



(SAFETY CIRCULAR No. 03 /2024)

**Sub:- Precautions to be taken while working in power block.**

Electrical accidents occurred in SBP division during working in power block at NRLA Station on date 12.12.2023 during changing of caution board where 9 tonne insulator was not provided at proper location for separation of elementary sections of Route1 & route 2. Another case of electrocution reported on 12.09.2023 at km 62/5-7 of Arand station of SBP division due to less clearance of charged portion of LSW wire. To aware the TRD staff & supervisors involved in working in power block the following instructions mentioned in ACTM & GR are reiterated below.

1. **GR 17.04. Permit –to-work on electrical equipment:-**If work is to be carried out adjacent to the electrical equipment or any other part thereof by other than the competent railway servant, such work shall be done only when for such time as the Person-in-Charge of the work has obtained a written permit-to-Work, duly signed and given by the railway servant authorised for the purpose by special instructions. He in turn, shall issue the same only with the knowledge of the Traction Power Controller.
2. **SR 17.04.01:-**Before commencing the work on any part of the overhead equipment, or within 02 meters of live overhead equipment, a permit-to-work shall be obtained from the Traction Power Controller or authorized person. Detailed instructions regarding power block and Permit-to-Work are given in SR 17.04.02 to SR 17.04.17.
3. **General(ACTM,VOL-II, PART-I, Para 20332):-**
  1. The following rules are supplementary to the General and Subsidiary Rules and the instructions contained in Volume 1.
  2. Printed boards containing instructions regarding treatment of persons suffering from electric shock should be exhibited in every OHE maintenance depot, equipment room, switching station, cabin, OHE Inspection Car shed, loco shed, OHE Inspection Car and wiring train and also in offices of SM, ASM, CYM, AYM and HTXR.
  3. First Aid Boxes should be kept at every switching station, maintenance depot, in OHE Inspection Car, breakdown vehicle and wiring train.
  4. Ropes, come-along clamps, tirfor, slings, D shackles and other load taking equipments etc. should be tested once in three months at least, in the presence of an JE, and record of such tests maintained in each depot.
4. **Documents to be kept with OHE Supervisors for Work on OHE(ACTM,VOL-II, PART-I, Para 20333):-**
  1. The JE (OHE) or other official supervising OHE work shall have with him a complete set of structure erection drawings, lay out plans, sectioning diagram and general supply diagram etc. pertaining to the overhead equipment under his charge. He shall also have with him Station Working Rules for the stations between which he is working. He shall, in addition, keep with him all useful information regarding the running of trains over his section.
  2. It shall be the responsibility of the SSE/ JE (OHE) or in his absence the senior-most official incharge of the work to ensure that all safety rules prescribed are actually



observed by the staff when carrying out work on traction installations. It shall be the duty of the supervisor to remind the staff periodically of the various safety rules to be observed at work site.

5. **Permit to Work(ACTM,VOL-II, PART-I, Para 20334):-**

Before commencing work on any part of the dead OHE or within 2m of live OHE, a permit-to-work shall be obtained from TPC or other authorized person as detailed in Chapter VI.

6. **Protection of Staff against Traffic Movements and Protection of Trains (ACTM,VOL-II, PART-I, Para 20335):-**

1. The supervisory official in-charge of work on OHE shall observe relevant provisions of GR and SR for protection of trains before work on OHE is commenced and for the whole time the work is in progress.
2. Measures laid down in the Chapter VI shall be observed by all concerned to prevent accidental energization of the section under power block on account of electric train movements.

7. **Earthing before Commencement of Work(ACTM,VOL-II, PART-I, Para 20336):-**

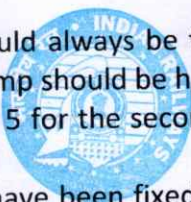
1. All metallic parts within reach (either directly or through tools etc.) shall be earthed, after they are made dead.
2. Each working party shall be protected by at least two independent earths, one on each side of a working party.
3. If the distance between the working parties exceeds 1000 m intermediate earths shall be provided in such a manner as to ensure that the distance between earths does not exceed 1000 m.
4. Even when earthing is provided by isolator switches with earthing heels, additional temporary earths as above shall also be provided.

8. **Procedure for Providing Temporary Earths(ACTM,VOL-II, PART-I, Para 20337):-**

The following sequence of operations shall be carried out while providing temporary earths on OHE.

1. Men shall be posted on both sides of the site of work to warn the working party of any approaching train on the same track and adjacent track(s).
2. The permit-to-work shall be obtained prior to commencing work to make sure that power supply has been switched off.
3. For providing temporary earth on the OHE or other equipment after it has been made dead, only discharge/ earthing rod assembly specially designed for this purpose alone should be used. The cable shall be flexible and should have adequate cross-section of 40 sq.mm.
4. Fix the earthing-clamp securely to a mast at least one span away on one side of the work site after making sure that the mast-to-earth rail bond/earth wire of this mast is intact. Alternatively, the clamp may be fixed to the bottom flange of one of the traction rails, taking the cable under the rails.  
In single-rail track-circuited sections, the earthing clamp should be fixed to the traction rail or to the mast i.e. non-track-circuit rail; on double-rail track-circuited sections the earthing clamp should be fixed to the mast.  
The mast-end or rail-end clamp of the discharge /earthing pole assembly should be checked for tightness just before connecting the top clamp on to the OHE as the earthing clamp fixed to the rail or mast in advance could have worked loose.
5. First touch the top hook with Register arm tube for ensuring the OHE is in switched off condition. Hook securely with a snap action the top clamp of discharge/ earthing pole assembly to the OHE conductor close to the mast/structure and tie the earthing pole to the mast/structure. Never hook on the top hook of the earthing cable to the OHE, till the other end has been first connected to earth.



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6. The earthing clamps should always be fixed to the traction rail or mast / structure first and then the top clamp should be hooked to the OHE to be earthed.
  7. Repeat operations 4 and 5 for the second temporary earth on the other side of the working party.
  8. After temporary earths have been fixed on the OHE on both sides of the work site, staff may proceed with the maintenance work.
  9. After work is completed and men, materials and tools have been removed and the OHE is clear, the above earthing rods may be removed in the reverse order i.e., first remove the hook on the OHE and then the clamp fixed to the rail or mast/structure. After warning all staff that supply will be restored and that they should keep away from live equipment, the permit-to-work may be returned and supply restored.
9. **Precautions in Regard to Discharge/Earthing Pole Assembly(ACTM,VOL-II, PART-I, Para 20338):-**
1. The continuity of the cable connection between the top clamp and the earthing clamp should be checked once a fortnight. Cable should be renewed if more than 20% strands are broken. During use, cable should be continually examined for fraying and breakage of strands. Discharge/Earthing pole assembly should be inspected by SSE/JE once a month.
  2. During accidents when slewing the OHE and in similar circumstances, the discharge/earthing pole assembly should be provided at a location where it is not likely to be interfered with during crane working or due to work on the permanent way.
10. **Work on OHE or any Conductor having a Sectioning Point(ACTM,VOL-II, PART-I, Para 20339):-**
- When work is to be carried out on OHE or conductors, which are not electrically bonded, following additional precautions are required.
1. The two sections of conductors or ends of conductor which may have snapped may be at different potentials. Each end should, therefore, be separately earthed at two points after switching off supply to both parts of the OHE or conductor.
  2. This precaution should also be observed when working on or in the vicinity of a sectioning point and cut-in insulators.
  3. Neutral Sections should be treated as live equipment and earthed separately at two points on either side of the work party before commencing work.
  4. When work is to be carried out on an isolator, both sides of the isolator should be earthed at two points or more conveniently, isolator jumpered temporarily
11. **Protective Helmets(ACTM,VOL-II, PART-I, Para20340):-**
1. At the work-site, staff are advised to wear helmets to protect their heads against any tools or equipment which may drop down accidentally, as well as to minimize head injury in case of accidental fall from a height.
  2. All staff at work site shall wear safety shoes suitable for working with 25kV.
12. **Safety Belt (ACTM,VOL-II, PART-I, Para 20341):-**
- Staff working on structures or a ladder are advised to protect themselves against an inadvertent fall by wearing a safety belt for supporting themselves by a rope sling.
13. **Rules for use of Ladders (ACTM,VOL-II, PART-I,Para20342):-**
1. It shall be the responsibility of the supervisor to ensure that ladders are stored in a protected enclosure, properly maintained and reconditioned as often as required. A ladder should never be in such a position so as to likely to fall on a live part.
  2. Ropes used with ladders should be of cotton or jute. Use of metallic ropes is prohibited. A ladder should be held by one person on the ground to prevent slipping, while the top end should be tied to the supporting structure or conductor to keep it in position and prevent it sliding away.
  3. Ladders should never be allowed to fall on or rest against the contact wire.



4. If the nature of the work involves risk of the conductor breaking into two parts (due to opening out of sleeves or splices) the ladder shall not be rested against the conductor. Trolley ladders shall be used in such cases.
5. More than one person shall not normally be allowed on a ladder as far as possible.
6. Climbing on a ladder with wet or slippery foot-wear is forbidden.
7. Ladders should not be used for transporting materials.
8. A rope should be used to pass tools or any equipment to the men working on a ladder.
9. No one should stand directly below a work spot under a ladder.

**14. Other Important Precautions to be taken while Carrying out Works on OHE (ACTM,VOL-II, PART-I, Para 20343):-**

1. The useful cross section of a conductor shall not be reduced while making joints.
2. Any contact with conductors, which are not specifically earthed, is forbidden.
3. The strength of the anchoring rope should be not less than that of the cable to be anchored.
4. Temporary anchoring of conductors should only be done by using stranded flexible steel cable at least of the same tensile strength as the cable to be anchored. Use of two cables of different strengths joined together is prohibited. Use of cotton, jute or other non-metallic ropes for anchoring is forbidden.
5. Structure bonds and cable connections of the structure to earth shall be maintained in proper condition. No heavy materials should be stacked on the rail bonds; transverse bonds between two rails of the same track as well as rails of different tracks shall also be maintained in proper condition.
6. Where rails to which structures are connected are replaced, the structure shall be connected to the new rail immediately after it has been laid.

**15. Isolators (ACTM,VOL-II, PART-I, Para 20347):-**

Isolating Switches on the 25 Kv system shall not be opened or closed when current is passing through them. Normally, isolators should only be opened or closed, after power supply to the section has been switched off by opening the appropriate interruptor (see para 20600 & 20601).

**16. Petroleum Sidings(ACTM,VOL-II, PART-I, Para 20348):-**

The following arrangements/precautions would be necessary: -  
Arrangements

1. An equipotential link between the petroleum sidings installation earth and the track via a switch.
2. Setting up of neutral zones (insulating joints) in the track to avoid any risk of propagating stray current.
3. Setting up of neutral zones/sections in the contact wire similar to loco inspection pits.
4. The tracks must be provided with longitudinal bonds on both the rails as well as transverse bond (30 m intervals). All masts and metallic structures in the vicinity of the track/ sidings should be provided with structure bonds. Copper rivets should be used for bonding.
5. 10 ohm earths must be connected to the petroleum siding on each side at the insulated joint.

**Precautions**

- a. No oil tanker is permitted to stable under live OHE for inspection purpose.
- b. Fuelling to be done by side filling arrangement only.
- c. Pipe lines in the vicinity of the track should be properly earthed.



- d. Minimum 2 m electrical clearance from live OHE of the adjacent track or only other structure nearby must be maintained.
- e. During filling/loading and unloading of petroleum products the isolator at the neutral section of OHE should be kept open to ensure that the OHE is dead and earthed.

**17. Operation of Isolator Switches. (ACTM,VOL-II, PART-I, Para 20600):-**

1. Before considering the procedure for obtaining power blocks, attention is drawn to the precautions to be taken in opening an isolator switch. Manually operated isolator switches are provided at different points on the main line to sectionalize the OHE into elementary sections and at large yards to isolate different elementary sections for maintenance of the OHE.
2. The operating handle of every isolator switch shall always be kept locked either in the open or closed position. Any loss or damage of a padlock or key shall be reported immediately to the OHE Section JE, SSE (OHE) and TPC.
3. An isolator switch is not meant for breaking a current, but only to break a circuit when no current is passing through it. If an attempt is made to open a switch when it is actually carrying current, severe arcing will occur at the switch contacts and may result in serious consequences including danger to the operator. An isolator switch shall not be opened when current is passing through it. It may be opened when there is no train in the sub sector in double/multiple line sections.
4. Isolators switches on the main line may only be opened provided the corresponding sub-sector is first made dead by TPC. The person operating the isolator switch shall not open it, unless specifically asked to do so by TPC by a clear message supported by a private number or after receipt of a separate permit-to-work for the section which includes the elementary sections on either the isolator switch. TPC shall ensure that the sub-sector is dead before he orders opening of an Isolator switch in it.
5. Isolator switches, however, can be closed by a duly authorised person even if the adjacent Interruptors are closed (i.e. on load) provided the closure is made swiftly in one motion. It is imperative that once the fixed and moving contacts have met, the contacts are not separated.

**18. Isolators in Yards and Sheds(ACTM,VOL-II, PART-I, Para 20601):-**

1. Isolator switches provided for isolating sidings and yards and also to feed OHE inside running sheds, may be opened provided the official concerned makes it certain that -
2. the entire section is visible; and
3. There is no locomotive with raised pantograph in the section.

If it is not possible to get an assurance of these conditions, the principles of para 20600-4 shall be followed.

**19. Restoration of Supply After a Permit-to-work is Returned (ACTM,VOL-II, PART-I, Para 20613):-**

On completion of the work, the person who received the permit-to-work shall ensure that –

1. all men and materials have been withdrawn from the electrical equipment and its vicinity,
2. all earths provided for the protection of the working parties have been removed and
3. all staff, who have been deputed to work, are warned that the power supply is to be restored.

He should then inform TPC by a message, supported by Private Number, that the work, for which the permit- to-work was issued, has been completed, the men and materials have been withdrawn from the specified section, the earths have been removed and power



supply may be restored to the section. This shall constitute cancellation of the permit-to-work previously obtained.

**20. Work by other than Authorized Persons (ACTM, VOL-II, PART-I, Para 20614):-**

1. If work is to be carried out on or adjacent to any part of the electrical equipment by other than 'authorized' persons such work shall not commence until the person in-charge of the work is in possession of a written permit-to-work in the prescribed form issued to him by an 'authorized' person. Such permits-to-work in the prescribed form shall only be issued to an 'authorized' person of the Electric Traction Branch not below the rank of a Senior Technician.
2. The permit-to-work shall first be taken from TPC by an 'authorized' person who shall earth the electrical equipment specified and hand over a permit-to-work card to the person in-charge of the work getting an acknowledgment on the other copy. A duplicate copy of every permit-to-work card shall be retained in the personal possession of the 'authorized' person who issued it.
3. On completion of the work and when all men and materials have been withdrawn from the electric equipment and its vicinity, the person in-charge of the working party shall cancel his permit-to-work card and return it to the 'authorized' person who issued it. The 'authorized' person shall in turn issue a message to TPC to cancel permit-to-work as detailed in para 20613.

**21. Local Cancellation of Permit-to-Work When Telephones are Interrupted (ACTM, VOL-II, PART-I, Para 20615):-**

If telephone communication with TPC is interrupted when a permit to work is to be cancelled, the authorized person to whom the permit-to-work was issued shall arrange locally for restoring the normal (live) conditions on the equipment specified in the permit-to-work and for cancelling the power block, if possible. Before this is done the authorized person should satisfy himself that no other party has been given a permit-to-work for the same section.

**22. Multiple Working Parties (ACTM, VOL-II, PART-I, Para 20616):-**

1. Whenever work has to be carried out by more than one working party, within a sub-sector or an elementary section, the permit-to-work shall be issued by the TPC only to one authorized person who alone shall be responsible for all work on the portion of electrical equipment specified in the permit-to-work. Other party or parties may work on the same portion of electrical equipment only with the permission of this authorized person. The authorized person shall cancel the permit-to-work only when he has satisfied himself that all working parties who have been permitted by him to work in the section covered by the permit-to-work have withdrawn their men and materials and have removed the earths from the electrical equipment on which they had worked. In the event of telephone communication being interrupted, the person responsible shall take action as provided in Para 20615 above for cancellation of the power block.
2. Where the two parties are working far from each other, the party who has to work for a longer period shall take the permit-to-work and then permit the other party to start his work by a message supported by a Private Number. The second party shall inform the party from whom he got the permit-to-work of completion of work and removal of earths and withdrawal of men and material by a message supported by Private Number.



23. **Local Block(ACTM,VOL-II, PART-I, Para 20619):-**

Power supply for sidings which do not affect movements of trains on the main lines, for loop lines and reception and despatch yards, is controlled by manually operated isolators. Keys for these isolators are usually in the custody of the Stationmaster concerned. Power blocks on such sidings can be arranged when required by an authorized official subject to the following:

1. The Station Master, Cabin Assistant Station Master, and others responsible for the movement of traffic, should take measures detailed in para 20621, 20622 and 20625.
2. TPC shall be informed before and after the shut-down is effected.
3. Isolators may only be opened after due precautions prescribed in para 20600, 20622 and 20625.
4. Earthing of equipment and issue of permit-to-work is done as prescribed in these rules.
5. Local power blocks shall be recorded in form ETR-4 prescribed for the purpose.

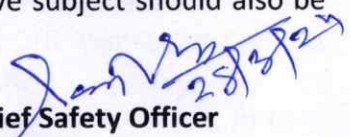
24. **Protective Measures for Power Blocks (ACTM,VOL-II, PART-I Para 20620):-**

It is essential that every Railway official concerned with the movement of trains on the electrified section, have a thorough understanding of the precautions to be taken to ensure safety of staff working on the OHE under power blocks. The reasons for the precautions and the nature of the precautions are therefore given at some length in the following paragraphs.

The protective measures are.

1. **Longitudinal Protection:** To stop movement of electric rolling-stock running on the same track on which a section has been made dead and power block has been granted.
2. **Transverse or Cross Protection:** To stop movement of electric rolling-stock running into a section which has been made dead, from another track or from a siding through cross-overs.

All inspecting Officials are directed to pay special attention to above subject & should ensure strict compliance and also counsel concerned staff accordingly. The above subject should also be discussed in safety seminars and safety meetings.

  
Chief Safety Officer  
Bhubaneswar

- Copy:**
1. Secy. to GM for kind information of GM.
  2. Secy. to AGM for kind information of AGM
  3. PCEE, PCE, CAO (Con), PCSTE, PCOM, PCME & PCCM for information and necessary action.
  4. CELE, CTE, CSE, CPTM & CRSE (Chg) for information and necessary action.
  5. DRM/KUR/WAT/SBP for information and necessary action.
  6. Sr.DSO KUR/WAT/SBP for information and necessary action.