
APPENDIX – ‘B’

TRACTION RULES FOR WORKING OF EMU TRAINS

TSR1. (i) In addition to these rules all General and Subsidiary Rules which control the movement and operation of trains, shall also apply to the movement and operation of EMU's except as otherwise provided in these rules.

(ii) Station Master, Inspector and staff working EMU's must have thorough knowledge of these rules.

TSR2. Definitions-

(i) Motorman – means a duly certified Loco Pilot of a single or multiple unit train.

(ii) Guard's emergency Brake valve – means a valve fitted in the driving compartments of EMU train equipped with compressed air brakes, by means of which the Guard can apply the brakes of the train in times of emergencies.

(iii) Jumpers – means multi-core flexible cables connected between all coaches of multiple units trains by means of which the control of the electrical equipment is affected from any driving compartment in use.

(iv) Trailer Coach – Means a passenger carrying coach equipped for coupling to and operating with motor coach, and not possessing traction motors, pantographs or driving or high voltage compartments.

TSR3. (i) Only one motorman is necessary for operation of an EMU train.

(ii) The following exceptions are permitted:

(a) GR 4.15(1)- Side lights showing white towards the front and red towards the rear are not provided on EMUs.

(b) GR 6.03(3)- On an EMU there is only one motorman for driving and he must not leave his post except for attending to defective equipment in his train.

TSR4. Width of Stock – Owing to the extra width (3.658 metres) of the EMU stock as against (3.048 metres) of conventional stock, staff are specially cautioned to stand well clear of passing trains and to warn passengers of the danger of standing too near the edge of the platform. Motormen and Guards must not put their heads out of their compartments when the train is running or when it is standing at a line when another train is passing on the adjacent track.

TSR 5. Work inside EMU car shed – In case of work to be done in EMU car shed, the rules as laid down in GR 17.04 should be followed.

TSR6. Washing and cleaning of stock – When EMUs are placed in siding for washing, cleaning etc. the section switch for that particular siding must be opened by the man incharge of washing and the key retained by him.

TSR7. Accidents – Responsibility of Electrical Department - In the event of any accident occurring in which electric coaching stock is involved or where damage to overhead structures or equipment takes place, the railway servant who notices it shall take necessary precautions against danger of electric shock and shall inform the nearest Station Master, Section Controller and Traction Power Controller to take immediate action to cut off power supply, if necessary, and restore the equipment as early as possible. The line is not to be re-opened for traffic until a responsible official of the Electrical Department inspects the site and certifies that the line is safe for the passage of train.

TSR8. Warning Boards –

- (i) For the protection of staff employed on coaches/ at car shed/ stabling depots/ or on platforms, warning boards must be placed in a conspicuous position on the ends of the coach or rake by the staff concerned before proceeding to carry out any work in or under the coaches. This board should bear a remark “not to be moved” in white letters on a red background and on no account it should be removed except by the man who placed them in position.
- (ii) Warning boards are on no account to be removed and power applied until all precautions have been taken to ensure that all men are clear of danger.
- (iii) Overhead equipment alive - The whole of the overhead equipment comprising of contact wire, catenary, droppers, register arms, steady arm etc is always to be considered “ALIVE” and men working over the electrified area must take care to see that nothing comes in contact with it. There is danger take care to see that nothing comes in contact with it. There is danger of death if men come in contact, directly or indirectly, with the overhead contact system.

TSR9. Fire: - See GR 6.10 and their S.R.s.

TSR10. Staff employed in the Electrical area must immediately inform the Section Controller by telephone as quickly as possible in the event of (a) accident (b) disabling of train (c) Unusual occurrence on overhead equipment or on overhead feeders or high tension cables etc. (d) any occurrence affecting the working of trains.

TSR11. Messages sent through Station Master must be fully recorded by them in the Message Book and a note must be made in the diary.

TSR12. The Section Controller will immediately take action on the information received and promptly inform the traction power controller who will take necessary action with any switching operations which may be necessary on the overhead equipment or at sub-station and will immediately inform Sr. Divisional Electrical Engineer (Traction).

TSR13. Access to the high tension compartment can be had only by authorised persons in possession of a reversing handle or special key provided for this purpose. Motormen and other officials to whom such keys are issued should keep them in their personal custody to prevent unauthorised person tampering with the equipment.

TSR14. No spanners or keys except those issued by the Railway Administration should be used for operating the equipment in electric trains.

TSR15.

- (i) No unauthorised person is allowed to travel in motormen’s and Guard’s Compartment of an EMU train unless he holds a motorman ‘s or Guard’s Compartment pass. The number of authorised persons, other than the Motorman and Guard (if travelling with Motorman), travelling in Motorman’s Cab must not be more than three at any time.
- (ii) A Motorman who is off duty is not permitted to enter or travel in any of the driving compartments or to use his reversing handle under any circumstances.

TSR16. A trainee or apprentice motorman when authorised by Divisional Electrical Engineer (Traction) may drive an Electric train under the supervision of a certified motorman and the latter shall keep a continuous watch over the trainee or apprentice and shall be responsible for safe working of the train.

TSR17. A driving Inspector is authorised to drive EMUs provided he had been driving at least 160 Kms. In a calendar month over the entire EMU territory.

TSR18. Line chargemen and other maintenance staff who are required to attend to defective equipment are allowed to handle the equipment in running train. They shall, however do this with the utmost care to ensure that the safety of the train and the equipment is not endangered in any way.

TSR19. An electric multiple unit train shall carry (a) one head light (b) one set of code lights in centre (c) Two red tail light (b) one set of code lights in centre (c) Two red tail lights in one fitting. The lights will have provision for blinking.

TSR20. Responsibility for head lights etc. of EMU’s – The motorman is responsible for carrying the correct Head lights by night and for ensuring that the tail lights are not seeing that the tail lights are not exhibited in the front. The Guard is responsible for seeing that the tail lights/tail boards, as the case may be, are correctly exhibited. In case of failure of electrical red tail lights, Guard should fix his hand signal lamp on the bracket provided for this purpose.

TSR21. Lighting and fan circuit of EMU’s - Guards must regulate the lighting of coaches and switch off the fans when not required. In the event of a defect in the lighting or in circuits the Guard will immediately inform the Motorman and the nearest Station Master will arrange for electrical staff to rectify defects.

TSR22.

- (a) Before an EMU train is brought on to a running line after inspection or maintenance in an EMU shed or stabling line, the brakes of the train shall be jointly tested by the Motorman and Guard to ensure that electro pneumatic and automatic brakes are functioning normally and the brake pipe is continuous throughout the train. The horn or whistle should be sounded and precautions taken to see that no one is working on EMU train before brake test is undertaken.

Procedure for Testing the Brakes: -

<u>To be done by the Motorman</u>	<u>To be done by the Guard</u>
(i) Give five rings to guard to be ready for brake test.	(i) Acknowledge by five rings.
(ii) Start the air compressor and when the main reservoir pressure is normal (4.55 kg/sq.cm. to 7 kg/sq.cm.), open the isolating cock switch to charge the brake pipe.	(ii) When the brake pressure is 4.2 kg/sq.cm., give one ring to Loco Pilot.
(iii) Make an electrical application to a pressure of 2.0 kg/sq.cm. (Approximately).	(iii) On observing 2.0 kg/sq.cm. pressure in the brake cylinder gauge, give one ring.
(iv) Make a full EP application.	(iv) On observing 3.5 kg/sq.cm pressure in the brake cylinder gauge, give one ring.
(v) Move the brake controller handle to the ‘release’ position to release brake.	(v) On seeing that the brake cylinder pressure is 0, open the Guard’s emergency brake valve (i.e. move the handle to ON).
(vi) On observing drop in brake pipe pressure, move brake controller handle to emergency.	(vi) On observing pressure 3.5 kg/sq.cm. in the brake cylinder gauge, move the emergency valve handle to ‘OFF’.

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| (vii) Keep the handle of the brake controller in release-running position and bring it to emergency position only after Guard has applied emergency brake by opening emergency application cock. | (vii) Open emergency application cock by means of red brake handle to destroy brake pipe pressure to zero and will observe 3.5 ± 0 kg/sq.cm. pressure in brake cylinder gauge. |
| (viii) When the brake pipe pressure is zero, move the brake controller handle to the 'release' position and when the brake pipe pressure is normal again, apply the automatic brake by reducing the brake pipe pressure to 3.8 kg/sq.cm. (approx.) | (viii) Observe the drop in brake pipe pressure on the gauge and then give one ring. |
| (ix) Move the brake controller handle to 'release' position. | (ix) On observing that brake cylinder pressure is zero and brake pipe pressure normal on gauge, give one ring. |
| (x) Motorman will acknowledge completion of test by giving five rings. | (x) Guard will observe that brake pipe pressure is 5 kg/sq.cm. and give five rings to indicate that above tests have been completed correctly from his end. |

Note:

- (i) During brake tests, Guard and motorman may use one pause one ring to draw the other person's attention in case of any lapse or abnormality.
- (ii) During brake testing, one ring from guard will indicate acknowledgement of motorman's action.
- (iii) As far as possible, this joint test should be taken before the EMU train leaves the shed or stabling line. However, if authorised by C.E.E. and COM, the brake test may be taken on the platform before commencement of the first trip.

(b) The examination and adjustment of brake must be carefully carried out before entering service. Motorman must ensure that jumpers and hose pipes are properly secured in their dummy receptacles after coupling.

He must take a careful examination of multiple units before taking them into service and any defect or deficiency noticed must be brought to the notice of the supervisor and he must see that the defect card in position and initialled to this effect.

When taking over from another motorman of any fault or defect likely to affect the working of the train.

(c) The above procedure must always be carried out most carefully when putting unit into service after stabling, also after two units have been coupled up. The train crew must assist the station staff in coupling and uncoupling units.

(d) The motorman should check the working of the dead man's safety device.

TSR23. It is the duty of the Guard and the Motorman to change the destination indicators at respective ends of the train.

TSR24. Stabling an EMU train -

(a) When stabling an EMU train in car Shed or on a stabling line, the motorman or Engine Turner who has taken over the rake will carry out the following essential operations: -

- (i) Switch off the lights and fans, if on.
- (ii) Trip the main circuit breakers and drop the pantographs.
- (iii) Destroy the brake pipe pressure, isolate the brake controller.

- (iv) Apply the hand brakes fully in the ‘D’ coaches.
 - (v) Put Off the main battery switch in the motor coaches.
 - (vi) Lock the equipment compartments and driving cabs.
 - (vii) Any other operation prescribed in local instructions.
- (b) When a rake is to be stabled, the Motorman should invariably be at the leading cab. Backing an EMU rake into a siding with the Motorman at the rear cab is strictly forbidden.
- (c) After stabling an EMU train or handing it over to the Engine Turner, the Motorman before going off duty should convey to supervisor in charge of the Car Shed or stabling line (or to the TLC) any defect or abnormalities noticed during the previous trips requiring immediate attention.

NOTE: On arrival of a train at terminal station for stabling, the Guard shall switch off lights and fans. No multiple unit or coach may enter a shed at a speed exceeding 10 KM per hour and only after sounding the whistle and coming to a stand outside the shed.

TSR25. Speed Control of EMU – For any position of the Master Controller chosen by the Motorman, the step by step notching is controlled automatically. The Motorman should switch on the Master Controller to the required position depending upon the speed to be attained.

TSR26. Oiling and Greasing - Motorman must not oil or grease any part of the train or equipment except to attend a warm or hot bearing and when this has been done he must specially report the occurrence to TLC.

TSR27. Motorman must keep a sharp lookout for all defects or anything unusual in the rolling stock equipment and promptly report such defects to the TLC or to the line chargemen and also record in the logbook. In the case of serious defects, a detailed report must be made by the Motorman.

TSR28. Electric Trains outside Electrified Area – Electric Trains must not be hauled outside the electrified area until the pantographs have been lowered.

TSR29. Non-electrified Sidings - Except in case of emergency, electric train must not be placed in non-electrified sidings within the electrified area, but when it is necessary to do so, care must be taken by Motorman to ensure that all pantographs are lowered and that there is no obstruction on or alongside the siding that will be likely to come in contact with the pantograph or any other part of the train, after which the train must be shunted into the siding with caution.

TSR30. (i) Every Motorman and Guard must have with him while on duty all the equipments prescribed as per Annexure ‘A’.

(ii) The Guard and the Motorman should also ensure that emergency telephone set is provided both in the front and rear cab before starting the train.

TSR31.

- (i) Automatic and semi-permanent coupler – EMU stock is fitted with Schaku couplers of two types, i.e. automatic couplers for coupling unit to unit and semi -permanent couplers for coupling the coaches of each unit. The units are coupled merely by bringing them together at a slower speed (between 3 to 5 KMPH). Both the automatic couplers should be in uncoupled position. While coupling the stationary unit or coaches it should have its brakes on. While uncoupling the automatic coupler, uncoupling ropes of both the couplers are pulled simultaneously and then the coaches are drawn apart.

It is, therefore, not necessary for the staff to go between the coaches during coupling operation. While coupling in between coaches of the unit, adjustable cup sleeves of end 'A' type coupler are opened by the handles provided on the semi-permanent coupler. Both the semi-permanent couplers are aligned manually and then coupled together by tightening the cup sleeves. Note that both the semi-permanent couplers, i.e. End 'A' and 'B' are aligned properly before coupling.

- (ii) Coupling of Units - In coupling units together, the station staff will be responsible for seeing that the jumper connections are properly made. Care is to be taken not to touch the contacts or to let them come into contact with the rails, ballast or metal-work of the coach when inserting jumpers in the receptacles provided. In all cases, this operation will be carried out under the supervision of the Motorman who will first ensure that both the motor generator sets are switched off.
- (iii) Stopping places for EMU trains – EMU trains shall be stopped at stopping marks as laid down in local orders.
- (iv) Guards to assist Station Staff – Guard must assist the station staff in coupling and uncoupling units which may have to be attached or detached.
- (v) Guards are responsible for seeing that all lighting and fan switches and the main lighting switch are off before units are uncoupled.
- (vi) At stations or sidings where it is necessary for the units to be disconnected, the person performing the work must before uncoupling, receive the assurance on a register of the Guard and Motorman that all the lighting and fan switches as well as the motor generator sets on both halves of the train have been switched off.

TSR32. When two separate units are coupled together at stations, only one Motorman must be in charge and on no account, a Motorman who is off duty allowed to use his reversing handle under any circumstances.

TSR 33. Formation of EMU's - Unless special instructions are issued to the contrary, the formation of EMUs is not to be altered.

TSR34. Shunting of Single and multiple unit trains. When shunting is to be performed the rules contained in GR 5. 14 must be complied with.

TSR35. (i) Shunting and Setting Back - When performing shunting, the Motorman shall be in the driving compartment nearest to the front and in the direction of movement. When driving is being done from other than the leading coach the man in charge of the movement must be in the leading coach in such a position that the Motorman can readily see his signals.

(ii) Coasting – Power must be switched off as early as possible before the application of the brakes in order to reduce consumption of electric energy.

(iii) Coasting Board to be observed in working trains - Motormen will normally observe the Coasting Boards. When time is to be made up, they may switch off power later than normal. The maximum permissible speed for the various sections shall not, howsoever, be exceeded in order to make up time.

(iv) Stopping – Care must be taken when applying the brakes to stop the train as smoothly as possible and the brakes must be put on at such a distance as will enable the Motorman to pull up at the proper stopping point at the station platform.

(v) Brake Application Normally, the brakes should only be applied after the Master Controller handle has been returned to the ‘OFF’ position, except in case of emergency.

TSR36. (i) Dead man’s Handle applied to in EMUs – Obstruction on the permanent way- If any obstruction is seen on the line ahead and the train cannot be brought to a stand still by ordinary application of brakes, the Motorman should remove his hand from the master controller handle when the power will be cut off and the brake applied automatically. This should only be done when an emergency application of the brake is required. The brake controller handle should then be moved to the full ‘ON’ position and the Master Controller switched off.

(ii) In the event of dead man’s handle becoming defective or inoperative the Motorman must stop his train immediately, call the Guard and ask him to travel in the driving cub and should inform the traffic section controller who should take the train out of service immediately if the defect is not rectified.

TSR37. (i) When EMU train is driven in accordance with G.R. 4.21, its speed should not exceed 15KMPH. At the first station where facilities are available, the train should be cancelled and withdrawn from service for repairs.

(ii) Before giving the starting code signal to the Motorman, the Guard must satisfy himself that the correct signals are shown for the train to start and that the section is clear. The Guard must keep a good lookout and must exhibit a green hand signal to the Motorman. The absence of such signal shall indicate ‘Danger’ and the Motorman must stop at once. He must keep a good lookout and be prepared to stop the train when necessary. He will also be responsible for observing all further signals en route. All caution orders, warning notices, advices and authorities regarding defective signals, authority to proceed without line clear, etc. must be first delivered to the Loco Pilot who will countersign these before they are sent to the Guard in the leading compartment. The Guard will retain such documents while he is in charge and will be responsible for seeing that the orders are carried out. At the end of the run these documents must be handed over to the Motorman and his signature obtained.

TSR38.

(a) The following code of Bell signals shall be given by the Guard and acknowledged by the Motorman:

Indication	Code	Acknowledgement
1. Start train	00	00
2. Start train when working under G.R. 4.21.	00-00	00-00
3. Push back train	000	000
4. Stop train	0	0
5. Stop train when working under G.R. 4.21.	0000	0000
6. Guard leaving the cab	000000	000000

(b) The following code of Bell signals shall be given by the Motorman and acknowledged by the Guard.

Indication	Code	Acknowledgement
1. Guard required by Motorman	000-000	000-000
2. Motorman has received an authority to pass a signal at danger.	0000-00	0000-00 followed by code to start the train
3. Passing an automatic signal in ‘On’ position as G.R. 9.02.	0000-0000	0000-0000
4. Train running through station	00	00
5. For testing the brakes	00000	00000
6. Protect train in rear	000-0000	000-0000

Note- 0 means one ring.

TSR39. Disabled train – In the event of an electric train failing, another electric train or a locomotive may be used to assist the disabled train, only after the motorman or the line charge man has certified that it is safe to be moved.

TSR40. Loss of time in locating defects - When a defect occurs which the Motorman is unable to rectify, he must not waste time in trying to locate defects after isolation has been effected except in case where it would be unsafe to proceed. Every effort is to be made to work the train to the nearest examining point and to get it out of traffic as soon as possible.

TSR41. Derailment - In the event of derailment, the traction power controller will pass the information to the electrical foreman, who will treat it as if it is a line fault and shall proceed to take all necessary precautions to prevent damage to the overhead line during the re-railing process.

TSR42. In the case of partial electrical disablement of an electric multiple unit train, such train must be worked to destination if possible and stabled there until certified fit for running by electrical department.

TSR43. Procedure when automatic brakes cannot be operated from the leading driving compartment of EMU train. When the automatic brake cannot be operated from leading driving compartment of an EMU train, the following procedure should be observed.

- (a) All passengers must be detrained at the first station with platform.
- (b) If the automatic brakes cannot be operated from any driving compartment of an EMU train but the driving apparatus in the leading compartment is in working order, the guard shall accompany the Loco Pilot on the leading compartment and shall operate the hand brakes as required. The speed of the train shall not exceed 10 KMPH.
- (c) If the brake apparatus in the leading compartment only is defective, the guard shall be responsible for the operation of the automatic brake from the nearest compartment (from the front) in which the brake apparatus is in working order. He will operate in accordance with the Motorman’s signals. The speed of the train shall not exceed 10 KMPH.
- (d) If the driving apparatus in leading compartment in addition to the automatic brake is defective the guard shall travel in the leading compartment and operate the hand brake as required. The Motorman shall drive from the nearest compartment in which the driving and automatic brake apparatus is serviceable. The guard shall be responsible for giving such signals as are required, to the motorman by means of the bell, horn or whistle and the Motorman shall control the train in accordance with these and the speed shall not exceed 10 KMPH.

- (e) Under the circumstances mentioned in (b),(c) and (d) above, the Motorman shall arrange for the section controller and nearest train examiner to be informed. The section controller shall take immediate steps to have the train withdrawn from service at the nearest station where siding accommodation is available.

TSR44. In case of any emergency when the train is held up in block section, the Motorman/Guard should stop the train nearest to the telephone explaining the emergent situation and asking for assistance if required and also switch ‘on’ the blinker lights.

TSR45. Working of alarm bell and Inter - Communication chain apparatus of an EMU train – When in an emergency, the inter-communication chain handle is pulled by a passenger, a red disc shoots out in the corresponding coach and an electrical contact is made completing the electric circuit of the alarm bell located in each driving cab and the alarm bell will continuously ring in all the cabs warning the Motorman to stop the train immediately. On hearing the alarm bell the Motorman should apply the emergency brakes and stop the train as per extant rules. After ascertaining the reason for chain pulling the guard should reset the disc in the corresponding coach with the help of the pole provided in the cab.

ANNEXURE ‘A’

- (i) The following articles shall comprise the prescribed equipment of a guard working an EMU train, which he must carry with him at all time while performing duty.
1. One hand signal lamp (Tricolour, 4 dry cell lamp).
 2. One set of Flags (One green and two red).
 3. Two flag sticks of aluminium telescopic pipes.
 4. One First Aid Box.
 5. One Case containing ten detonators.
 6. One Fusee.
 7. One whistle.
 8. One Carriage Key.
 9. One watch.
 10. One Working Time Table
 11. One rule book for working electric trains on electrified section.
 12. One detail book showing the link of Guards etc.
 13. One Guard’s Memo Book.
- (ii) The following articles shall comprise the personal equipment of a Loco Pilot working an EMU train, which he must carry with him at all time while performing duty.

<u>S.No.</u>	<u>Description</u>	<u>Quantity</u>
1.	Handbook and trouble shooting directory for motorman.	1
2.	Copy of Working Time Table and schedule.	1 each.
3.	Motorman’s memo book.	1
4.	Memo Book for reporting defects.	1
5.	Reversing handles	2
6.	Motorman’s control keys	3
7.	Brake control key	1
8.	Carriage key	1
9.	Modified key for motor coach door	1
10.	Hand signal flags red and green with sticks	2
11.	Torch with red and green adoptions and spare bulbs	1
12.	Box of ten detonators.	1
13.	Illuminating signal fusee	1
14.	Rule book for working electric trains on electrified sections.	1
15.	Watch	1
16.	Duster	1

