

CHAPTER - XVII

WORKING OF TRAINS ON ELECTRIFIED SECTIONS OF RAILWAYS

17.01. Applicability of General Rules.—

All rules referring to the working of trains shall also apply to electrified sections except as otherwise provided in the rules contained in this Chapter.

S.R.17.01.1.1. All subsidiary rules and special instructions which control the movement and operation of diesel trains shall also apply to the movement and operation of electric trains, except as otherwise provided for in these rules.

S.R.17.01.1.2.1. All officials connected with movement of electric rolling stock shall have a thorough knowledge of these rules. They shall also be responsible for ensuring that staff working under them are thoroughly conversant with the instructions relating to their work and the correct procedure to be followed under normal conditions as well as in an emergency.

S.R.17.01.1.2.2 Every railway servant, supplied with these rules shall make himself thoroughly acquainted with the rules and shall be held responsible for knowledge of and compliance with them.

17.02. Special definitions applicable to this chapter.—

In these rules, unless the context otherwise requires,-

- (1) “*electrical way and works*” means the traction installations including overhead equipment and other connected works provided on the electrified sections of the railway.**

S.R.17.02.1.1. Electrical equipment means any apparatus used for generation, transmission or utilisation of electrical energy.

S.R.17.01.1.2. Transmission line means cables or bare overhead conductors by means of which electrical energy is transmitted between various points of a distribution system.

- (2) “*feeding post*” means a supply control post, where the incoming feeder lines from grid sub-station are terminated;**

S.R.17.02.2.1 ‘Feeder’ means a conductor connecting (a) a generating station with a sub-station, or feeding point, or (b) a sub-station with a feeding point.

S.R.17.02.2.2 ‘Feeder’ also means a conductor connecting, a supply control post to a grid sub-station, and a supply control post or switch gantry to a feeding point. Feeder also includes a conductor connecting OHE to switching station.

- (3) “*neutral section*” means a short section of insulated and dead overhead equipment which separates the areas fed by adjacent sub-stations or feeding posts;**

S.R. 17.02.3. Neutral section is provided mid-way between two consecutive sub-stations.

- (4) “*Power Block*” means blocking of a section of line to electric traffic only;**

- (5) “*supply control post*” means an assembly of interrupters, isolator switches, remote control equipment and other apparatus provided for controlling power supply to overhead equipment. It includes feeding posts, sectioning and paralleling post, sub-sectioning and paralleling posts and sub-sectioning posts;**

S.R.17.02.5.1. 'Interrupters' means a single phase oil circuit breaker without an automatic tripping device.

S.R.17.02.5.1.1. 'Bridging Interrupter' means an interrupter which is provided at a neutral section to enable one sub-station to feed a sector of the overhead equipment normally fed by another sub-station during emergencies or when the latter is out of use. This interrupter normally remains in the open position.

S.R.17.02.5.1.2. 'Sectioning Interrupter' means an interrupter which connects adjacent sub-sectors together to maintain continuity of supply. This interrupter normally remains in the closed position.

S.R. 17.02.5.1.3. 'Paralleling Interrupter' which connects overhead equipment of two different tracks. This interrupter normally remains in the closed position to reduce voltage drop.

S.R.17.02.5.2. 'Switch Electrical' means a device for opening or closing an electrical circuit.

S.R.17.02.5.2.1. 'Switch Alternate Feed' means a switch used for connecting the overhead equipment of a loop or siding or crossover to alternative sections of the overhead equipment.

S.R.17.02.5.2.2. 'Switch, Double-pole, Gang-operated, Earth type' means a special switch used in electric loco sheds, for feeding two sections or for making one section dead and earthing the other.

S.R.17.02.5.2.3. 'Switch, interconnecting section or Isolator' means a switch used for connecting or disconnecting adjacent elementary sections of overhead equipments.

S.R.17.02.5.2.4. 'Switchgear' means Isolator switches, Circuit breakers, interrupters, cut-out and other apparatus used for the operation, regulation and control of electrical circuits.

S.R.17.02.5.3.1. 'Remote Control Centre' means the centre from which, the equipment at various supply control posts are remotely controlled by the TPC.

S.R.17.02.5.3.2. 'Remote Control Cubicle' means a room in a supply control post in which remote control equipment and batteries are erected for remote operation of switchgear located at the post.

S.R.17.02. 5.4.1. 'Section insulator' means a device for dividing a contact wire into electrical sections while maintaining mechanical continuity and a continuous path for pantograph.

S.R.17.02.5.5. 'Sector' means a section of overhead equipment of a track from a feeding post to a sectioning post.

S.R.17.02. 5.5.1. 'Sub-sector' means the shortest section of overhead equipment which can be isolated by opening of interrupters.

S.R.17.02.5.5.2. 'Elementary Sections' means the shortest section of overhead equipment which can be isolated from the rest of the system by switching operation.

Supply control post:-

S.R.17.02.5.6.1. 'Feeding post (FP)' means a supply control post where the incoming feeder lines from grid sub-station are terminated.

S.R.17.02.5.6.2. 'Sectioning and Paralleling post (SP)' means a supply control post situated midway between two feeding posts at neutral section and provided with bridging and paralleling interrupters.

S.R.17.02.5.6.3. 'Sub-sectioning and paralleling post (SSP)' means a supply control post where sectioning and paralleling interrupters are provided.

NOTE: Sub-sectioning post (SS) – These are provided only occasionally. They are similar to SSPs with sectioning the OHE, but not paralleling. This is a supply control post where only sectioning interceptors are provided.

- (6) **“Tower Wagon” means a self-propelled vehicle which is used for the maintenance and repairs of overhead equipment.**
- (7) **“Traction Power Controller” means a competent railway servant who may for the time being be responsible for the control of power supply on the traction distribution system.**

S.R.17.02.7.1. 'Traction Power Controller (TPC)' means an official who is responsible for ensuring continuity of power supply and operations appearing thereto on the traction power distribution system. He coordinates the requirements of traffic and electric power supply and arrange for the issue of permit to work on or adjacent to overhead lines, cables and switchgear connected thereto.

S.R.17.02.7.2. 'Section Controller (SCOR)' means an official of the operating department appointed to coordinate the movement of trains over a specified section of the railways.

S.R.17.02.7.3. Additional definitions.

S.R.17.02.7.3.1. 'Apparatus' means electrical apparatus and includes all machines, fittings, accessories and appliances in which conductors are used.

S.R.17.02.7.3.2. 'Assistant Loco Pilot' means the duly certified Assistant Loco Pilot of a Single or Multiple unit train or of an electric engine.

S.R.17.02.7.3.3. 'Assistant electrical Engineer/Traction Distribution (AEE/Tr.D)' means an Assistant Executive Officer in-charge of maintenance and repairs of the power distribution system in a division or in an area and responsible to the DEE/Tr.D.

S.R.17.02.7.3.4. 'Assistant Electrical Engineer/Rolling Stock (AEE/RS)' means an Assistant Executive Officer in charge of maintenance and repairs of electrical rolling stock in a division or in an area and responsible to the DEE/RS.

S.R.17.02.7.3.5. Assistant Traction Foreman (ATFO).

S.R.17.02.7.3.5.1. 'ATFO/OHE' means a subordinate of the area concerned responsible to the Traction Foreman for inspection and maintenance of traction overhead lines, rail bonds and for the staff employed thereon.

S.R.17.02.7.3.5.2. 'ATFO/RS' means a subordinate of the area concerned responsible to TFO/RS for the maintenance of electric rolling stock and for the staff employed thereon.

S.R.17.02.7.3.6. 'Authorised person' means any person who is duly authorised to perform the duties pertaining to his employment, the authorisation being by an Officer of the Railway Administration empowered for that purpose.

S.R.17.02.7.3.7. 'Bare' means not covered with any insulating material.

S.R.17.02.7.3.8. 'Brake valve' means a valve which operates the automatic brake of the train.

S.R.17.02.7.3.9.1. 'Cable' means a length of insulator single conductor or two or more of such conductors, (solid or stranded) each provided with its own insulation, which are laid up together. Such insulated conductor or conductors may or may not be provided with an overall mechanical protective covering/armoring.

S.R.17.02.7.3.9.2. 'Transmission line' means cables or bare overhead conductors by means of which electricity is transmitted between various parts of a distribution system.

S.R.17.02.7.3.9.3. 'Conductors' means a body or substance which offers a low resistance to the passage of an electric current.

S.R.17.02.7.3.10.1. 'Phase Conductor' means a conductor which carries current to the traction overhead equipment.

S.R.17.02.7.3.10.2. 'Return Conductor' means a conductor which carries return current from the tracks to the sub-station. Return conductor also includes carrying return current from booster transformer to the track.

S.R.17.02.7.3.11. 'Caution Notice' means a notice attached to or placed in the danger zone of live equipment calling attention to the danger of touching or interfering with such equipment and bearing the words 'Caution-Live Equipment'.

S.R.17.02.7.3.12. 'Chargeman' means an authorised person in charge of a gang of workmen, authorised to work on specific types of traction equipment such as overhead equipment, supply control posts, feeder lines, remote control equipment, electric rolling stock etc.

S.R.17.02.7.3.13. 'Circuit' means an arrangement of conductor or conductors for the purpose of conveying electrical energy and forming a system or a branch of a system. When they form a closed path through which a current can circulate, the circuit is referred to as closed. When the path is not closed, the circuit is referred to as 'open'.

S.R.17.02.7.3.14. 'Circuit breaker' means a device for closing and opening an electrical circuit under all conditions unless otherwise specified, and so designed as to open the circuit automatically under abnormal conditions.

S.R.17.02.7.3.15. 'Competency certificate' means a certificate issued to a person by the Railway Administration authorising him to carry out specified duties pertaining to his employment.

S.R.17.02.7.3.16. 'Contact wire' means an overhead conductor from which electric power is supplied to electric rolling stock.

S.R.17.02.7.3.17. 'Cut-out (fuse)' means any appliance for automatically interrupting the transmission of energy through any conductor when the current rises above a predetermined value.

S.R.17.02.7.3.18. 'Danger' means danger to health or to life or any part of the body from shock, burn or other injury to persons, or property, or from fire or explosion, attendant upon transmission, transformation, conversion, distribution or use of electrical energy.

S.R.17.02.7.3.19. 'Danger Notice' means a notice attached to dead equipment to convey a warning against such equipment being made alive and bearing the words 'Danger-Men Working'.

S.R.17.02.7.3.20. 'Danger Zone' means the zone, lying within 2 metres of any live equipment in which no work is permitted, when the equipment is live. Notwithstanding the above, the Loco Pilot of an electric loco is permitted to change the head light bulb of the loco while standing on the buffer beam projection at the floor level of the cab.

S.R.17.02.7.3.21 'Dead equipment' means any electric equipment which is not electrically live.

S.R.17.02.7.3.22. 'Dead Man's handle' means an emergency safety device fitted in the handle of a master controller which when released, automatically cuts off the supply of electrical energy to the traction motors and applies the brakes.

S.R.17.02.7.3.23. 'Distribution system' means system of electrical equipment by means of which electrical energy in the form of alternating or direct current is distributed over a given area.

S.R.17.02.7.3.23.1. 'Traction power distribution system' means distribution system provided for traction purposes.

S.R.17.02.7.3.23.2. This is also referred to as "Power Distribution system".

S.R.17.02.7.3.24. 'Divisional Electrical Engineer/Traction Distribution (DEE/Tr.D)' means an executive officer responsible for the traction power distribution system including power supply arrangements and remote control equipment in a division or in an area.

S.R.17.02.7.3.25. 'Divisional Electrical Engineer/Rolling Stock (DEE/RS)' means an executive officer responsible for the electric rolling stock in a division or in an area.

S.R.17.02.7.3.26. 'Loco Pilot' means the duly certified Loco Pilot of a single or multiple unit train or of an electric engine. This definition is in addition to the definition given in GR.

S.R.17.02.7.3.27. 'Driving Trailer' means a coach which has a driving compartment and which is not a motor coach.

S.R.17.02.7.3.28. 'Dropper' means a fitting used in overhead equipment construction supporting the contact wire from the catenary.

S.R.17.02.7.3.29. 'Earth' means the conducting mass of the earth or of any conductor in direct electrical connection therewith.

S.R.17.02.7.3.29.1 'Earthed' or 'Connected to earth' means connections with the general means of earth in such a manner as to ensure at all times an immediate discharge of energy without danger.

S.R.17.02.7.3.29.2. 'Earth' for the purpose of the overhead equipment only includes the track return circuit and the structures supporting the overhead equipment, provided such structures are connected to earth or track return.

S.R.17.02.7.3.29.3. 'Electrical equipment' means any apparatus which is used for generation, transmission or utilisation of electrical energy.

S.R.17.02.7.3.30. 'Electrified Track' means track provided with overhead equipment.

S.R.17.02.7.3.31. 'Emergency Telephone' means a telephone circuit provided for connecting the TPC.

S.R.17.02.7.3.32. 'Grid sub-station or sub-stations' means an electrical installation equipped with transformers and switchgear from which power is supplied for electric traction.

S.R.17.02.7.3.33. 'Guarded' means covered, shielded, fenced or otherwise protected by means of suitable casing, barrier, rails or metal screens to remove the possibility of dangerous contact or approach by persons or objects to a point of danger.

S.R.17.02.7.3.34. 'High Voltage' means a voltage which under ordinary working conditions may exceed 650 volts.

S.R.17.02.7.3.34.1 'Voltage' means the difference of electric potential measured in volts between any two conductors or between any part of either conductor and the earth as measured by a suitable voltmeter.

S.R.17.02.3.35. 'Independent air brake handle' means a removable handle controlling independent air brake apparatus of electric engine.

S.R.17.02.7.3.36. 'Insulated (Air-gap) overlap span' means an arrangement of overhead equipment over a track where two sets of traction conductors overlap each other for a short distance, providing for a smooth passage for the pantographs of electric rolling-stock, the two sets of wires being insulated from each other by an adequate air-gap.

S.R.17.02.7.3.37. 'Insulator or insulating material' means material which offers relatively high resistance to the passage of an electric current.

S.R.17.02.7.3.38. 'Linesman' means a person authorised to inspect and work on the overhead lines and switches in relation therewith.

Note: He is the lowest grade employee who is allowed to enter an unattended supply control post unaccompanied by his superior.

S.R.17.02.7.3.39.1. 'Live equipment' means any electrical equipment which is electrically live.

S.R.17.02.7.3.39.2. Electrical equipment is live when a difference of potential exists between it and earth or when it is connected to another conductor or circuit in which such a difference of potential exists.

S.R.17.02.7.3.40. 'Master Controller' means a controller in the driving compartments of electric engines, motor coaches and driving trailers, which are not included in the main circuit of the controlled motor or motors but which operate other controller or contactors by means of control circuit thereby controlling the supply of electrical energy to the Traction Motors.

S.R.17.02.7.3.41. 'Motor Coach' means coach equipment with traction motors and with the necessary control and power apparatus for operating them.

S.R.17.02.7.3.42. 'Multiple Unit train' means a train consisting of two or more single unit trains coupled together and operated as one train.

S.R.17.02.7.3.43. 'Off position' means the position of the reversing handle whereby a master controller is locked 'off' and where by the deadman's handle, if provided, is rendered ineffective.

S.R.17.02.7.3.44. 'Operator' means a person on duty who is in charge of a supply control post.

S.R.17.02.7.3.45. 'Overhead equipment' means the electrical conductor over the track together with their associated fittings, insulators and other attachments by means of which they are suspended and registered in position.

Note: All overhead electrical equipments, distribution lines, transmission lines and feeders may be collectively referred to as 'Overhead lines'.

S.R.17.02.7.3.46. 'Pantograph' means a collapsible device mounted on and insulated from the roof of an electric engine or motor coach and provided with means of collecting current from the overhead equipment .

S.R.17.02.7.3.47. 'Permit to work' means a form of declaration signed and given by an authorised person to a person in charge of work to be carried out on or adjacent to any electrical equipment, for the purpose of making known to such person exactly what equipment is dead, earthed and safe to be worked on or adjacent to.

S.R.17.02.7.3.48. 'Rail Bond' means an electrical connection across a joint in or between adjacent lengths of rail.

S.R.17.02.7.3.48.1. 'Bond continuity' means a rail bond used for maintaining continuity of the rail return circuits at points and crossings.

S.R.17.02.7.3.48.2. 'Bond cross' means a rail bond used for connecting together two rails of a track or rails of adjacent tracks.

S.R.17.02.7.3.48.3. 'Bond Joint' means an electrical connection across a joint between two adjacent lengths of rails as part of the track return.

S.R.17.02.7.3.48.4. 'Bond structure' means an electrical connection between the steel work of a track structure, bridge or station building, to which the traction overhead equipment is attached, and the track return.

S.R.17.02.7.3.48.5. 'Bond Impedance' means a special rail bond used to bridge an insulated rail Joint in AC track circuited sections in area equipped for electric traction.

S.R.17.02.7.3.49. 'Reversing handle' means a handle which controls the forward and reverse running of the traction motors and is fitted in such a manner that it can only be removed when the master controller is locked 'off'.

S.R.17.02.7.3.50. 'Single Unit Train' means the combination of a motor coach or motor coaches adopted by a railway administration as an operating unit.

S.R.17.02.7.3.51. 'Track return' means the track rails when used as the return conductor for the traction return current to the sub-station.

S.R.17.02.7.3.52. 'Traction' means electric traction.

S.R.17.02.7.3.53. 'Traction engine examiner' means an official responsible for inspection and maintenance of electric rolling stocks.

S.R.17.02.7.3.54. 'Traction Foreman (TFO)'.

S.R.17.02.7.3.54.1. 'Traction Foreman/Overhead Equipment (TFO/OHE)' means a subordinate for the area concerned responsible for the operation and maintenance of the overhead equipment and for the staff employed thereon.

S.R.17.02.7.3.54.2. 'Traction Foreman/Rolling stock (TFO/RS)' means a subordinate responsible to AEE/RS for the maintenance and/or inspection of electric rolling stock and for the staff employed thereon.

S.R.17.02.7.3.55. 'Traction Loco Controller (TLC)' means an official under the control of AEE/RS who will be responsible for booking of electric locomotives and running staff to meet the requirements of the traffic.

S.R.17.02.7.3.56. 'Traffic Block' means blocking of a track against movement of all traffic over a particular section.

17.03. Inspection of electrical way and works.—

The electrical way and works shall be inspected regularly in accordance with special instructions by officials nominated for the purpose and in accordance with the duties assigned to them.

SR.17.03.1. Electrical way and works –

Railway servants employed on electrical way and works shall observe all General Rules 15.01 to 15.17, 2.05, 4.07 and 6.10 inclusive wherever applicable to electrical way and works except as otherwise provided in the rules contained in this chapter, and the Railway Administration shall prescribe on whom the duties of Inspector of Way and Works and the duties of Ganger devolve in each case together with any additional requirements thereto.