

Government of India
Ministry of Railways
Research Designs & Standards Organisation, Manak Nagar, Lucknow - 226011

MAINTENANCE INSTRUCTION NUMBER TI/MI/0050-Rev. 1

1. **TITLE:** Prevention from Bird Menace on Traction Installations (OHE, PSI).
2. **APPLICATION:** Traction Installations [Overhead Equipment (OHE), Power Supply Installation (PSI)].
3. **OBJECTIVE:** Prevention from following kinds of bird-menace on traction installations
 - 2.1 **Clustering of birds:** It causes tripping, parting of conductors.
 - 2.2 **Bird nesting:** Collection of metal parts, cloth pieces, leaves and sticks for making the nest by the bird causes tripping and parting of conductors.
 - 2.3 **Bird droppings:** It causes damage to insulator's surface resulting in flashover of the insulator, tripping of OHE supply and supply failure.
4. **MAINTENANCE INSTRUCTIONS:** To achieve above objective, following maintenance instruction shall be adopted.
 - 4.1 Preventing the birds from gaining access for nest forming by provision of anti bird High density polyethylene (HDPE) monofilament netting type III, UV stabilized as per IS 16008(part-2)-2016/PVC virgin HDPE Net preferably in black colour inside the existing fabricated structures (fabricated masts, Portal/TTC uprights/boom, fabricated Drop arms, gantry booms etc.).
 - 4.2 The main properties of High density polyethylene (HDPE) monofilament netting type III as per IS 16008-2016 are as given below:

SN	Characteristics	Requirement	Method of test
1.	Mass g/m ² , min	310	IS-1964
3.	Shading Percentage	70-80	Annex C of IS 16008
4.	Average Breaking strength of shade net fabric (strip method, 325mmx50mm test piece with gauge length of 200mm) N, Min		Annexure-B of IS 16008 and IS-1969 (Part-I)
	(a) Warp way	450	
	(b) Weft way	1700	
5.	Retention of breaking strength after UV exposure, N, Min	85% of original actual value of fabric	Annex. B IS-1969 (Part-I)
6.	Bursting pressure, kgf/cm ² , Min	30	IS 1966 (Part 1 or Part 2)
7.	Colour fastness to artificial light for coloured sheds	4 or better	IS 2454

- 4.3 The main properties of UV stabilized PVC virgin HDPE polymer Net are as follows:

Tensile Strength (KN/M): 4.0 (ASTM D638)

Mass:: 510 GCM

Aperature Shape: Hexagonal

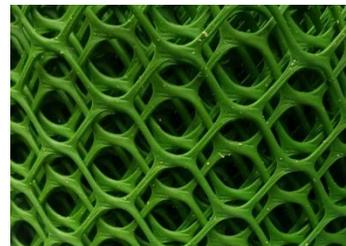
Aperature Size:28X28

Melting point:130°C

Density: 0.94-0.96 g/cm

Specific Gravity: 0.50-0.60 g/cm

Colour: Preferably Black Colour



HDPE Net



Shade Net 70-80%

- 4.4 Preventing formation of nests by obstruction the birds from sitting for nest forming by providing PVC pipes of smaller diameter and varying lengths (2 to 4 m, depending on area to be covered) in vertical and horizontal condition(depending on location e.g. upright or boom). Provision of Yellow & Red reflective sticker on PVC pipe/portal joints to scare birds.
- NOTE:** Following precautions shall be ensured for 4.1, 4.4 above for net/ pipe:
- (i) These shall be fixed inside the fabricated structure and not outside.
 - (ii) These shall be tied with UV Resistant Nylon Cable tie to prevent slipping or movement or falling due to wind etc. Use of metal wire is prohibited. The Specification of cable tie is as given below:
 - Material: Nylon 6.6
 - Colour: Preferably Black
 - Loop Tensile strength min.: 80 kg
 - Max. Bundle Diameter: As per requirement
 - Length: As per requirement
 - Width: 9mm
 - Thickness min. :1.8mm
 - Operating Temperature: -25°C to +85°C
 - Testing Standard: BSEN 62275:2019
 - (iii) Initially Anti Bird Net with Cable ties should be erected in bird prone areas on some structures as decided by PCEE for trial purpose and six month performance feedback should be submitted to RDSO for proliferation of use.
 - (iv) Cable ties used for fixing shall not hang outside the structure.
 - (v) Arrangement should be provided for full length of boom, drop-arm and upto bracket-insulator for portal upright & fabricated mast upright.
 - (vi) Holes of the net will not be very small to reduce the weight for carrying and lifting during installation as well as to reduce the effect of wind.
 - (vii) Diameter of the pipe shall be kept small for its oscillation with low winds. Pipe should be in level while in horizontal condition. Arrangements should be completed prior to nesting season to get more benefit.
- 4.5 **Redundant Cross-arms on super-mast:** Redundant Cross-arms over super-masts of old RC wire are available projecting over the stay insulator. These cross- arms facilitate sitting of birds on it, which makes bird's dropping falling over the insulator. Redundant Cross-arm available toward stay insulator shall be got removed.
- 4.6 Depot should identify the types of birds, duration of nesting season, bird nest zone in their jurisdiction and staff should be nominated for timely removal of bird nest. Collected metal wire should be disposed preferably at depot in closed container.
- 4.7 The patrolling staff should pass immediate message to the maintenance gang, TPC for removing Birds' nests, stray wire pieces affecting healthiness of OHE.
- 4.8 **Overline structure:**
- (i) The catenary should be so erected as to have maximum clearance from the over-line structure to reduce the possibility of birds perching on the catenary wire/ Contact wire causing earthed fault.
 - (ii) For Overline structures having lesser clearances, arrangement as per the directive of Railway board/ RDSO (e.g. provision of contact wire in-place of catenary wire) should be adopted.
- 4.9 Bird Guard shall be provided on Transmission towers as per RDSO Drawing No TI/SK/BG/RDSO/00001/08/0 & TI/SK/BG/RDSO/00002/08/0 which were issued to railways vide RDSO letter TI/OHE/INS/GEN/08/7 Dated 18.11.2008.
- 4.10 **Catenary wire inspection:** For every case of insulator flashover or direct short-circuit from the cantilever assembly, condition of catenary wire inside the 'Suspension clamp' shall be checked to confirm that catenary wire is healthy. For this, as an immediate measure, to identify the hot spot inside the suspension clamp due to strands cut, help of binocular and thermal imager should be taken. Permanent rectification as per standard guidelines shall be adopted for strands cut locations. Availability of Packing saddle (RI No. 1174) with Catenary suspension clamp (RI No.

1160) as given in RDSO drawing No. RE/33/P/1160 Rev. K should be checked. For prevention of Bird faults RDSO SMI No. TI/MI/0059 should be followed.

- 4.11 **Bonds:** Availability as well as tightening of all types of bonds on both ends of all OHE structures (mast, portal, TTC etc.), Rails, Buried rail, earth pit, PSI structures (supports of PSI equipment, connection between equipment and structure etc.) is very important. Improper tightening (loose condition) will result into either no action or delay in relay operation which is undesirable. In addition, ground potential will rise and may cause equipment failure. It is more relevant for Bird related cases since the resistance will vary depending on the medium causing fault.
- 4.12 **Elimination of redundant metal wires on track and nearby:** Metal wires used by the birds for making nest causes problem while carrying it as well as during nesting. These metal wires should be got removed from the track and all nearby places by all concern departments(e.g. GI wire cut pieces of wagon door closing/sealing/binding etc)and use of Nylon wire/rope in-place of metal wires will be suggested. Awareness shall be made to all departments. Periodical drive should be conducted.
- 4.13 Extra projection of bracket tube towards portal boom should be identified & cut.
- 4.14 Cantilever arrangement on the chair fitting should be observed for clearances between chair and live tube of cantilever. Clearances should be increased on all possible locations with standard arrangement.
- 4.15 Use of metal wire, metal pipe, metal boxes, wire brush, CD& metal mesh etc. is prohibited.
- 4.16 Any measure other than mentioned above for prevention of Bird Menace, may be adopted as per the local condition with the approval of CEE of concerned Zonal Railway.

5.0 MAINTENANCE OF RECORDS:

- 5.1 Location wise record of 4.1, 4.5, and 4.9 shall be ensured to verify the locations where net/pipe is provided. It will assist for failure analysis also.
- 5.2 For 4.8 above, existing records of Overline structure shall be verified at SSE and ADEE level to short list the locations & lines over which such instruction need to be implemented. Such list shall be finalized and implemented with the approval of Divisional head of traction distribution.

6.0 AGENCY FOR IMPLEMENTATION: Railway TRD maintenance Organisation.

7.0 Sample Photos:



PORTAL BOOM NYLON NET DROP ARM



NYLON NET



JAPAN RAILWAY-NYLON NET ON PORTAL BOOM & DROP ARM



HDPE NET ON PORTAL



HDPE NET ON TTC