

SAFETY BRANCH
West Central Railway
Jabalpur

E-Safety Bulletin

For the month

of MAY-2017

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ELECTRICAL SAFETY

The objective being to ensure the safety of personnel and equipment under all circumstances.

1. No work shall be carried out on live electrical equipment. After making equipment dead, it shall be effectively earthed, before work is started.
2. The responsibility devolving on different officials should be clearly defined and only "authorised person" may work on electrical equipment.
3. The procedure for effecting shut down and resuming supply should be clear cut and foolproof.
4. Machinery to ensure that the rules prescribed are actually observed by the staff concerned.
5. As far as possible, repair work should be carried out during day light hours. If work has to be done during night hours, sufficient artificial lighting should be provided.
6. Staff working on overhead lines should use proper ladders, safety belts etc. , to ensure they won't fall down.

Objective - 100% safety and 0% accidents.

a) Careless use of electricity is dangerous and leads to fires, shocks, destruction and deaths.

b) DOs and DON'Ts.

- * Check list
- * Warning board
- * Entry should be restricted
- * Security should be ensured
- * Unsafe act and unsafe condition.

A. Who is an "Authorised Person"?

A person who is specially empowered by the administration to carry out a specified task or duty

Authority given in the form of a "Certificate of competence" which clearly defines the responsibility resting on each person, by virtue of his holding any particular category of post.

Examples :

Unskilled Labour : Assist electric fitters to carry our work on electrical equipment

Skilled Electric Fitter : Authorised to effect shut down, test, earth and issue line clear certificate.

Sub-Station Operator : Authoised to effect shut down on any feeder, on receipt of requisition and issue "Permit to work" and to energise the feeder after receiving the line clear certificate, from the party concerned.

Sr. SE/SE/JE : Authorised to effect shut down test and earth the lines and issue "permit to work" supervise the work of subordinate staff.

A register of authorised person should be maintained in every office.

1. In caes of Power Block

TPC shall put red warning caps on control switches corresponding to interruptors which are kept open for isolating the section.

Warning boards shall be fixed on all manually operated switches opened locally for isolating the section.

2. Isolator switch

Not meant for breaking a current, but only to break a circuit when no current is passing through.

An isolator switch shall not be opened when current is passing operating it. TPC first dead the sub-sector. The person operating the isolator switch shall not open it, unless specifically asked to do so by TPC by a clear message or receipt of a separate permit to work.

3. At the time of Emergency Power Block.

* No work on the affected lines shall be commenced until an authorised OHE official arrives at site and earths the OHE at two points.

* Power supply shall not be restored by TPC until authorised official at the site issue a message.

1. Persons authorised to open interrupters and isolator switches.

*No staff of rank lower than a linesman working under Sr. SE(OHE) is authorised to open or close the interrupters or isolators controlling power supply to be overhead traction wires in the watering section.

*A list of the authorised person on duty signed by CTFO (OHE) shall be exhibited in the office of the ASM and the TXR. Each

authorised person should carry an identity card with photograph or specimen signature.

*The keys of interrupter/isolators are kept in the personal custody of the ASM on duty.

2. General Precautions:

*No work shall be done above or within a distance of 2 M from the live OHE without a "permit to work".

*No part of a tree shall be nearer than 4 meter from the nearest live conductor.

*No fallen wire or wires shall be touched unless power is switched off and wires suitably earthed.

3. Continuity of track:

*During maintenance or renewal of track, continuity of the rails serving electrified tracks shall invariably be maintained.

*In case of a rail fracture, the two ends of the fractured rail shall be first temporarily connected by a temporary metallic jumper of approved design.

* In all cases of discontinuity or rails, the two parts of the rail shall not be touched with bare hands.

*Before fish plates are loosened or removed, temporary connections shall be made.

4. Precautions in the event of breakage of wires:

Centenary or contact wires snaps and falls on the running track, it is possible that the fault current may damage signaling equipment.

5. Precautions for movement of ODC (over dimensioned consignments) in electrified sections.

*When a consignment whose length, width and height are such the one or more of these dimensions at any point during the run from start to destination likely to infringe the Schedule of Dimensions.

*Movement of ODC shall be undertaken only after sanction of competent authority has been obtained.

*No consignment with less than 100 mm clearance from the contact wire will be permitted.

*Speed must be restricted to 15 kmph when the clearance is between 390 mm and 340 mm.

*When an ODC is permitted to be move in an electrified section with the OHE power off, it will be the responsibility of the section controller to arrange with the TPC for power to be cut off before admitting the ODC into the section.

6. Restoration of supply after a permit to work is returned.

On completion of the work, the person who receive the permit to work shall ensure that:

* All men and materials have been withdrawn from the electrical equipment and its vicinity.

*All earthed provided for the protection of the working plates have been removed.

*All staff, who have been deputed to work, are warned that the power supply is to be restored.

7. Safety measures to be observed in case of unusual occurrences on electrified sections:

In the event of an OHE fault, the TPC after segregating and isolating the faulty section immediately switch off the power to the healthy section on the adjacent line over the same route length as the faulty section. The TPC shall promptly inform the section controller details of the isolated faulty section as well as the adjacent of the section temporarily isolated.

8. In case of electric shocks with 25 kV OHE supply of concerned sub-sector and also sub-sector of adjacent line to reduce the effect of induction and shall advise all concerned.

9. Earthing of feeder lines:

After the feeder is made dead, it shall first be discharged by throwing an earthed chain over the conductor. The feeder line is then connected to earth by means of a stranded copper cable of adequate size securely connected to earth and the conductor.

10. Issue of caution orders:

Before commencing work on OHE or in cases of breakdown of OHE, when it is necessary for a train to proceed cautiously, the Sr. SE/SE (OHE) responsible for such notification.

11. In the event of Hot Axle:

In case any hot axle or any abnormalities is seen in a running train in block sections, power supply to OHE of the affected section shall be switched off immediately by TPC on advice from section controller.



पश्चिम मध्य रेल
West Central Railway

महाप्रबंधक कार्यालय
संरक्षाविभाग
इंद्रामार्केट, जबलपुर 482 001
General Manager's Office,
Safety Deptt.
Indira Market, Jabalpur 482 001.

No.: WCR/JBP/HQ/Safety-302/SD-02(RB)/2017

Date: 08.03.2017

DRMs
JBP, BPL & Kota

Safety Drive No. 02/2017 [RB]

- Sub. : 15 days long Safety drive to prevent incidents of Signal Passing At Danger (SPAD).**
Ref. : RB Letter No 2017/Safety-I/3/1 dated 07.03.2017 (copy enclosed)

The rising trend of collision/derailments especially of passenger carrying trains is a serious concern. Railway Board vide letter under reference, a safety drive for a period of fifteen days over WCR from 10.03.2017 to 24.03.2017 for reinforced commitment to safety by prevention of SPAD incidences being occurred due to non-observance of proper rules in train operation.

During the drive, emphasis must be given on the following points:

- (1) Ensuring that the breathalyzer available in crew booking lobbies is functional and breathalyzer tests are carried out as prescribed, both at the time of 'Signing On' and 'Signing Off'.
- (2) Ensuring the Performance of LPs by closely monitoring and sensitizing them to follow proper safety rules.
- (3) Ensuring that no LP/ALP overdue PME, refresher, Competency etc. is allowed to work and they are booked for necessary safety training programmes if required.
- (4) Footplate inspections by officers and supervisors, particularly during night/early morning hours. Also surprise/ambush checks shall be conducted with a view to sensitize not only to running staff but also to other staff involved in train passing and maintenance activities.

- (5) Bad Sections in respect of compliance to 10 hrs. rule shall be identified & monitored closely.
- (6) LPs/ALPs shall be counselled on use of Mobile phones during work and about alcohol policy. Ambush checks shall also be conducted to check status of their Mobile phone during run. BA test on LPs/ALPs during run shall also be conducted by portable BA equipment by LIs / Officials.
- (7) ALPs should be counselled for applying emergency brakes by opening RS valve quickly in case they notice lack of alertness by Loco Pilot. ALPs shall also be advised that they are equally responsible as LPs in case of SPAD.
- (8) Ensuring that while approaching signals, ALPs are calling out signal aspect loudly indicating location of signal by posture and LPs are acknowledging in the same manner.
- (9) Ensuring that LIs are counselling LPs and their families about the imperative need to take adequate rest especially at Hqrs.
- (10) Proper feedback mechanism shall be made and systematised in divisions regarding acknowledgement of any unusual incidents reported by the running staff and action taken on these cases.
- (11) Ensuring that Walkie-Talkie available with LP and Guard are in working condition.

Intensive foot plate inspections by Officers/Supervisors to be done especially ***between 00.00 hrs to 04.00 hrs.***

Condition of the crew booking lobbies and Running rooms shall also be monitored and improved as per existing instructions, to ensure adequate and proper rest to running staff.

Officers/Supervisors from Mechanical, Electrical, Engineering, Operating, S&T, & Safety departments shall participate in this drive.

Feed back of above safety drive should be submitted on weekly basis on each Monday in ***Format-I*** and summary in ***Format-II***.

Format-I

S.No	Name & Desig.	Section	Date of	Time of	Irregularitie	Action
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	of officer/supervisor	inspected	inspection	inspection	s noticed	Taken including counselling if any

Format -II

S.N.	Items	Elect.	Mech.	Optg.	Engg.	S&T	Safety	Total
1.	No. of Officers participated during the drive department wise.							
2.	No. of Supervisors participated during the drive department wise.							
3.	No. of Loco Pilots/Assistant Loco Pilots counseled during the drive.							
4.	No. of stations covered during the drive.							
5.	No. of ASM, Pointsmen counseled during the drive.							
6.	Details of irregularities, shortcut & unsafe practices noticed during the drive							
7.	Action taken to remove irregularities.							

Final feedback of above safety drive must reach to this office by 29.03.2017 positively for onward submission to Railway Board.

DA: As above

(राजेश अर्गल)
मुख्य संरक्षाअधिकारी
पश्चिम मध्य रेल/जबलपुर

C/- Secy. to GM-for kind information to GM please
PCE, CEE, CME, COM, & CSTE -for kind information & n/action please.
Sr.DSO/Jabalpur, Bhopal & Kota- for information and n/action please.

1.25 KW Vertical Axis Wind Turbines Hybrid Energy System at Chanera Station of BPL division



- **Wind + Solar** combined energy production technology configured for this unique application by former NASA scientists.
- Vertical axis "**Savonius**" turbine accept wind from any direction and accommodate changes in wind direction.
The turbine, generators, and electronics will allow for the addition of wind generating power with minimal amount of added weight.
- Wind stream's Maximum Power Point Tracking (MPPT) is applied to each turbine independently.
- On board three turbines connected in series running the length of the tower, outputting power to the equipment.
- Cut-in wind speed 3m/s and cut-out wind speed 18 m/s.
- Designed for both On-Grid and Off-Grid applications.
- Silent operation, modular design, roof top mounted, scalable to fit needs.
- This 1.75 KW system generate 0.5 KW through wind & 0.75 KW from solar.

WIND MAP OF INDIA

1.25 KW Vertical Axis Wind Turbines Hybrid Energy System at Chanera Station of BPL Division



- **Wind + Solar** combined energy production technology configured for this unique application by former NASA scientists.
- Vertical axis "**Savonius**" turbine accept wind from any direction and accommodate changes in wind direction.
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- This 1.75 KW system generate 0.5 KW through wind & 0.75 KW from solar.



Comparison between Standalone Solar system and Vertical Turbine Hybrid System

	Vertical Turbine Hybrid System	Standalone Solar System
1	24 Hours power production and battery charging	Generation is only in day time
2.	Reduces the battery discharge cycle thereby increasing battery life	Battery discharge cycle is more hence life reduces

3	Needs 35 Sq Ft. area for 1 KW	Needs 80 Sq Ft. area for 1 KW
4	Cost of 1.25 KW system is Rs. 1.73 Lakhs only and load can be connected up to 0.8 Kw.	However for equal load around 4 Kw plant to be installed which will be costs around 9-10 lakhs.
5	Permissible load on this system is 800 watt	For standalone system permissible load is only 20% of its capacity.

LOAD CONNECTED TO THIS SYSTEM

- All Emergency load of Station.
- Computer for Reservation and Printer.
- Think client System.
- Lights and 02 nos. Fan of Dy. SS room.
- 08 nos. Tube lights at platforms.

AUTOMATIC TENSIONING OF OVERHEAD EQUIPMENT

Introduction

The 25 kV ac overhead equipment (OHE) consists of hard drawn grooved copper contact wire suspended from cadmium copper/Hard drawn bare copper(HDBC) catenary wire by means of solid hard drawn copper dropper wires.

The tension in OHE conductors and thereby the sag depend upon the temperature of the conductors when the OHE is unregulated i.e. Fixed termination of conductors is adopted. In such case the contact wire will sag or hog depending upon higher or lower temperatures. This in turn will deteriorate the current collection performance of OHE and pantograph.

In order to improve current collection performance it is essential to keep the tension in OHE conductors constant irrespective of expansion of OHE conductors at higher temperatures at lower temperatures. It therefore becomes essential to make the OHE regulated by installing the Regulating Equipments or Auto-Tensioning Devices (ATD) at termination of OHE conductors.

Tension length

With regulated overhead equipment every tension length is equipped with an auto-tensioning device at each end and an anti-creep located approximately midway between the tensioning devices. The distance between the anti-creep and anchor mast/structure on either side is limited to 750 m for copper conventional OHE or 15 supporting structures.

Half tension length of regulated overhead equipment not greater than 750 m between anchorages may also be adopted where necessary. The equipment is fixed at one end and provided with an automatic tensioning device at the other the fixed end being determined to suit convenience of erection.

The half tension length on either side of neutral section should not exceed 600 m when whole or part of it is located on curve. The distance of the axis of a 4 span insulated overlap from anti-creep /fixed termination on either side shall not exceed 600 m.

Types of Regulating Equipment

When 25 kV, ac, 50 Hz single phase system of electrification was introduced on Indian Railways 5:1 Ratio pulley block type regulating equipment consisting of 5 pulleys was adopted. This was replaced by 5:1 ratio which type regulating equipment in order to reduce as well as to increase sensitivity. Problems of over-riding of rope and cutting of helical grooves were experienced with which type regulating equipment. This leads to its malfunctioning. In order to overcome the problems of over-riding on ropes on helical grooves of drum of which type of regulating equipment .3:1 ratio(three pulley type) regulating equipment has now been designed and adopted by Indian Railways. This has a mechanical advantage of 3 as against 5 with 5:1 ratio pulley block type and winch type regulating equipment. Sketches depicting three types of regulating equipments are given at the end of this Chapter.

The 3:1 ratio regulating equipment basically consist of three pulleys, the stainless steel wire rope counter weighs and associate fittings. The three pulleys are in the same vertical plane. Two pulleys at a given distance apart are fixed to the mast/structure through pulley arms and associated fittings. The third pulley connected to OHE through pulley arms and associated fittings is movable. With the increase or decrease of temperature the OHE conductors expand or contract. The third pulley connected to OHE moves towards anchor mast or away from anchor mast depending upon expansion or contraction of OHE conductors .One end of stainless steel wire rope 34 x 7 (6/1) construction.8.5 mm diameter and 7 m long is connected to pulley arms of movable pulley through stainless steel wire rope and fitting. The wire rope is then passed once round each of the pulleys and the other end is then attached to counter weights through associated fittings.

In order to avoid falling of OHE on ground in the event of breakage of stainless steel wire rope or some other fitting the arrangement anti-falling device has also been incorporated.

X-Y Adjustment of Regulating Equipment

With the increase of temperature the OHE conductor expand and the movable pulley moves towards the anchor/mast structure causing slackness in the wire rope which is finally taken up by counter weight (suspended at the other of wire rope) which travel down-wards. With the decrease in temperature the OHE conductors contract thereby the movable pulley moves away from anchor mast/structure causing the counting weights to travel upwards.

The extent of movement of counter weight depends upon the expansion or contraction of OHE conductors.



Disaster management



Disaster : meaning , definitions

- Organization and management of resources and responsibilities for dealing with all humanitarian aspects of emergencies, in particular preparedness, response and recovery in order to lessen the impact of disasters. (Red Cross Society)
- "A serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources." (UNISDR 2009)



Disaster : meaning , definitions

- "Disaster" means a catastrophe, mishap, calamity or grave occurrence in any area, arising from natural or manmade causes, or by accident or negligence which results in substantial loss of life or human suffering or damage to, and destruction of, property, or damage to, or degradation of, environment, and is of such a nature or magnitude as to be beyond the coping capacity of the community of the affected area."

(Disaster Management act 2005)



Disaster management : definitions

- "The organization, planning and application of measures preparing for, responding to and, initial recovery from disasters." (UNISDR 2015)
- "A continuous and integrated process of planning, organising, coordinating and implementing measures which are necessary or expedient" for the following: 1) Prevention of danger or threat of any disaster, 2) Mitigation or reduction of risk of any disaster or its severity or consequences, 3) Capacity-building, 4) Preparedness to deal with any disaster, 5) Prompt response to any threatening disaster situation or disaster, 6) Assessing the severity or magnitude of effects of any disaster 7) Evacuation, rescue and relief, and 8) Rehabilitation and reconstruction." DM Act 2005



Disaster management

- 1. Understanding disaster risk
- 2. Strengthening disaster risk governance to manage disaster risk
- 3. Investing in disaster risk reduction for resilience
- 4. Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation and reconstruction



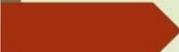
Preparedness

- Full scale drill of control coordination also
- Drill is much more than ART / ARME
- Regular coordination with State authorities , esp. Medical, Transport, Police and Disaster management
- Use of IT



Preparedness : NDRF

- Sharing of information with NDRF ,esp. about level crossings, road access etc.
- A full scale planned drill with NDRF and involving State Authorities like Gas or oil companies do.
- Frequent Joint training exercises with NDRF and sharing of skills



Preparedness

- Better equipment
- Better Training
- Better communication with Media , affected persons and their relatives
- Better mindset



Disaster handling

- Damage assessments
- Providing relief
- Debris clearance, removal
- Restoration
- Re-establishment of transport linkages