

ST-26

SIGNALLING IN 25KV
TRACTION AREA

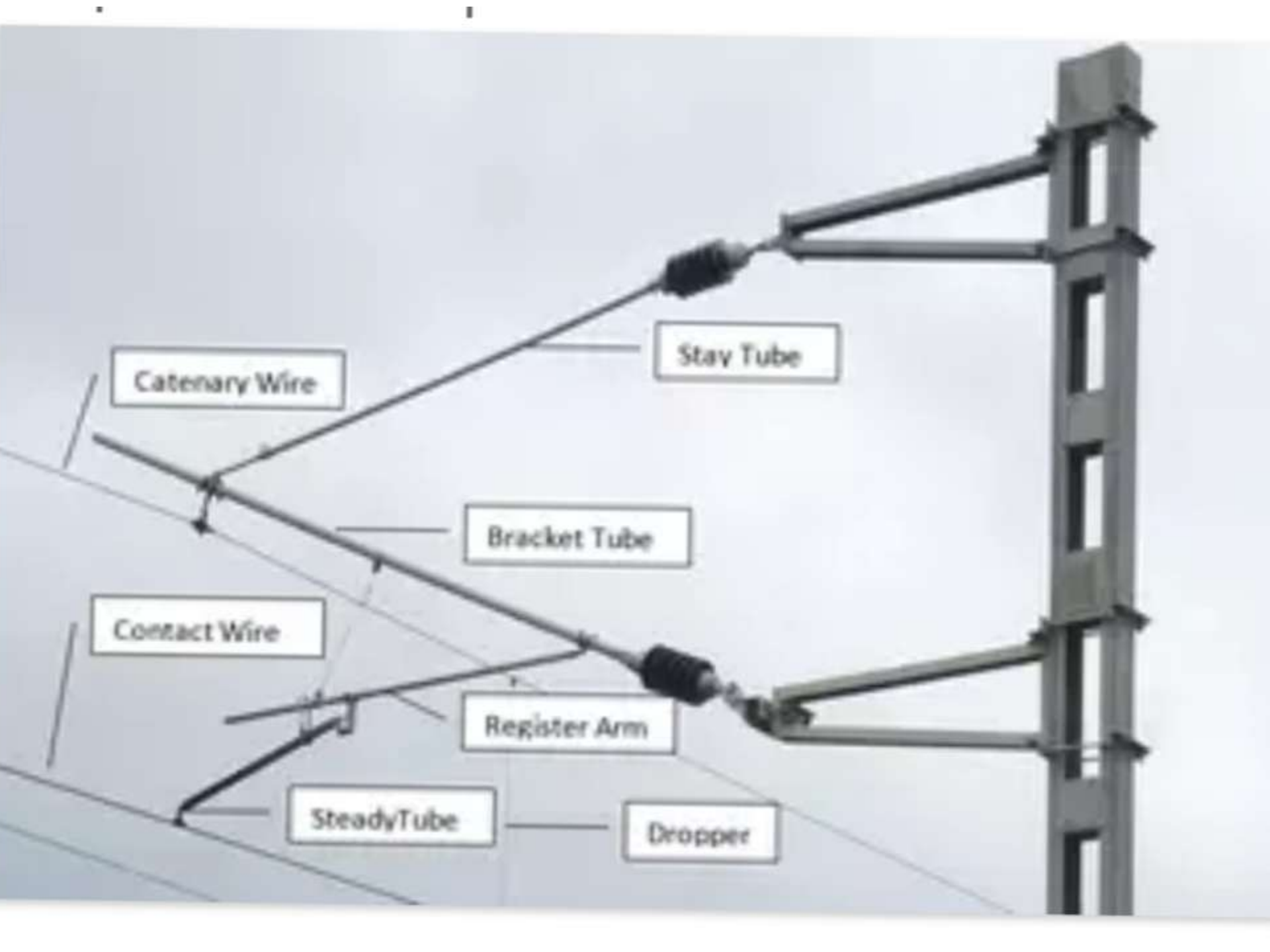
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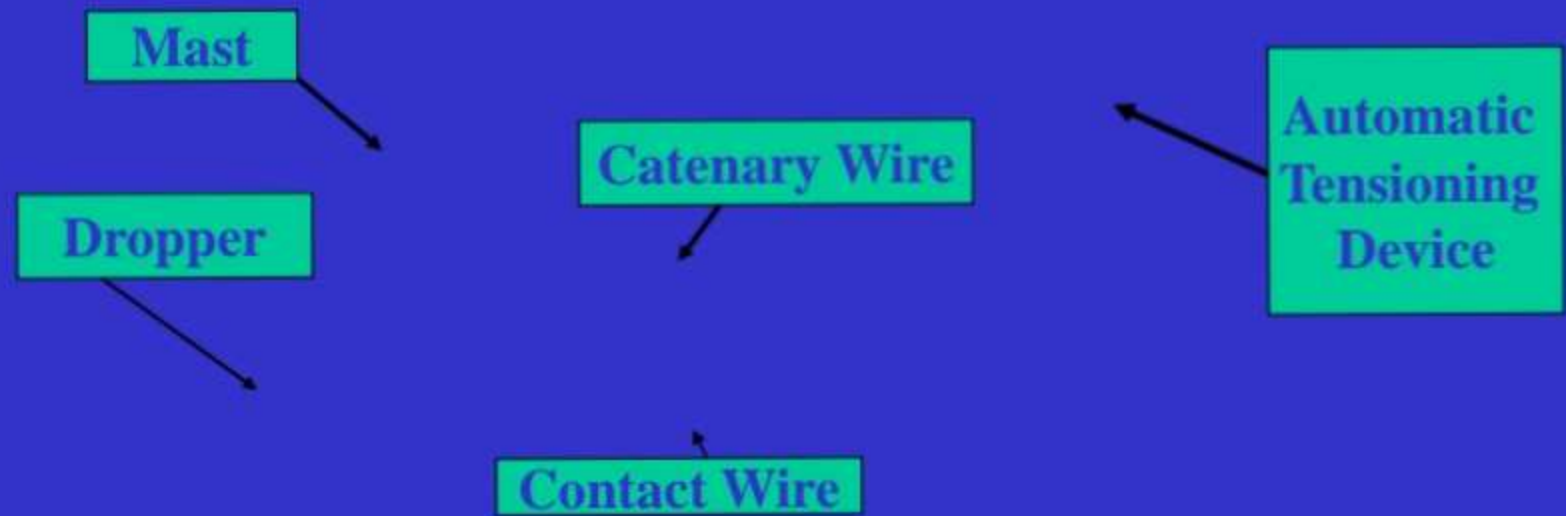
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- 8. Insulations in Lead out, double wire and Point Rodding.
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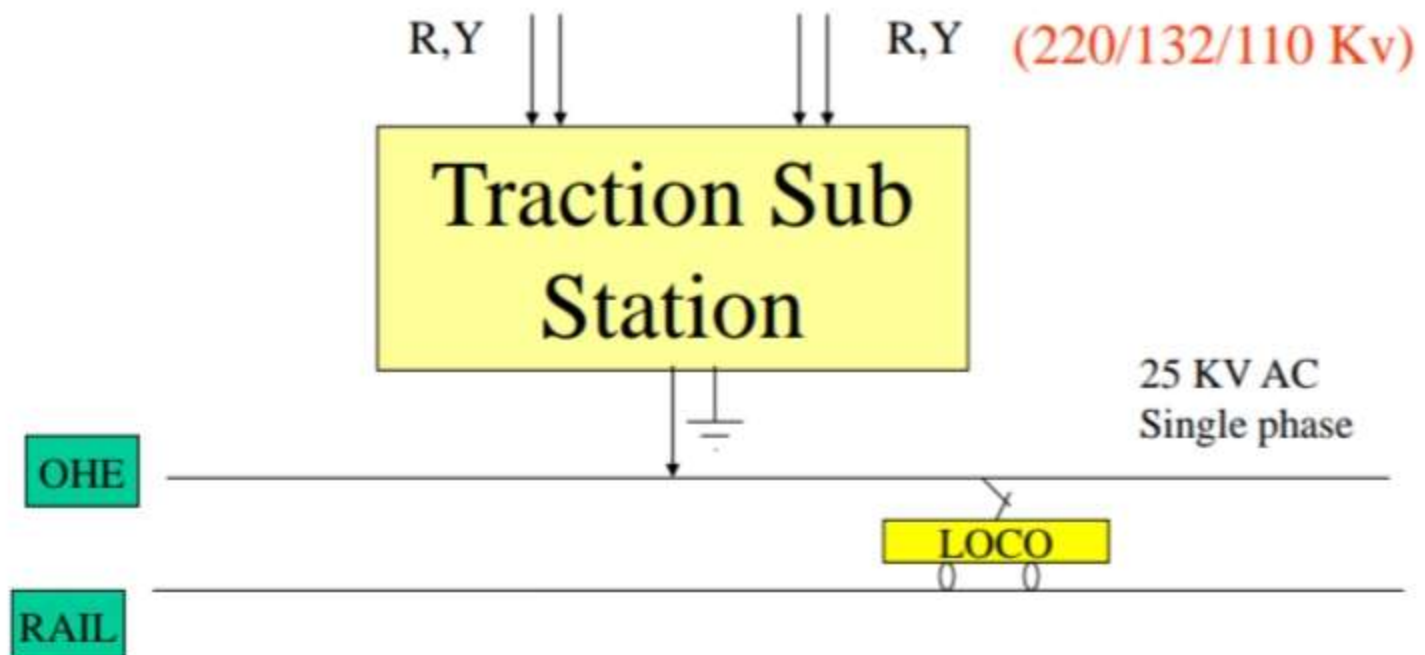




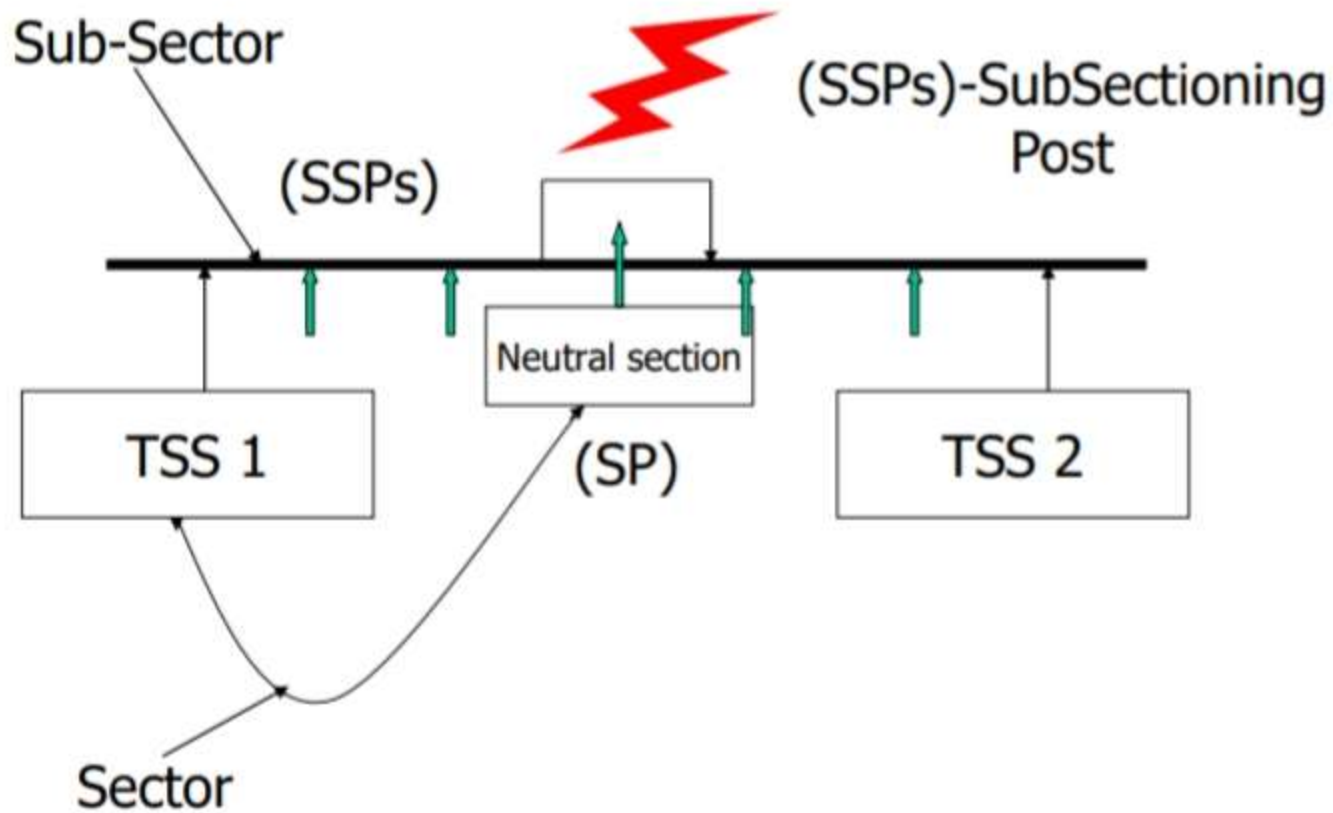
OHE Arrangement



SCHEMATIC DIAGRAM OF TRACTION SUB STATION



SCHEMATIC DIAGRAM



SUB SECTIONONG AND PARRALING POST DC SECTION



CURRENT TRANSFORMER



PTFE SHORT NEUTRAL SECTION



Neutral Section

A short section of insulated dead overhead equipment which separates the sectors fed by two adjacent substations which are normally connected to different phases.

- Warning Boards for Driver

Electromagnetic ,Electro static induction

- **Electromagnetic induction**: It is the Production of emf across an electrical conductor in a changing magnetic field.
- It is practically eliminated by transferring a circuit into underground cable.
- **Electro static induction**: Redistribution of electric charge in an object caused by the influence of nearby charges is known as Electrostatic Induction

Height of the Contact Wire

- Minimum 4.80m (above rail level)
- maximum 5.80m
- On level crossing 5.50m. (Provision of Height Gauge at LC Gates)

IMPLANTATION

- The horizontal distance from the nearest face of traction mast to the centre line of track
- The nominal IMPLANTATION of mast is **2.5 m.**
- Can be lowered to 2.36 m (with the approval of EIG)

CONTACT & CATENARY WIRE

- Contact wire –
 - cross sectional area - 107 sq.mm.
 - diameter - 12.24 mm
 - normal tension – 1000 kg
 - breaking load – 3905 kg
- Catenary wire –
 - cross sectional area - 65 sq.mm.
 - diameter – 10.50 mm
 - Normal tension – 1000 kg
 - breaking load – 3920 kg

Electrical Clearance

- The minimum distance in air between live equipment and the nearest earthed part.
- Vertical
 - i) long durations 320 mm
 - ii) short durations 270 mm
- Lateral
 - i) long duration 320 mm
 - ii) short duration 220 mm

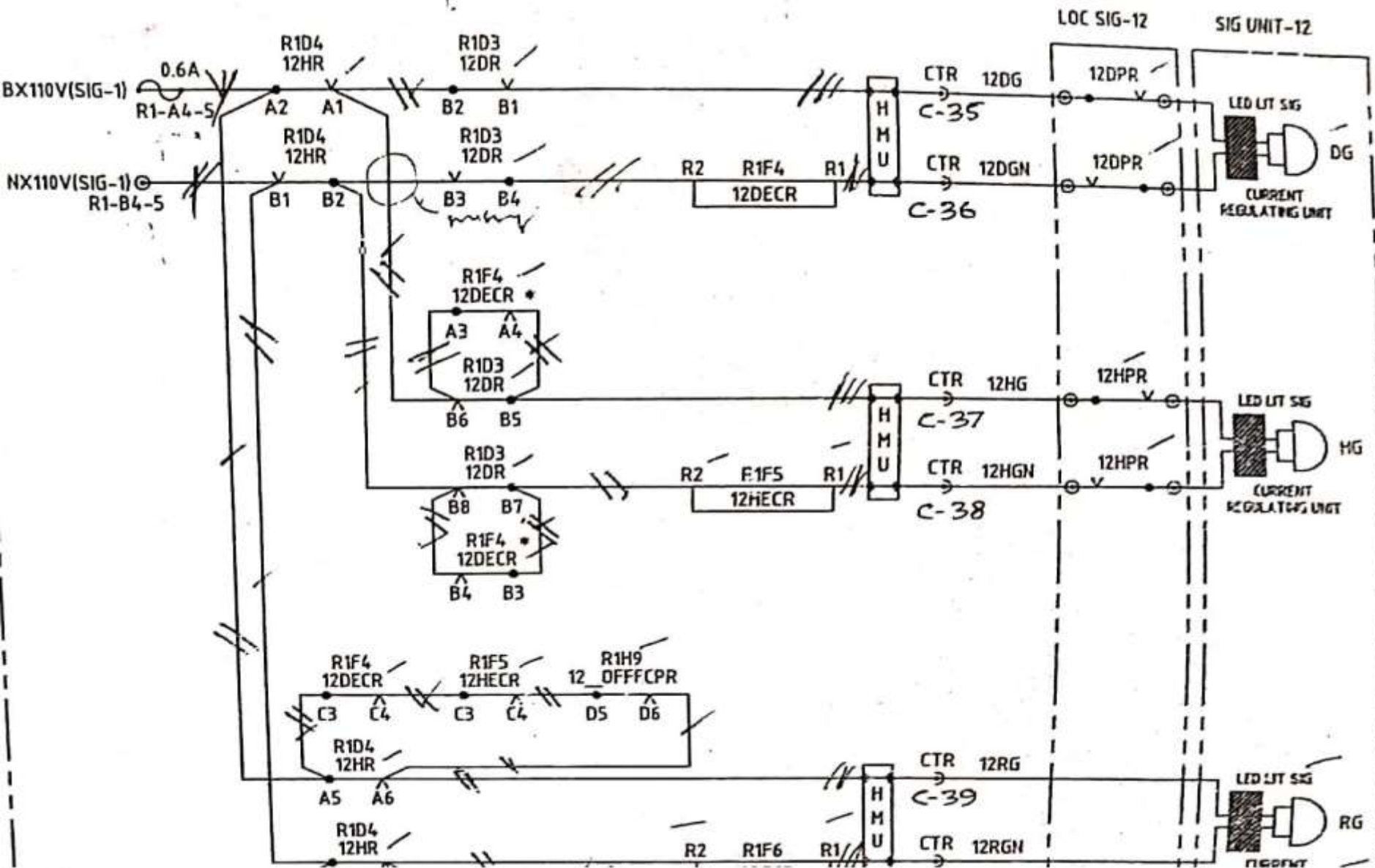
Working Clearance

- Minimum clearance between live conductor/equipments and such earthed structure/live parts of different elementary sections where men are required to work shall be 2 m.
- Where the clearance is not obtained the structure shall be protected by earthed metallic screens or prescribed warning boards.

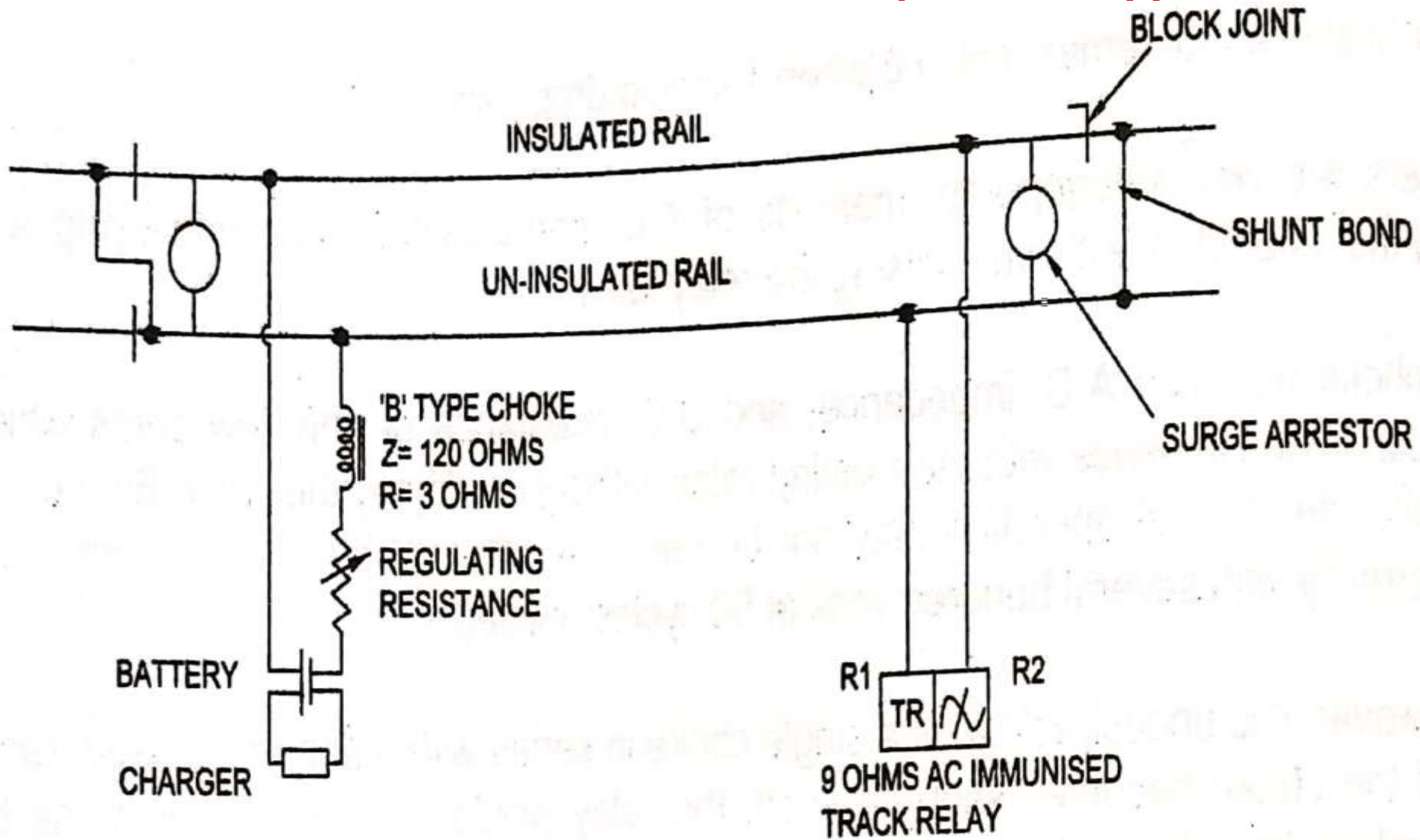
2.Screened,Unscreened cables,earthing

- **Screened Cable(shielded cable):**one or more conductors enclosed by a common conductive layer.It is surrounded by screen of coper or Alluminium.
- **Unscreened cable:**It is not Surrounded by Screen of copper or Alluminium .
- It reduces the effect of electromagnetic interference.
- **Earthing:**It is used to Protect Equipments from electri shock.
- Types of Earthing: Chemical earthing(Bentonite or graphite based compound) helps in reducing Soil resistivity.

3. Control and Repeating Circuits in RE area for CLS, Lamp Proving Circuit.



4.Track Ckt.in RE area,DC Single



TYPICAL SINGLE RAIL DC TRACK CIRCUIT

Bonds

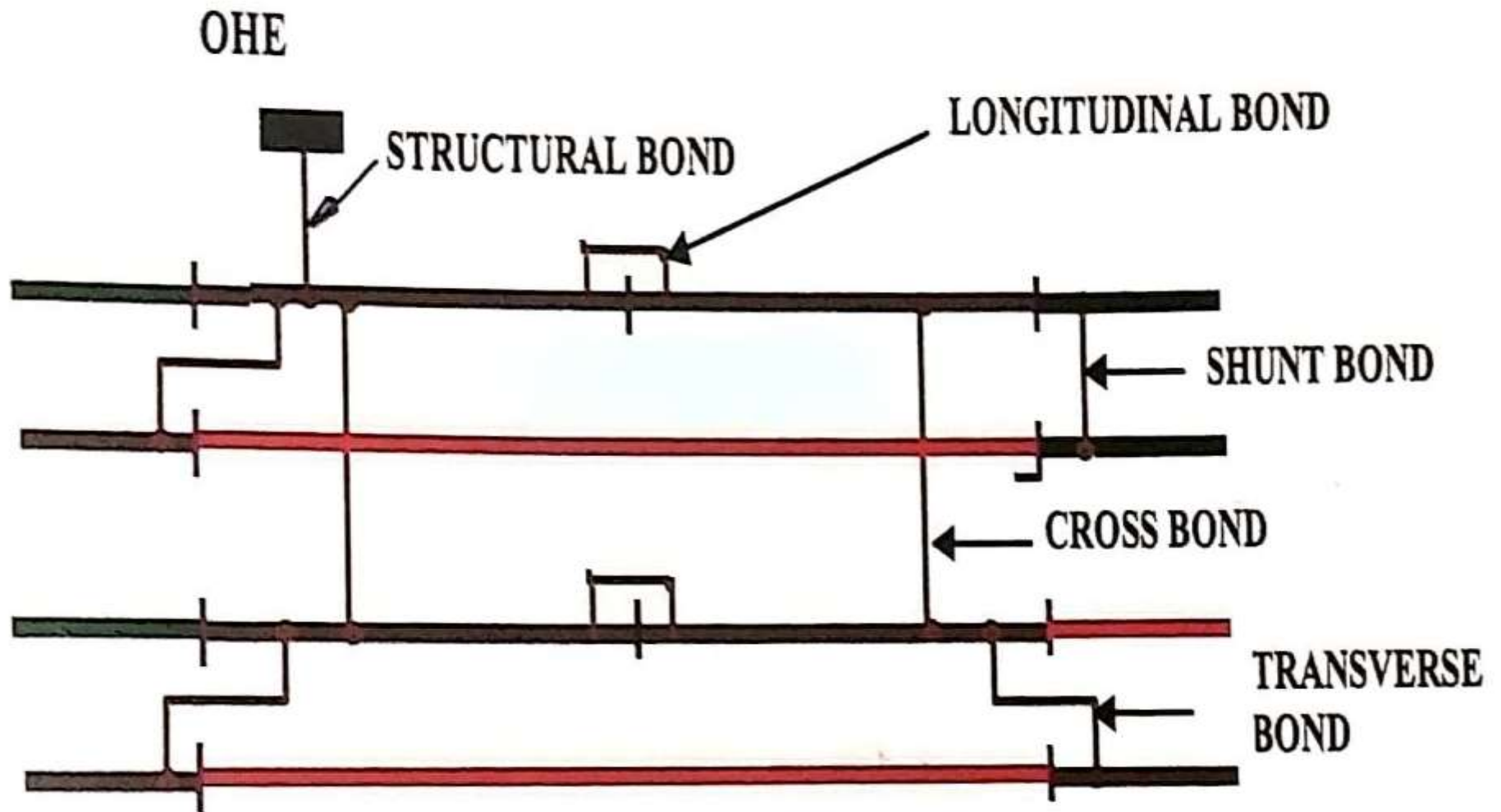


Fig.8.6

Cross Bond



Structural Bond



Longitudinal Bond



Transverse bond



Revised Design Norms

Sl No	Description	Single Line	Double Line
1	Catenary Current	800 Amp	1000 Amp
2	Short ckt Current	6000 Amp	8000- Amp
3	Soil Resistivity	1500 ohm meter	
4	Rail Impedance	0.701	0.561
5	Rail Reduction factor	0.3926	0.2666
6	Track Cable Seperation	8 mtrs	9 mtrs
7	New Screening factor	0.91	

Revised Design Norms

Sl No	Description	Single Line	Double Line
8	Induced voltage in Unscreened cable	116 v/Km	95 v/Km
9	Induced voltage in Screened cable	35 v/Km	
10	Safe Handling Voltage	400 V	
11	Factor of Safety	1.5	
12	Maximum Length of Parallelism of Ckts.	2.1 Km	2.8 Km
13	Max.Direct feeding of Signals by using 110 v	180 mtrs	220 mtrs
14	Max.Direct feeding of Signals by using 300 v	440 mtrs	605 mtrs

OHE (Over Head Equipment)

1	Height of contact wire	Regulated OHE	5.55 mtrs
2	Height of contact wire	Un-Regulated OHE	5.75 mtrs
3	Height of contact wire	Under Bridges	4.65 mtrs
4	Distance bet RE Masts	On straight Track	72 mtrs
5	Staggering of Contact wire	On straight track	200 mm
6	Staggering of Contact wire	On curves	300 mm
7	Clearances bet any live part of OHE and part of any fixed Structure(Verticle)	320 mm Stationary	270 mm Moving
8	Clearances bet any live part of OHE and part of any fixed Structure(Lateral)	320 mm	220 mm

Contd.

9	Implantation of RE Mast	From Centre line of Track	2.5 mtrs.
10	The nearest part of Signal post from centre of Track	For a Signal with a Route	2.844 mtrs
11	Distance bet Signal and Mast in front of it		30 Mtrs(minimum)
12	Distance bet Signal and Mast in Advance of Signal		10 mtrs(Minimum)
13	Stray voltage on Track		100 mv(max)
14	Stray current for Track less than 100m		10 mA
15	Stray current for Track more than 100m		100 mA
16			

Protection of S&T Staff

- 1.Wear Rubber gloves and use Insulated handles tools.
- 2.Split the circuits into sections and/or earth them.
- 3.Insulate from ground using Rubber mats etc
- 4.Insulate Rod Run & wire runs.
- 5.Cable conductors pertaining to Block ckts.to be marked Red to Remind of Danger.
- 6.Make armour through before cutting a cable
- 7.Alteration to Bonds to be done carefully.
- 8.Linen measuring Tapes to be used on Tracks.
- 9.Maintain Continuity of Track on all times.

DO'S

- 1.Do ensure proper earthing of Battery charger after replacing Defective charger.
- 2.Do ensure that Transverse and L-Bonds are provided after replacement of defective GJ on Track ckt.
- 3.Do always arrange for Power Block before taking the work on hand for Replacement of signal unit
- 4.Do always use surge arrester on cable terminated bet JB and Evaluator of Axle counter.
- 5.Do ensure that the voltage drop of power cable for feeding the signals is within 5%
- 6.Do ensure that a Caution Board is provided on the signal post at a height of 3m above Rail level,if protective screen is not provided on sig post.

- 7.Do ensure that Earth is seperated with other earth with min 3m.
- 8.Do ensure continuity of Earth Bonds before opening any Insulation joint.
- 9.Do Inform OHE staff Immediately if any OHE Bond Like L Bond,S-Bond & C Bond is found open or loose.
- 10.Do Ensure Continuity of Armour while providing joints in the cable.
- 11.Do Ensure that Rods and wires passing under the Track are not e Rail flange.

Don't

- 1.DO not Remove or disconnect Screen or wire mesh provided bet Sig Post and OHE live Conductor,
- 2.Donot energise any circuit on overhear lines
- 3.Do not make through any wire Insulator or Rope wire.
- 4.Do not bypass any Lightning arrestor.
- 5.Do not combine Earths with each other
- 6.Do not remove any OHE Bonds provided for the Traction Bond.
- 7.Do not Keep the Track ckt. In working condition only on Battery charger.
- 8.Do not combine Internal & Ext. cell with each other.
- 9.Do not replace any AC Immunised Relay with Non ACI Relay