATING STAFF AND LOCOMOTIVE DRIVERS

- (i) Operating staff shall follow the instructions covered in operating instructions for drivers issued for different types of diesel and Electric locomotives.

In addition, the following instructions should be given wide publicity amongst the drivers operating these trains. It must be ensured that these instructions have been clearly understood by the drivers.

- (ii) Crew specially trained for handling air-braked trains should only operate single/double headed air-braked trains. The crew should be thoroughly drilled on the precautions required to be taken by them.
- (iii) During the initial 3 to 6 months period of running the single/double headed air-braked trains, the driver's performance should be continuously monitored either at the senior inspectorial level or at the officers level in order to ensure that drivers have been properly educated and that they are following strictly all the instructions laid down for them.
- (iv) The instructions required to be followed by the drivers should be suitably stencilled in the locomotive cabin and the drivers should be asked to sign a register in token of having understood these instructions before being allowed to drive the single/double headed air braked trains.
- (v) The load/Amp meter of diesel and electric locomotives shall be marked with a red line at particular reading on the scale depending upon the type of the loco and the number of locos used for hauling such trains to indicate that the Driver shall not exceed the current values while operating the air brake trains.
- (vi) On locos equipped with dynamic brakes, It shall be kept in good working order and should be used for controlling train speed.
- (vii) It would also be necessary to ensure that the proportionate air brake for the locomotives are in good working order so that whenever the automatic brake application is made, the locomotives are braked proportionately to the air brakes applied on the train. This would avoid any severe jerks on the coupling of the vehicles.
- (viii) During full service/emergency brake application, high coupler forces have been observed, if driver puts the SA-9/A-9 valve in release position before the train has actually come to a stop.

These forces are particularly higher when this valve is put to release position while the train still has a speed of 15 kmph and above. This occurs because the locomotive brakes get released before the release of train brakes. This results on a situation when the unbraked mass of the loco(s) is pulling the trains ahead and the braked mass of the full train is pulling the locomotive. In order to avoid such a situation and to reduce draw bar forces during braking, it is necessary that the locomotive brakes are in applied position when the train comes to a halt. To achieve this, the drivers should apply the locomotive independent brakes after having moved automatic brake application valve to release position before the train comes to a halt.

- (ix) The operating staff should be drilled towards ensuring that the loco transition couplings are fully tightened before train departure. Also it should be ensured that before tightening the coupling, the rotating handle is in the central position so as to take full advantage of the

designed travel of the coupling. These precautions would obviate the problems of gap between side buffers of the loco and the adjacent coaching stock.

- (x) It may be ensured that the Brake pipe and Feed Pipe pressures in the locomotives are $5+0.1 \text{ Kg./CM}^2$ and $6+0.1 \text{ kg/CM}^2$ respectively before BP and FP are connected to the corresponding pipes of the train. After coupling BP and FP of the locomotive with respective pipes of the first vehicle, the angle cocks of these two pipes of the locomotive and the first vehicle should be opened.
- (xi) After emergency application, if the driver wants to restart the train he must wait for at least one minute after moving his brake valve handle to release position to permit full release of brakes. This would avoid high stresses being developed in front couplings during restarting.
- (xii) Driver should keep close watch on the Air-flow indicator gauge and set the fixed needle on the indicator coinciding with the movable needle after the air-brake system on the train is fully charged. In case during the run or at halts, the movable needle shows higher reading than the pre-set fixed needle, it would indicate either alarm chain pulling or train parting or Guard van valve operation or the train brake is not fully released or there is heavy leakage in the Brake pipe. In case the movable needle shows lower reading than the preset fixed needle, there are chances of any of the brake pipe angle cock in the train either not in fully open position or in closed position. In case of parting of locos and train or alarm chain pulling indication light through the flow indicator would also come ON.
- (xiii) In case of parting between locomotives or train parting, driver should move his automatic brake valve handle to emergency position after ensuring stoppage of rear position to stop further depletion of main reservoir air through the open brake pipe.
- (xiv) Driver shall ensure that the Audio visual system provided in the locomotive is in good working order.
- (xv) After the locomotive is attached to the train and before the issue of brake power certificate, the functioning of the alarm chain equipment on a few coaches must be checked and necessary endorsement made signed jointly by the JE/SE (C&W), Loco Driver and Guard.

5016. Loco failure.

- (i) In case of failure of locomotive (Diesel or Electric) or OHE Tripping in Electrified route on a gradient section, the Driver must apply train and locomotive brakes immediately to avoid rolling back of train. Since the main reservoir pressure can discharge at the rate of 0.6 kg./CM^2 per minute little delay in application of brakes may cause a serious accident due to rolling down.
- (ii) During double headed operation if the rear loco fails, the train is to be worked by the leading loco and the Block section cleared. If the load can't be cleared by one loco, assistance is to be given by any loco, preferably from rear, only for the purpose of clearing the Block section. But when the block section is being cleared by a vacuum braked loco, the Driver has to be extra cautious to stop the train at the stop signal.

- (iii) During double headed operation, if the leading loco fails, the train must be stopped. The isolating cock in the BP charging line and MU-2B valve of the rear loco are to be put in normal position in order to feed the BP pressure to the load and for the application of brakes from the rear loco to clear the Block section.
- (iv) In the event of non-availability of a loco fitted with air brakes, the brakes of the entire rake have to be released and a vacuum braked loco can be attached to clear the block section at a restricted speed not exceeding 15 kmph.

5017. SPECIAL INSTRUCTIONS FOR GUARDS

- (i) Before the Guard gives the green signal to start to the Driver, he should ensure that the gauges in his Brake van show a pressure of not less than 4.8 kg/ CM² and not more than 5.0 kg/ CM² of Brake Pipe and not less than 5.8 kg/ CM² and not more than 6.0 kg/ CM² in the Feed Pipe.
- (ii) Before commencement of train journey, the Guard should conduct a check by operating the van-valve provided in the Brake van and confirm with Driver that operation of the Guard's van valve gives the Driver an indication on the flow meter.
- (iii) He should ensure that the angle cocks of feed and brake pipes of the trailing end of the last vehicle are in closed position and hose couplings are kept on the dummy carrier.
- (iv) The Guard should normally not use his van valve for stopping the train except in emergency. He should make use of the telephone equipment, if provided between him and the Driver. In case the same is not provided, Guard shall apply brakes through van valve when required.

5018. Attaching of vehicles not fitted with Air Brake to Coaching trains. :-

- (a) Mail/Express and passenger trains on this Railway are being worked with vacuum as well as air brake systems. In case they are fitted with air brakes, brake piped vehicles (vehicles fitted with only brake pipe and not with Distributor valve, Brake cylinder, Brake rigging etc.) not more than one such vehicle may be attached in a passenger train duly protected by one or more vehicles fitted with working air brakes attached in rear of it.
- (b) No goods vehicle fitted with brake pipe only is permitted to be attached to a coaching train.

5019. Blanking off Air Brake Distributor valve. :-

When an air brake distributor valve or its brake cylinder on a vehicle is out of order, the distributor valve and brake cylinder must be put out of action. The brakes of individual wagons can be isolated by shutting off isolating cock. This isolating cock is fitted either with distributor valve itself or on the branch pipe connecting from brake pipe to the distributor valve.

- 5020.** The gauges on the engine and in the Guard's van when the train pipe is continuous should indicate the air pressure available by reduction of which the train can be stopped. The brake pipe gauges should not indicate less than the following pressures.

	<u>Engine Gauge</u>	<u>Brake van Gauge</u>
Mail/Exp/Pass trains.	5 kg./CM ²	4.9 kg./ CM ²
Goods trains	5 kg./ CM ²	4.8 kg./ CM ²

Air pressure of 5 kg./ CM² is not necessary as such the Air Brake combination in the engine (A-9 valve) should be so adjusted that the pressure charged in the brake pipes not more than 5 kg./ CM² as otherwise the brake binding troubles likely to be experienced.

Note :- Above readings hold good for Ghat sections as well.

5021. Air pressure for Ghat section

- (i) In addition to the specification on air pressure requirements and all other instructions laid down for goods train in the foregoing paras, it should be further ensured that a minimum of 90% of total number of cylinder are fully operative on a train on ghat section.
- (ii) If the requisite brake power as explained in the preceding para is not available or if the driver has any doubt as to the availability of sufficient brake power, adequate number of hand brakes should be pinned down to ensure effective control on a train on a falling gradient.

II. First Aid Boxes

5022. Description/Supply :- (a) It shall be made of metal with a felt lined lid fittings well down over the sides so as to be dust proof and should be of a size and pattern approved by the Chief Medical Director.

- (b) Obsolete and sub-standard First Aid Boxes should be gradually withdrawn and replaced with approved ones through the usual manner of procurement from the Stores Department.
- (c) Initial supply of First Aid Boxes for all Departments is to be made by the D.M.O. through the A.M.O. concerned. The D.M.O. should keep a 10% reserve of the total number of First Aid Boxes required on the Divisions.
- (d) Replacement of complete First Aid Boxes, after the initial supply will be arranged by the Station Master of Guard's H.Q. stations from the stores Department in the usual manner of procurement.
- (e) First Aid Boxes supplied should be sealed by a wax seal bearing clear imprint of the AMO concerned. This is important to ensure correct maintenance of First Aid Boxes. A.M.O. will, therefore, ensure that the seal is properly affixed.
- (f) The Station Master who receives the First Aid Boxes from D.M.O. will have the name of the Division, Headquarter station and serial No. painted thereon.

5023. Use :- (a) Every Guard incharge of a train carrying passengers shall carry a First Aid Box. These boxes will be supplied initially by the Station Master of Guard's H.Q. station to the Guard's as part of their personal equipment. It will be their responsibility to recoup from the Station

Master of their Head Quarter station any item that may have been consumed so as to ensure that the contents of the First Aid Box are always complete.

- (b) The Station Master of Guard's Head Quarter station will keep a reserve stock of all items of the First Aid box, the quantum of the reserve stock to be kept in respect of each item being determined by the respective Station Master taking into account the average issue, say, over a period of three months.
- (c) The Station Master will maintain a register for the purpose of keeping a record of the various items issued to each Guard. For this purpose, a couple of pages in the register will be allotted to each Guard, so that it could be known at a glance as to which items have been issued to each Guard from time to time. The Guard's signatures will be obtained each time he recoups the contents of his First Aid Box from the reserve stock maintained by the Station Master. The Station Master will recoup his reserve stock once every month from the AMO/DMO at his Headquarter stations. AMO/DMO will indent these items and recoup their stock as usual.

5024. Maintenance and Replenishment (a) Contents of a First Aid Box are given in Accident manual. It will be the responsibility of the Guard to ensure that the boxes are maintained properly and deficiencies are replenished promptly. A Railway Officer while checking the Guard's equipment will inspect the First Aid Box as available with the Guard on duty and in running rooms and ensure that the contents of the First Aid Box are correct as per list. In case he detects any deficiency he will direct the Guard to have the deficiency replenished from the station master concerned and make a report to senior DSO/DSO for necessary action.

- (b) A Guard working a train carrying passenger or labourers and provided with a First Aid Box, must also have with him a First Aid book while working such train.

- (c) Since such staff only as are qualified in First Aid shall use the First Aid Box they are expected to know the various uses of the medicines provided in the Box. The following instructions which are kept in the First Aid Box are given for ready reference in case of minor injuries :-

- (i) A scratch or slight wound:- Treat every scratch or slight wound immediately. Apply tincture of iodine over the broken surface once and allow to dry. Do not attempt to wash the wound at all. Apply a 'sterilized dressing'. A bandage can be applied over this dressing if necessary. Do not touch the part of the sterilized dressing which is put next to the wound. Blood poisoning or septic infection of a wound is caused by introducing germs into it. A sterilized dressing should therefore always be used as it is free from germs. Iodine sterilizes the wound and makes any dirt harmless. Hands are never free from germs and should never touch the wound or the part of the dressing to be applied to the wound.

- (ii) A burn or scald:- Cover the injured part with a dry 'sterilized' dressing according to size. Do not use any oil ointment. Do not prick a blister, except under medical advice.

- (iii) A foreign body in the eye:- Instil a drop or two of liquid paraffin in the inner side of the lower lid. The eye can then be covered with a pad (e.g. a clean handkerchief folded), which should be gently bandaged on. Seek the advice of the doctor at once. Do not try to remove any particle which cannot be brushed away. To relieve pain give one analgesic tablet like by mouth and another after 2 hours, if necessary.

Brakevan Safety Equipment:-

(a) Consequent to the recommendations of the Commissioners of Railway Safety on various Railway accidents on the subject matter the Board has reviewed and decided the following complement of Brake Van equipments for Coaching Trains:-

Item	No.	Maintained/Supplied by
Portable Control Telephone	2*	Jr. Eng.(Tele)
Portable Trains Lighting Equipment	1	Jr. Eng.(Elec.G)
Portable Fire Extinguisher	2	Jr. Eng.(C&W)
Wooden Wedges/Skids	2	Jr. Eng.(C&W)
Stretcher	1	SS/SM

A. For Inter Railway trains, one each for electrified and non-electrified territory.

B. Either for electric or non-electric or both depending upon traction over which the train travels within the Zonal Railway.

(b) The following procedures will be followed for loading/unloading of these Brake Van Equipment: -

(i) A proper arrangement in the form of closed cupboard would be provided in the SLR by Mechanical Department for keeping brake van equipments in locked condition.

(ii) Equipments would be loaded and run on end to end basis and will be kept in the cupboard provided in the brake van in locked condition by universal key.

(iii) No Coaching train shall start without full complement of brake van equipment.

(iv) In order to ensure safety of equipment and proper handing over and taking over, the Brake Van Equipment's shall be loaded by respective staff shown to the Guard at originating station and acknowledgement taken from him.

(v) Each Guard while taking over charge en-route, will sign for the intactness or otherwise, of Brake Van Equipment's in the relieved Guard's rough journal book.

(vi) At the terminating station, equipments shall be handed over by Guard to the staff of respective departments. At stations where staff of C&W and other departments are not available, the equipments will be handed over to authorised representative of SS/SM who will also be responsible for its loading in return direction, taking acknowledgement from Guard.

(vii) In case of any consumption en-route or any defect noticed during journey, it will be advised in writing to relieving Guard by the relieved Guard. At the terminal station, same shall be advised in writing to SS/SM Representative of concerned Department will recoup the shortage. However, responsibility to ensure full complement of brake van equipment in working condition will lie with the primary maintenance depot. In case of any defect noticed en-route responsibility will be fixed up on supervisor who has supplied the equipment.

2. It is issued with the approval of Board (MT, ML and MM.)

3. The instruction will be effective from 1st July, 2000 in order to ensure arrangement of equipments and provision of cupboard in SLR.

III- Portable Control Telephone and Emergency Control Telephone Equipment (For electrified Section)

- 5025. Part of Passenger train equipment:-** (a) Portable Control Telephone forms a part of brakevan equipment in all Mail, Express and Passenger trains over controlled sections and emergency control telephones in electrified sections is to be used in cases of accidents and other emergencies with a view to getting medical and other relief in the shortest possible time.
- (b) Guards working such trains must make it a point to ensure that their brakevans are equipped with portable control telephone equipment and emergency control telephones (in Electrified sections) complete in all respects. The Guard of the train as soon as he detects the absence of the Portable control Telephone set, emergency control telephone set and accessories, should immediately issue a message to control as well as Station Master of the nearest junction station who will then ensure by contacting the Telecommunication Maintainer/Telecommunication Inspector at the nearest station where spare portable control telephone sets/emergency control telephones are provided that a spare set is provided on such a train. Action should also be taken against responsible official of base station who was supposed to supply these equipments.
- (c) The equipment should be sealed at the starting station by staff of Telecommunication department. Two copies of the certificate to the effect that the equipment is complete in all respects and in good working order shall be prepared by the Signal and Telecommunication staff as per prescribed proforma. One of these copies shall be kept in the portable control telephone/emergency control telephone equipment box before sealing. The other copy will serve as office record of the Telecommunication official concerned.
- (d) Portable control equipment/Emergency control telephone must be passed on from Guard to Guard and finally handed over to the Telecommunication Maintainer on duty or any other Official specially authorised by the Divisional Railway Manager at the station upto which the train is scheduled to run. Each Guard taking over the train enroute, must sign for the Portable Telephone equipment/Emergency control telephone in the Rough journal Book of the relieved Guard and the Guard making over the equipment to the Telecommunication Maintainer on duty or any other official specially authorised by the Divisional Railway Manager at the destination station must obtain the latter's signature in his Rough Journal Book.
- (e) Guards and Drivers incharge of Mail, Express and Passenger trains must be qualified to use the Portable control Telephone/Emergency control telephone and must be in possession of necessary certificate of competency.

5026. Description : 1. The portable control Telephone equipment consists of :- (a) A sealed wooden box containing a portable control type telephone in a leather case and a rig chart in a bound volume showing diagrammatically the position of the control wires on the particular section; and

- (b) a set of 3 poles with connectors and flexible. The equipment shall be stenciled with the code name of the Headquarters station, a distinguishing number, and the service on which and the stations between which the equipment is scheduled to run.
- (2) Emergency control telephone equipment in case of electrified area consists of sealed wooden box containing control telephone with a 6 pin plug which is to be inserted in the emergency socket provided along the track at interval of 0.9 to 1.2 KM.

5027. How used (a) The rig chart must be studied to observe the position of the insulators carrying the control wires on the telegraph alignment. Wherever the position of section and Deputy Control wires is clearly indicated by painting of the relevant portions of the telegraph bracket with the colour code (i.e. for section red & for deputy green).

- (b) The three poles must be connected together telescopically to suit the height of the control wires. The two prongs provided on the topmost poles should then be hooked to the two control wires and the loose ends of the flexible attached to the poles should be connected to the terminals marked L1 and L2 on the portable phone.
- (c) The hand set key should be pressed to speak. When the call is over, the line wires should be disconnected and the hand set replaced in the box **TAKING CARE TO SEE THAT THE CORD IS NOT WOUND OVER THE HAND SET AND THAT THE KEY DOES NOT REMAIN PRESSED.** The leather case and the box should now be closed. The leather case should not be removed from the wooden box.
- (d) The Guard or the authorised person using this telephone can check the performance by pressing the key and blowing into the mouthpiece when a sound will be heard.
- (e) All equipment, including the poles should be handled with extreme care.
- (f) In electrical areas emergency socket boxes are provided along the tracks at interval of 0.9 KM to 1.2 KM. Portable emergency telephones are to be plugged into the emergency socket boxes for establishing communication with the traction power controller in emergency. Sockets for emergency telephones are also provided near signal cabins, sub sectioning and sectioning posts, insulated over laps and feeding posts.
- (g) When there has been an occasion to use the portable phone/emergency control, phone, an all concerned message should be sent giving details regarding work, place, reasons etc. which necessitated its use and action should be taken to have the box resealed.

5028. Inspection (a) Telecommunication Inspectors are required to examine Portable Control Telephone/Emergency Control Telephones once a month and Chief Telecommunication Inspector once in six months.

- (b) Separate Signal and Telecommunication staff are posted at various places wherever justified. They are entrusted with the specific responsibility of checking portable control Telephone/emergency control telephone equipment on trains passing through, terminating or starting from the stations ensuring that these telephone are in working order.

IV- Fire Extinguishers

5029. Every Guard in-charge of a train carrying passengers must carry two fire extinguishers in the brake-van. In addition each mail van on the train must also have two fire extinguishers.

5030. The initial provision of fire extinguishers on brackets in brake vans and mail-vans shall be the responsibility of the JE/SE (C&W) at the starting station.

5031. JE/SE (C&W) at all starting and terminal stations must inspect fire extinguishers before the departure and after the arrival of each train. They must have in stock a sufficient number of refills to recharge any extinguishers that may have become exhausted or defective. When recharging

extinguishers the instructions supplied with the re-fills must be followed. The station name and the date of recharging must be stencilled on each extinguisher.

5032. (a) The JE/SE (C&W) at the starting station will place the fire extinguishers in the Guards brake-van and the Guard must sign for it in a special register to be maintained for the purpose after satisfying himself that the fire extinguisher is intact and has been recharged within due date. Each guard taking over the train enroute will sign for the extinguisher in the relieved Guard's rough journal book. The guard who works the train to the terminal station will then make over the extinguisher to the JE/SE (C&W), who must be ready to receive it. The JE/SE (C&W) must sign for the extinguisher in the Guard's rough journal.

(b) At terminal stations, where there are no, fire extinguishers shall be taken over from guards of incoming trains and made over to guards of outgoing trains by the Station Master on duty. A record of each transaction will be maintained by the Station Master.

(c) Fire extinguishers provided in trains proceeding to other Railways must remain in the brake vans and be made over to the other Railway Guard in the usual way, who will acknowledge in writing the receipt of the extinguisher to safeguard against its loss.

(d) In the case of fire extinguishers provided in military and other special trains proceeding to other Railways, it shall be the duty of the train starting station concerned to message to the destination stations for the return of the fire extinguishers.

(e) If the JE/SE (C&W) or Station Master of the terminal station does not receive a fire extinguisher from the Guard of an incoming train, the matter must be reported to the Divisional Railway Manager. A similar report must be made by a Guard who does not receive a fire extinguisher from the starting station.

5033. Fire extinguishers shall be tested and recharged as per prescribed schedule or immediately after use.

V. Emergency Lighting Kit Boxes

5034. Emergency lighting kit boxes are provided in the Guard's compartment by Train Lighting staff so that in case of accidents in the night, some lighting of the area is provided with the help of 24V batteries available on the train before the arrival of ART. All Guards have to take thorough training for installing and connecting the search lights and hand lamps provided in this emergency lighting kit box.

5035. Emergency light equipment boxes will be stocked by the train lighting depots where the primary maintenance of rakes is based. The Train lighting staff on duty will issue the equipment boxes to the Guard of the train under a proper hand over and take over memo. The Guard will hand over the equipment box to the train lighting staff either at the terminating station or at the inter-change station, if the train-extends to the other Zonal Railways. This will also be done under clear hand-over and take-over memo. The train lighting staff will go to the Guard's compartment for this purpose on arrival of the train.

5036. The train lighting staff will be responsible for checking the contents and sealing the equipment boxes. Periodical check about proper functioning of equipment shall also be done by the train lighting staff atleast at three monthly intervals. The check results shall be maintained in a proper register.

5037. At Guard changing station the equipment boxes will be properly handed over from one Guard to the other through the guard journal.

5038. For purpose of identification each emergency box would be serially numbered giving the serial number and the home station.

5039. The loss of the emergency lighting equipment boxes at the stocking station will be responsibility of the train-lighting staff. The loss of the lighting equipment boxes in the train and its non return by the Guard to the train lighting staff, will be the responsibility of the Guard. In case a box is not returned by the Guard to the train lighting staff, the matter will be reported by the train lighting staff to D.E.E. who will immediately report the matter to D.O.M. The D.O.M. will investigate for the loss, sanction the write off if no staff is found responsible or debit the cost of the box to the Guard if latter is held responsible. The D.E.E. will order for the immediate replacement of the lost equipment boxes and raise the debit of the cost and of the loss against the Guard of the concerned train, if no write off sanction is received from the D.O.M. within three months of the loss.

5040. Officers of the Electrical and Operating Departments will make frequent checks of the above boxes alongwith the records maintained for this purpose so that they are maintained in good order.

(VI) Walkie-Talkie

5041. Instructions for use of Walkie-Talkie sets between Driver and Guard of Mail/Express & Passenger/goods trains running on North Eastern Railway:-

1. Walkie-Talkie sets provided to the drivers & Guards should be used in case of emergency/accidents/unusual incidence of unscheduled halt during the run of the train etc.
2. One Walkie Talkie set with one spare battery will be picked up by both the driver and guard of Mail/Express Passenger goods trains from the crew controller/staff on duty at the time of signing on, at the driver's or guard's lobby.
3. The crew controller/staff on duty at the lobby issuing the Walkie Talkie set will maintain a proper record of the sets issued and obtain signature of driver/guard.
4. The crew controller will check up if the Driver/Guard had handed over the sets earlier issued to him on the last journey.
5. The driver and guard will test their sets before starting the train by voice calling.
6. As the time of sign off, the driver/guard will hand over his set with spare battery to the crew controller in their respective lobbies. The crew controller before accepting the sets will check for physical damage to the equipment. He will also maintain a record in the prescribed format in the lobby.
7. The crew controller will hand over the sets collected from the driver/guard to the S&T staff manning the charging room located adjacent to the driver/guard lobby. The charging arrangement for adequate sets, requiring 230 V AC will be provided by Electrical Department. The sets will be put on charge by the S&T staff for the prescribed hours. The spare battery which was supplied also will be charged whether it had been used or not.
8. S&T staff will hand over the charged Walkie Talkie sets to the crew controller at least 60 minutes prior to the scheduled departure who will accept it by establishing a call with the crew controller of the other lobby.
9. Proper documentation of handing over and taking over of sets between the crew controller and the S&T staff will be maintained.

10. The driver and the guard will hold the Walkie Talkie set and communicate by holding it nearer to the window. Care should be taken to see that the set is not dropped or left to lie loose on the loco or brake van.
11. The driver Walkie Talkie sets will work on the same frequency. The driver/guard will call the attention of the other by using their names and the train numbers. All the walkie-Talkie sets will work on the same frequency.
12. Wherever driver or guard notices any usual incidence, immediate action should be taken to inform the guard will call the attention of the other by using their names and the train number. All the other about the nature of unusual incidence and action to be taken.
13. The driver and guard should respond immediately with the first call by saying his identification.
14. During accidents or emergency, the driver and guard should keep the sets with themselves while doing protection of the train on the occupied line and protection of adjoining line.
15. Immediate action should be taken by guard and driver to inform each other for protection of train/pinning of brakes whenever train comes to a halt due to loco failure, parting/stalling in mid section or station area in case of Hot Axle, brake binding or flat tyre, the driver and guard
16. In case train is standing without clearing fouling mark and is to be taken ahead, the guard should advise the driver to take the train ahead.
17. In case of automatic territory driver should inform guard about passing of automatic signal at 'ON' position, and if the driver is over speeding after stopping at automatic signal at 'ON' the guard should advise driver to reduce the speed.
18. There will be no change in the train working procedure. All the rules laid down in G&SR and other circulars will continue to be followed, even after the provision on Walkie Talkie sets with the driver and guard. The walkie-Talkie set is only an additional aid.
19. The sets will be kept switched on throughout the run. When the low battery indication appears, the spare battery will be provided in the place of original discharged battery.
20. In case of any ACP/HPD in the running train, the Guard and driver should talk to each other immediately on the Walkie Talkie sets provided to them. They should also identify coach no. etc involved in ACP/HPD and keep a proper record of the same.

GENERAL INSTRUCTIONS

- (i) The sets will bear a distinctive number in the form 'X-999T' where X signifies the owner division of North Eastern Railway and 999 is the S.no. of the set and T, the Trans-receiver. The two batteries will have the number as X-999 A/B. For various divisions, the code allotted for X will be as under.

IZN - Izzatnagar division
 LJN - Lucknow division
 BSB - Varanasi division

- (ii) The legend North Eastern Railway will be painted on the sides.
- (iii) Indications on the sets

Mode	Own set	Other sets
Transmit	PTT pressed Permanent red	PTT not pressed Flashing red
Receiver	PTT not pressed Flashing red	PTT pressed Permanent red.
Battery Low	PTT pressed Flashing red with Pip tone.	