C

केवल कार्यालयीन उपयोग हेतु
(For Official Use Only)

सत्यमेव जयते

भारत सरकार GOVERNMENT OF INDIA
रेल मंत्रालय MINISTRY OF RAILWAYS

REVIEW

OF

MAINTENANCE SCHEDULE FOR OHE

TARGET GROUP: TRD Maintenance Staff

CAMTECH/ E/ 11-12/ OHE-Schedule/ 1.0

August, 2011

अआसंRDSO
रेल अग्रदूत Transforming Railways
Excellence in Maintenance
Indian Railways
Centre for Advanced Maintenance Technology

महाराजपुर, ग्वालियर – 474 005
Maharajpur, GWALIOR - 474 005

Review of Maintenance Schedule for OHE

QUALITY POLICY

"To develop safe, modern and cost effective Railway Technology complying with Statutory and Regulatory requirements, through excellence in Research, Designs and Standards and Continual improvements in Quality Management System to cater to growing demand of passenger and freight traffic on the railways".

FOREWORD

To achieve high reliability and zero defects on Overhead Equipment (OHE), it is necessary to maintain the OHE through proper schedule maintenance/checks on its geometry and all other design parameters.

CAMTECH has prepared this handbook on "Review of Maintenance Schedule for OHE" to achieve the above objective. This handbook contains details of various maintenance schedules and the proformas used for these schedules. Newly developed current collection test by OLIVER-G and Condition Based Maintenance through Thermo Vision Camera etc. have also been covered.

I hope this handbook will prove to be useful for the maintenance personnel working in TRD department.

CAMTECH, Gwalior ***S.C. Singhal***

Date : 30th August 2011 ***Executive Director***

PREFACE

Overhead equipment (OHE) provides energy to electrically driven locomotives & EMUs. OHE comprises of the electrical conductor over the track, together with their associated fittings, insulators and other attachments. For utmost utilization of traction assets, outage of overhead equipment should be minimum. For this proper maintenance of OHE is essential to cater growing demand of passenger and freight traffic on the Railways.

This handbook on Review of Maintenance Schedule for OHE has been prepared by CAMTECH with the objective of making OHE maintenance personnel aware of correct maintenance procedure, upkeep records, proforma and repair techniques. Recent developments in maintenance such as current collection test by OLIVER-G and Condition Based Maintenance through Thermo Vision Camera are also included in this handbook.

It is clarified that this handbook does not supersede any existing provisions laid down by Railway Board, RDSO or AC Traction Manual (ACTM). This hand book is for guidance only and it is not a statutory document.

I am sincerely thankful to TI Directorate RDSO Lucknow and also all field personnel who helped us in preparing this handbook.

Technological up-gradation & learning is a continuous process. Please feel free to write to us for any addition/ modification in this handbook. We shall highly appreciate your contribution in this direction.

CAMTECH, Gwalior ***(Peeyoosh Gupta)***

Date: 29th August 2011 ***Jt.Director Electrical***

e - mail id : direlcamtech@gmail.com

CONTENTS

Item No.	Description	Page No.

ISSUE OF CORRECTION SLIPS

The correction slips to be issued in future for this handbook will be numbered as follows :

CAMTECH/E/11-12/OHE-Schedule/C.S. # XX date---------

Where “XX” is the serial number of the concerned correction slip (starting from 01 onwards).

CORRECTION SLIPS ISSUED

Sr. No.	Date of issue	Page no. and Item no. modified	Remarks

1.0 INTRODUCTION

To achieve high reliability and zero defects on OHE, it is necessary to maintain the OHE in perfect condition through proper schedule maintenance/checks on its geometry and all parameters adopted in the design without compromising on safety of the equipment as well as personnel.

The Over Head Equipment is subjected to dynamic oscillations due to the movement of the fast moving pantograph and wind pressure. It comprises huge number of insulators, fittings and accessories. The failure of any one may result in interruption of train services for substantial period until the defect/ breakdown is rectified.

The following schedules of maintenance for OHE are being followed in the Indian Railways:

1. Foot Patrolling
2. Trolley Inspection/ Cab of locomotives
3. Current Collection Test
   - i. By Mirror
   - ii. By Oliver 'G'
4. Special Checks
5. Annual Maintenance
6. Checks by OHE Inspection Car
7. Periodical Checks
8. Re- tensioning of Unregulated OHE
9. Condition Based Maintenance through Thermo Vision Camera

2.0 FOOT PATROLLING OF OHE

An experienced OHE technician (accompanied by an OHE staff if deemed by local condition) should be deputed to petrol the section on foot by day. He should cover every parts of the section including yards once a fortnight and suburban sections once a week. SE/JE OHE should foot- patrol the section once in six month.

The technician on foot-petrol should be equipped with signal flags, emergency telephone instrument and essential tools required for attending minor defects (without power block) on the spot.

The technician should check the points given on next page.

FOOT PATROLLING DIARY

1. Depot:
2. Date:
3. Name of the Technician:
4. Section:
5. From Km to Km:
6. Time of Starting:
7. Time of Ending:
8. Reporting time to TPC:

S.No	Item	Observation
1.	FOUNDATION	i) Damaged or cracked
		ii) Water collection around foundation
		iii) Side earth filling required
		iv) Top of foundation cleaned or not
2	MASTS AND PORTALS	i) Mast deflected towards track
		ii) Mast deflected away from track (other than those already under observation & thus painted with yellow band)
		iii) Hit mark or damage to the mast
		iv) Number plate missing
		v) Number plate damage
		vi) HRL, IMP, Telephone socket marking etc.
3.	ANCHOR	i) Nut, check nut or lock plate pin missing from anchor 'U' bolt
		ii) Nut, check nut or lock plate pin missing from guy rod
		iii) Anchor bolt rusting
		iv) looseness of guy rod
4.	BRACKET ASSEMBLY	i) Bracket insulator damaged
		ii) Stay Insulator damaged
		iii) 9-Tone insulator damaged
		iv) Any other defect noticed
5.	SECTION INSULATOR	i) Abnormal wear on runners
		ii) Core insulator cleaned or not
		iii) Core insulator having flash mark/damaged
		iv) Any grease accumulation noticed
		v) Abnormal wear of contact wire under section insulator splice
6.	AUXILIARY TRANSFORM--ER FOR CLS SUPPLY	i) Drop out fuse found fallen
		ii) Soundness of earth connection
		iii) Any oil leakages noticed
		iv) Core insulator having flash mark/ damaged

S.No	Item	Observation
7.	OHE SPAN	i) Span droppers abnormally out of plumb.
		ii) Span droppers damaged.
		iii) Any other abnormality in respect of jumper.
		iv) Catenary strand damaged
		v) Excessive sagging or hogging of contact wire
		vi) Excessive wear of contact wire under swivel clip, curve, splices, PG clamps etc.
8.	ISOLATOR	i) Post insulator damaged
		ii) Integral and pad lock missing/damaged
		iii) Any signs of sparking/over heating
		iv) Isolator number plate missing
		v) Soundness of earth connection
		vi) Proper closing of contacts
9.	GENERAL CHECKING	i) Availability of danger and caution boards
		ii) Height gauge at level crossing
		iii) Emergency socket found damaged/out of order
		iv) Earthing of platforms/Sheds etc.
		v) Bonds found disconnected/missing or any sign of sparking
		vi) Protective screens on FOB/ROB
		vii) Tree branches near OHE.
		viii) Birds nest and pieces of stray wires
		ix) Defect in transformer secondary neutral connection to rail at FP
		x) General conditioning of SSP/SP on route.
		xi) Minor defects rectified if any during patrolling.
		xii) Observe running train pantograph condition passing in section for smooth current collection and any abnormality
		xiii) Any other abnormal/ unusual situations noticed
10.	REGULATING EQUIPMENT	i) Guide tube should not be bent & all fasteners and fitting must be intact
		ii) a. Movement of counter wt. with 10 kg wt. for winch type. b. Movement of counter wt. with 17 kg wt. for three pulley and observe for restoration in original position.
		iii) Check the alignment of drum pulley and anchor fitting

S.No	Item	Observation
10.		iv) SS wire rope over riding on drum grooves
		v) SS wire rope rubbing with pulley/drum
		vi) SS wire rope strands found cut and bird caging
		vii) Whether equalizing plate is tilted or not
		viii) Twisting of OOR contact wire
		ix) 'Y' distance is abnormal i.e. beyond the temperature markings
		x) Whether small pulley is horizontal (for winch type ATD)
		xi) Any flattening of wire rope observed near small pulley (for winch type ATD)
		xii) Check for bend, deformation, missing guide tube, deformation of eye of base counter weight
		xiii) Hex pipe of suitable length is provided over hex tie rod (anti- falling rod)

Signature of Technician

Checked By:

Signature of Depot In-charge:

Pictures Related to Foot Patrolling

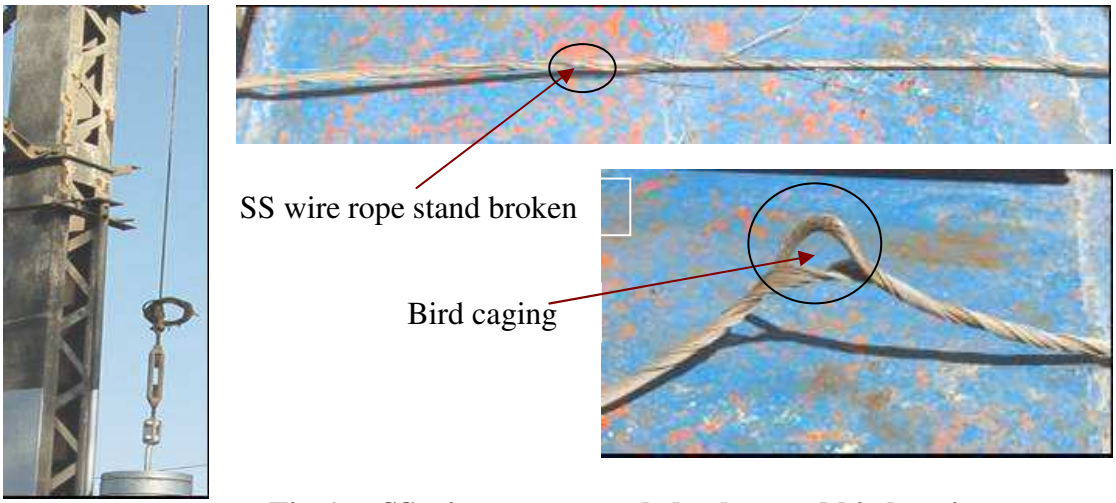

Fig-1 SS wire rope strands broken and bird caging

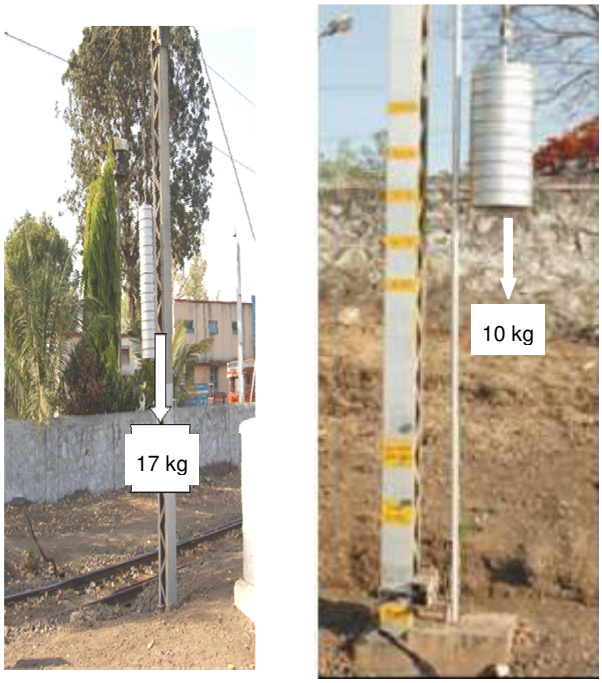

Fig-2 Movement of counter weight with 17 kg for three pulley & 10 kg weight for winch type.

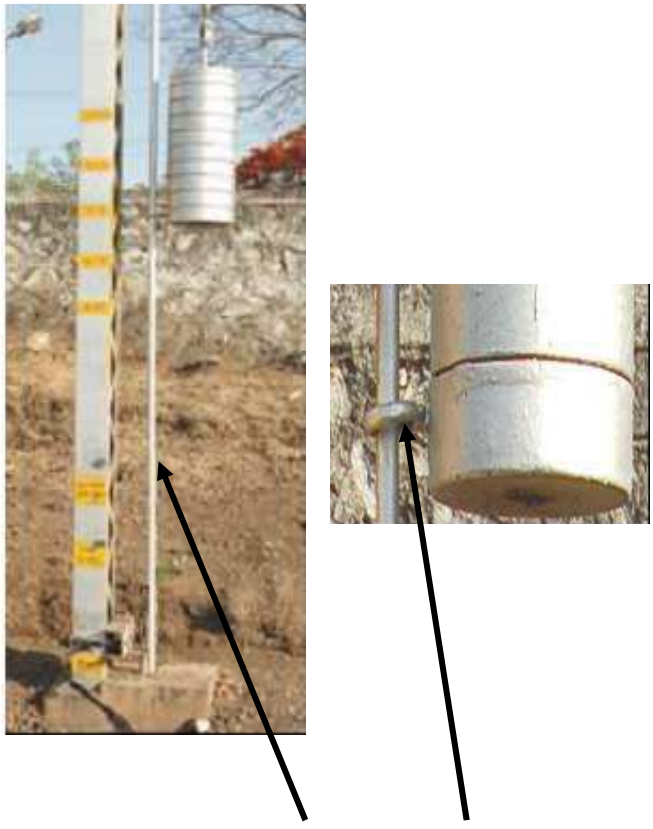

Fig-3 Guide tube & eye

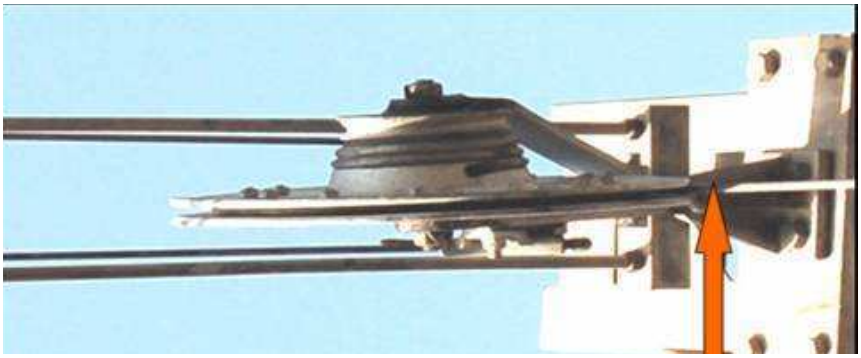

Fig-4 SS wire rope rubbing with pulley/drum

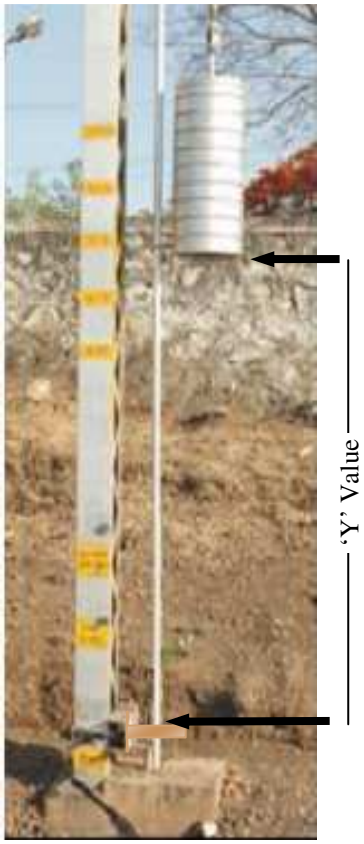

Fig-6 'Y' distance

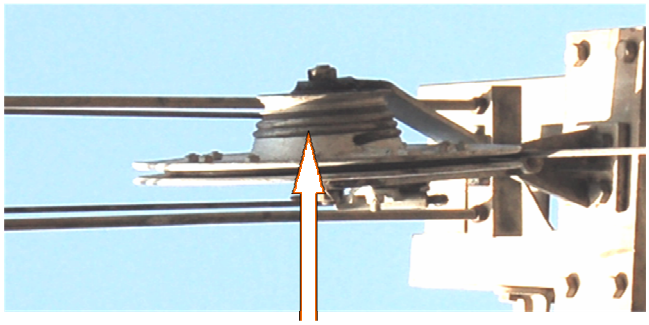

Fig-5 SS wire rope over riding on drum grooves

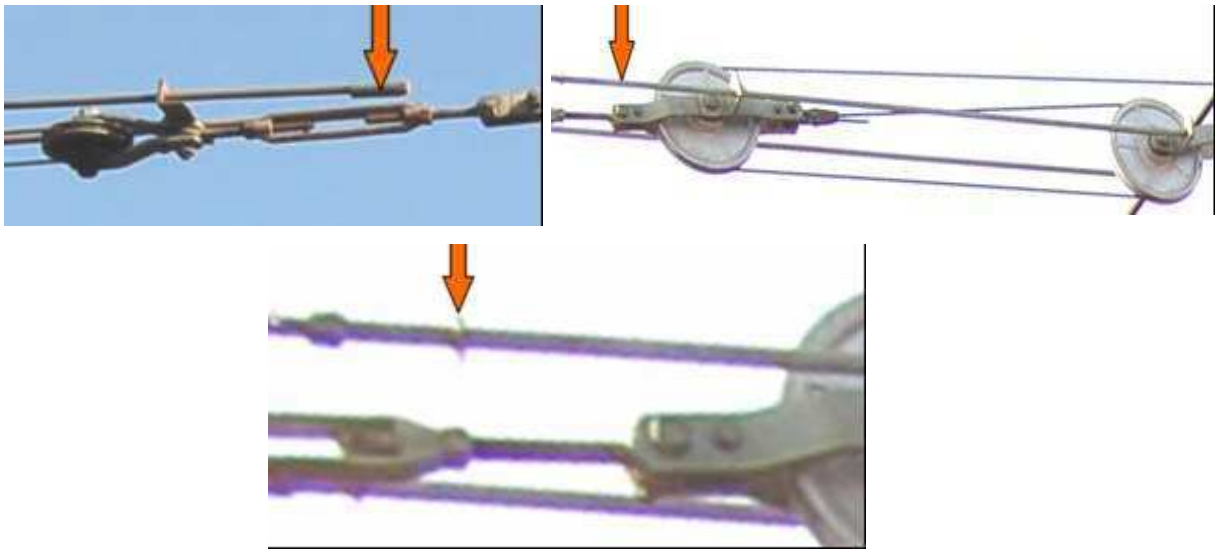

Fig-7 Hex pipe of suitable length and anti falling rod must have washer at ends and straight

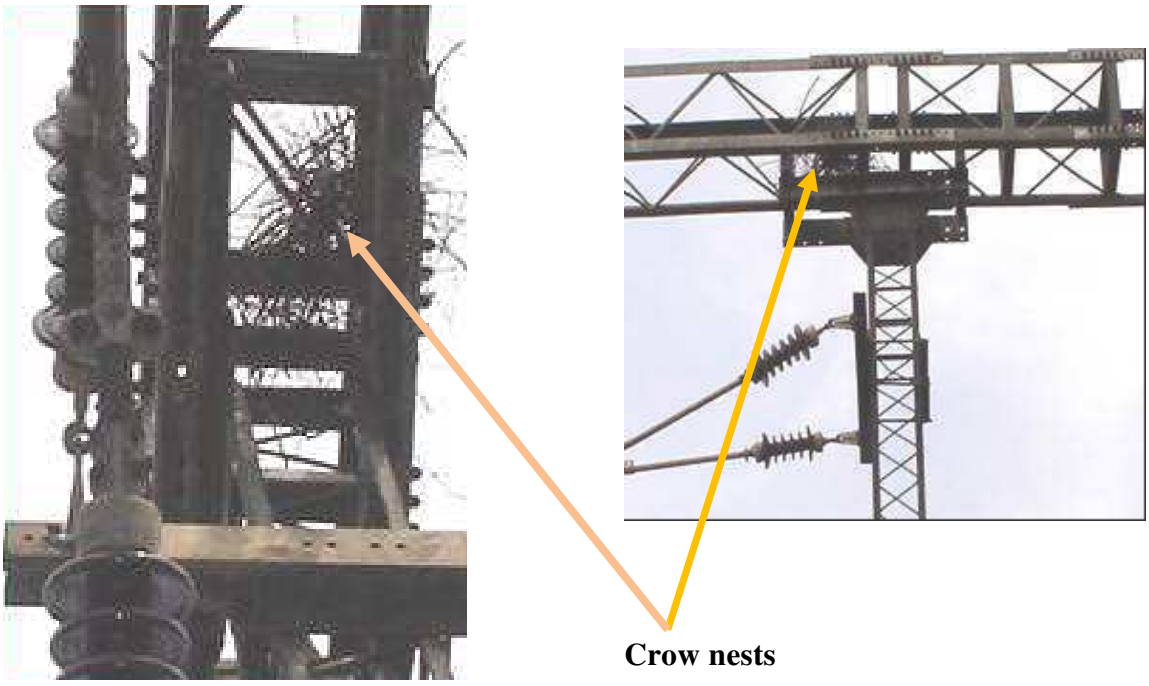

Fig - 8 Crow Nests

3.0 TROLLEY / CAB OF LOCOMOTIVE INSPECTION OF OHE

Inspection of OHE by push trolley is to enable supervisors and officers in charge of OHE maintenance to observe closely the OHE under their charge and should be carried out during day time. The depot /OHE in-charge (SE/JE) should inspect his entire section once in a month. SSE/ADEE (TRD) should inspect their respective sections once in 3/6 months. Sr.DEE/DEE (TRD) also should cover his entire section at least once a year by push trolley or motor trolley.

Apart from trolley inspection as above, officers and senior supervisors shall travel by the cabs of locomotives and EMU trains at least once a month to observe the general condition of OHE and to get a first hand knowledge of operating conditions.

4.0 CURRENT COLLECTION TEST

4.1 By Mirror

It is necessary to carry out periodic tests to detect points at which contact wire between the wire and pantograph is unsatisfactory resulting in sparking. Such current collection tests are performed at night. A mirror is fitted in front of look out glass of the rear cab of a locomotive and adjusts so as to get a reflection of the rear pantograph which is normally in service. A person traveling in the cab can then observe through the mirror any sparking which may take place and note down the location.

The current collection tests should be carried out by the depot /OHE in-charge (SE/JE) once in three month over his entire section. SSE/ADEE (TRD) should accompany the depot /OHE in-charge (SE/JE) during such test alternately to cover their respective sections once in 3/6 months. Sr.DEE/DEE (TRD) should accompany the depot /OHE in-charge (SE/JE) cover his entire section at least once a year.

4.2 Current Collection by Oliver-G

The OLIVIR-G Plus is developed to assist Over Head Equipment (OHE) spark detection using a video camera. The hardware unit consist of a GPS receiver which track the current position of the locomotive in which the 'OLIVIR-G plus' is mounted.

The OLIVIR mate RT software supplied with the unit identity sparks in real time and save them as images with locations, at the same time continuous video film is also recorded in hard drive. These images can be analyzed to recognize the type of spark (mega pixel) with their locations.

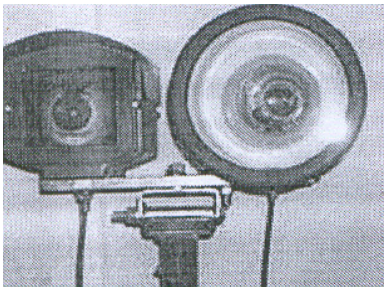

Fig- 9 OLIVER-G Plus

4.2.1 Procedure

a) Current collection and checking of OHE by OLIVER-G is carried out consecutively for two to three trips at an interval of two days, covering entire section. Same cycle to be repeated after every two months.

b) Current collection through OLIVER-G is conducted by rear most electric locomotive of banker in ghat- section.

c) Current collection is carried out during night time only.

d) Limit of flashes in the unit of Mega pixel and the time frame for its attention will be as follows:

More than 100 units (High Intensity)	-	Attend within a week
Between 60 – 100 units (Medium Intensity)	-	Attend within a fortnight
Between 40 – 60 units (Low Intensity)	-	Attend within a month

4.2.2 Schedule

The current collection tests should be carried out entire section by ADEE (TRD) level every two months. Sr.DEE /TRD will cover entire section once in six months.

5.0 SPECIAL CHECKS

Mostly OHE items require attention during annual maintenance and periodical overhaul. Some items should require more frequent attention as follows:

5.1 Insulators

i. Normally insulator needs cleaning once a year along with the annual maintenance schedule, where there is no pollution.

ii. Where pollution is not high, the interval may be three months or longer depending upon the degree of pollution in the area.

iii. Where pollution is heavy, more frequent cleaning of insulators are required.

iv. The affected section should be divided into various zones based on the degree and nature of pollution and periodicity of insulator cleaning may be fixed suitably.

5.2 Section Insulator

Section insulators on the main lines neutral sections, passenger yards and sidings should be attended to once in three months as follows:

i. Clean insulators and replace badly chipped or even slightly cracked insulator.

ii. Check runners for flash mark.

iii. Check level of the assembly and adjust as required.

iv. Check for excessive contact wire wear near anchor clamp.

v. Tighten the PG clamps of droppers and stiffener properly.

vi. Check that pantograph passes underneath the section insulator smoothly.

5.3 Isolating Switches at Yards/ Loading Siding

The continuity and soundness of earth connections should be checked once a month.

5.4 Bi- Metallic Clamps

These should be checked for tightness and sign of overheating once a three month.

5.5 Earth Connections

Apart from general inspection of bond and earthing connections during foot patrolling, all such connections should be specially checked for continuity and soundness of connections once in six months.

5.6 OHE Support on Steel Girders

OHE support on steel girder bridge should be examined as possible depending upon traffic movement.

5.7 Bird Nests

Precaution should be taken during the nesting season and the nests removed as soon as possible.

5.8 Pre- Summer Checks

i.	Overhead crossing	:	Check all power line crossing for broken & loose guard wire.
ii.	Bird nest/Kite threads	:	Remove all kite threads and polythene from OHE, transmission line and other nearby structure as FOB/ROB/platform sheds etc.
iii.	ATD's	:	Ensure free movement of ATD's, replaced jammed/ over riding ATD's. Proper Z & Y adjustment should be done.
iv.	Jumper	:	Excessive loose jumpers should be attended.
v.	Anti- creep	:	Anti creep having excess sag should be re-tensioned.
Vi	Turn out/Cross over	:	All turnouts and crossovers should be checked.
vii.	FOB/ROB	:	Clearance of the OHE under FOB/ROB should be checked. Protective screen, cable/wires should be properly secured.

5.9 Pre- monsoon checks

i. Check the condition of insulators specially that of section insulator at major yards having mixed type of traction.
ii. Check the over line structure for any water leakage on the OHE.
iii. Trimming of trees branches near to OHE.
iv. Check the condition of embankments with respect to stability of mast.
v. Ensure that proper drainage of rain water surrounding the OHE foundation/ OHE mast.

5.10 Monthly Maintenance of PTFE Type Neutral Section Make Balfour Beatty Power corporation Ltd UK (BBPC)

1. Date of Inspection:
2. Section:
3. Location:
4. Line:

S.No.	Observation	Action taken
1.	Check ceramic bead insulator	Cleaned/replaced (if required)
2.	Check complete bracket of PTFE for any abnormality	Checked loose connections, damages and cracks.
3.	Check the burning of arcing horns and arc catcher tips	Attended
4.	Check horizontally of arc catcher	Adjusted by adjustable dropper, if required.
5.	Check flexibility of anti-torsion spring dropper	Free movement checked
6.	Measure air clearance between arcing horn and arc catcher tips	Examined it should be 320 mm min.
7.	Check earth jumper	Flashing mark on nut & bolt, lug and loose connection checked
8.	Check flashing mark on the rail, lug and mast	Checked or replaced nut & bolt (if required)
9.	Check bond between rail to mast and mast to earth electrode	Checked flashing mark and loose connections
10.	Check any cracks on anti-torsion tube to messenger clamp	No crack observed
11.	Check free movement of telescopic anti-torsion tube.	Checked free movement.

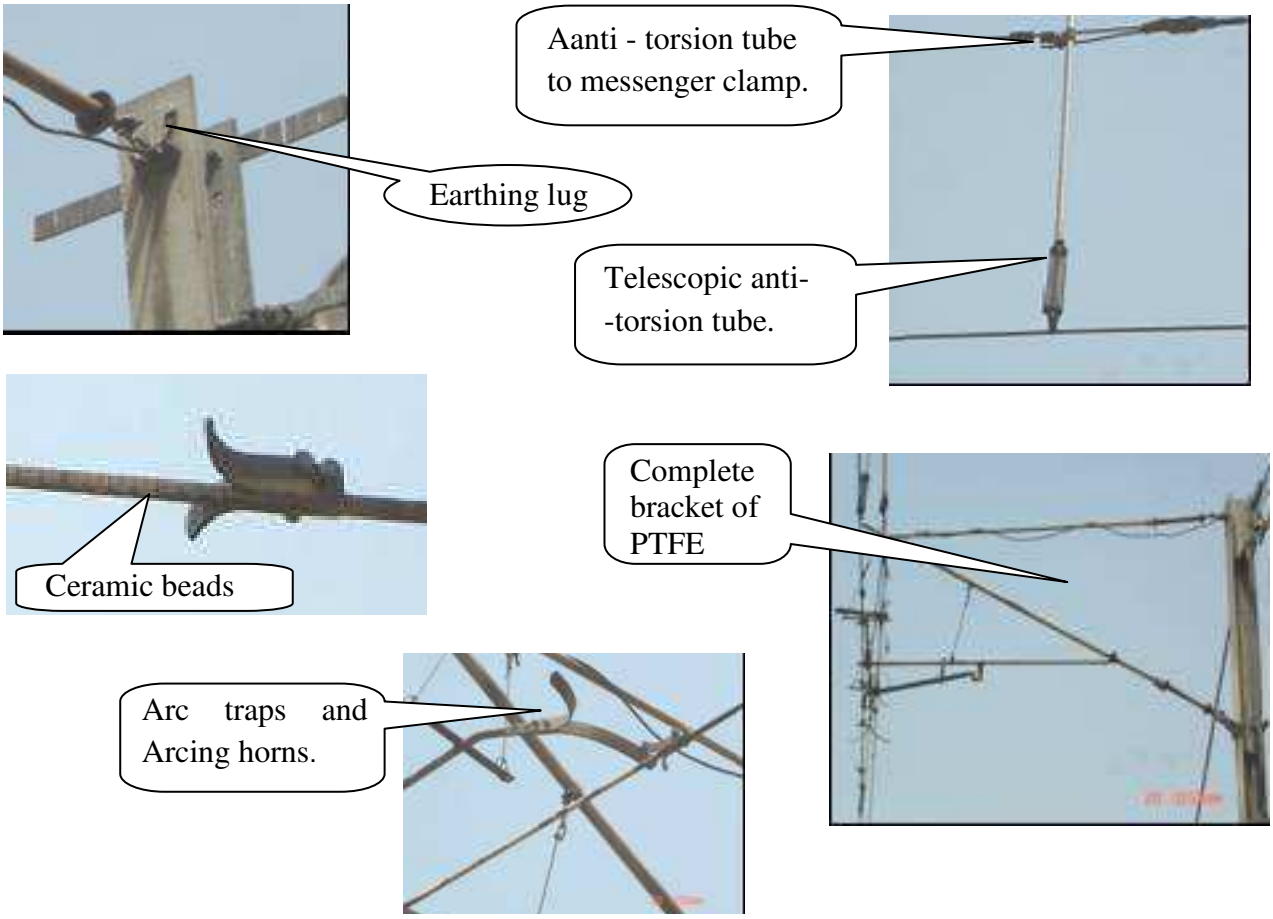

Fig – 10 Maintenance of BBPC Type neutral section

5.11 Quarterly Maintenance of PTFE Neutral Section of Make Arthur Flury AG

1. Date of Inspection:
2. Section:
3. Location:
4. Line:

S.No.	OBSERVATION	ACTION TAKEN
1	Check PTFE cover of the insulating rod	Cleaned/rotate(if required)
2	Check complete bracket of Neutral Section for any abnormality	Checked looseness of screws, nuts, damages and cracks
3	Check wear of insulating rod	Checked, if wear max 2 mm, the rod should be rotated by 2 marks(72 degree)
4	Check leveling of skid	Checked level by sprit level
5	Check the length of skid's bulb	Checked, if length less than 2 mm, then skid's should be replaced immediately
6	Excessive wear at the intake point of skids	Checked readjusted of the skids
7	Check turnbuckles	Checked and locked with counternuts and secured with locking wire
8	Check earth cable	Connection checked

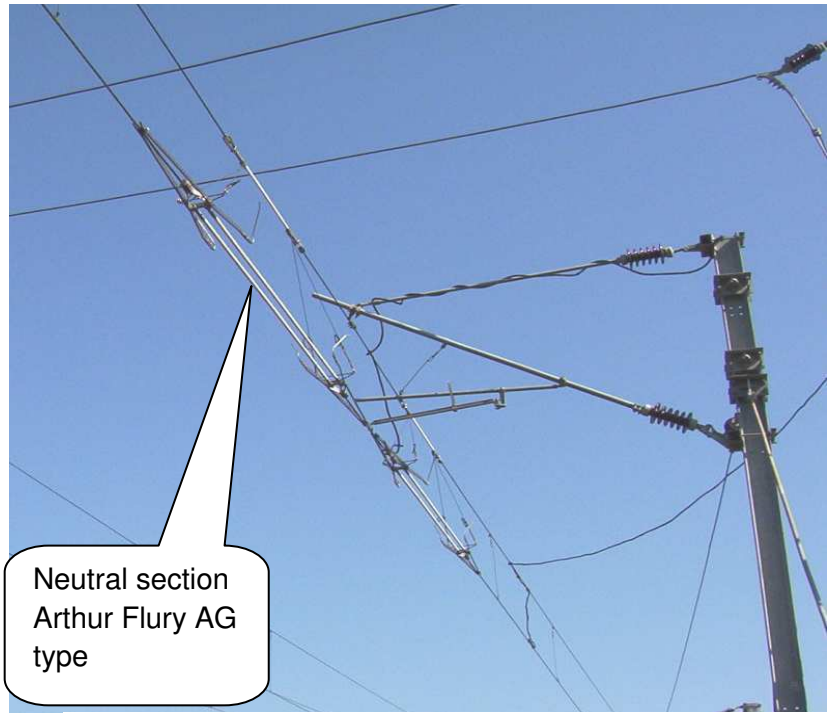

Fig – 11 Neutral Section of Arthur Flury AG

6.0 MAINTENANCE

6.1 Annual Maintenance of ATD

1. Location No
2. Section
3. Elementary Section
4. Half Tension Length
5. Type of ATD
6. Make of the Equipment
7. Make & batch/year of mfg. of 9 ton insulator
8. Make & batch/year of mfg. of SS wire rope
9. Make of cat. wire ending cone
10. Make of cont. wire ending cone
11. Date of maintenance
12. Checks the following and attend /replace wherever required:-
    - a) Condition of SS wire rope and lubricate
    - b) Free movement of regulating equipment
    - c) Rubbing of SS wire rope with side wall of the pulley
    - d) Alignment of wire rope with drum/pulley
    - e) Condition of check nuts and split pin of anti falling rod
    - f) Condition of 9 ton insulator
    - g) Condition of guide tube
    - h) Condition of 9 ton adjusters
    - i) Condition of eye of base counter weight, if found bent or broken replace/provide with clamping ring suitably sitting in the guide tube
    - j) Counter weights for any crack
    - k) Alignment of drum, center to center distance of hole in bent arms

13. Checks the availability:-

a) Base counter weight split pin

b) 9 ton adjusters split pins

c) Double strap split pin at counter weights

d) Anti falling rod check nuts, split pins

e) Split pins of guide tube at top and bottom

f) Check the fixing end of SS rope and secure, if required

14. Check the tightness:-

a) Guy rod

b) Check nuts of 9 ton adjuster

c) Check nuts of anti falling rod

d) Anti falling rod angle

e) Top and bottom attachments of guide tube

15. Check the clevis for free to swivel, cracks / blow holes and defects:-

16. Measure and record:-

a. X / Z value in meters .

b. Y value in meters

c. Temp.0 C

I. Before Adjustment

II. As per Temperature

III. After adjustment

IV. Type of adjustment by turn buckle or by cutting of contact/ catenary wire

17. Check the appearance of counter weights paint, if required with white aluminum.

18. Lubricate the SS wire rope with BALMER LUBE-1000

19. Length of sleeve to be provided on

Hex tie rod (anti falling rod) : ---------cm

Sleeve actually provided : ---------cm

20. Felt & Grease seals of drum with correct grade of grease

21. Check the max, min & normal markings of temperature, if faded repaint

22. Stencil the tension length on the mast and date on the bottom counter weight

23. Deviations if any from SED

24. Remarks, if any

Signature of the technician Signature of the supervisor

Initials of depot in-charge

Pictures Related to Annual Maintenance of ATD

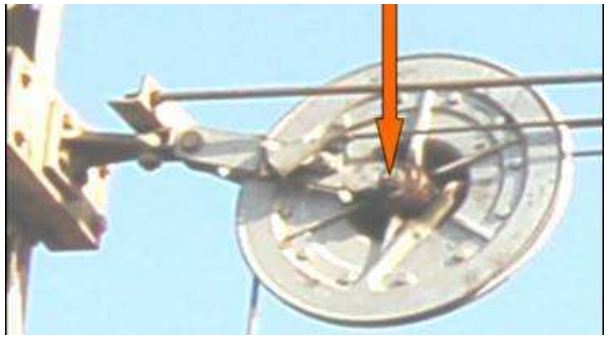

Fig-12 Alignment of Drum, center to center distance

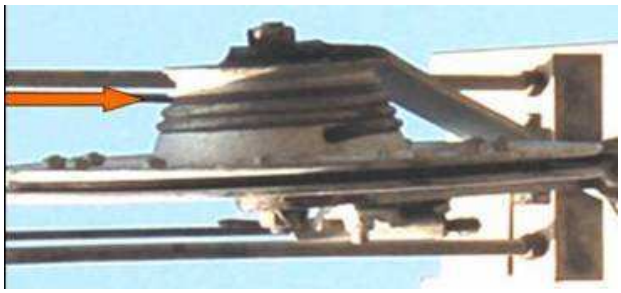

Fig-13 Drum grooves no damage of its wall

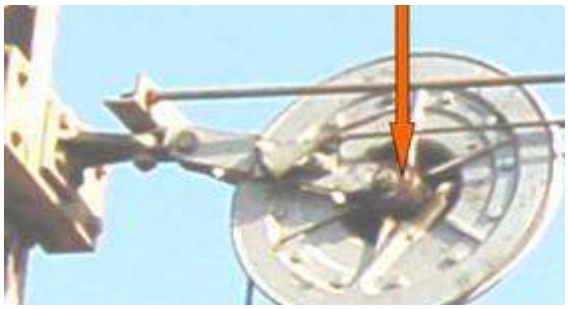

Fig-14 Felt & Grease Seals must

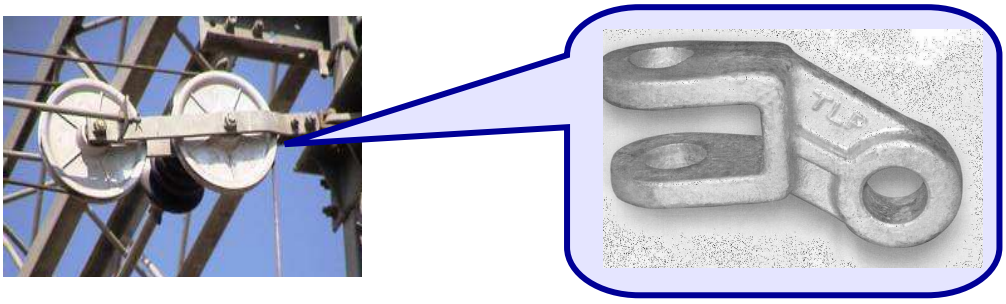

Fig- 15 Clevis free to swivel

G I pipe sleeve

Fig-16 Anti falling rod sleeve

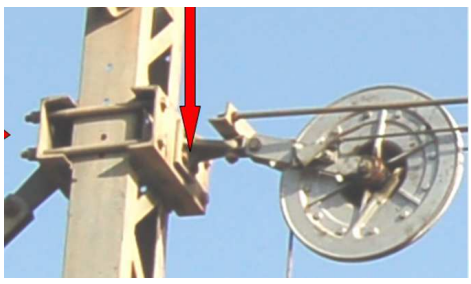

Fig-17 Mast anchor fitting

6.2 Eighteen Months Maintenance of Single Cantilever and Annual Maintenance of Double & Triple Cantilever

1. Date of Inspection:
2. Section :
   i) Location No:
   ii) Km
   iii) Road Up/Dn
3. Insulator make & year batch no:
   i) Stay
   ii) Bracket
   iii) 9 ton insulator
4. Implantation: Height: Stagger:
   i) As per SED
   ii) As recorded
   iii) As adjusted

Sr.	OBSERVATION	ACTION TAKEN
5.	Type of Location	
6.	Type of mast	
7.	Tangent/Curve	
8.	Check the verticality of the mast (for leaning) measure leaning	- Up to 3 cm permitted - Up to 5 cm keep under observation. A yellow band is painted at a height of 1.85 m from rail level - Above 5 cm attend it.
9.	Check the condition of insulators for any chipping / flash over / cracks /loose cementation at the metal caps	Checked and replace, if required
10	Check the condition of structure bond, in case of flash over noticed at the bond fasteners	Checked for any damages of catenary wire inside the suspension clamp
11	Check the register arm dropper for any wear on the hook & dropper clip for looseness	Checked for dropper clip tightness Slipping of dropper clip cause panto entanglement
12	Check the plumbing of the cantilever and attend	Checked if required
13	Check the up drooping of stay tube	Checked and use adopter, if possible
14	Check the diameter of contact wire and record	Wear of contact wire appears abnormal, location should be specified
15	Check the projection of bracket tubes & register arm tubes whether infringing the clearances to the portals or to other elementary section of OHE.	Checked bracket tube/ RT projection is more then 20 cm replace or cut the tubes

Sr.	OBSERVATION	ACTION TAKEN
16	Check the availability and condition of split pins at i) Mast attachment for bracket fitting clevis, ii) Bracket insulator snap head pin iii) Rivet at catenary suspension clamp holding RT dropper iv) Catenary dropper clip bolts of in span droppers v) Contact wire swivel clip pin ('U' pin)	
17	Check the condition of rivets of large bracket tube	Checked for any slackness
18	Check the tightness of i) Mast fitting for hook insulator bolts ii) Mast bracket fitting iii) Anti-wind clamp iv) Drop bracket assembly v) Tubular stay sleeve vi) Catenary suspension bracket vii) Catenary suspension clamp viii) Stay tube insulator fasteners ix) Bracket tube insulator 'U' bolts x) Check inclined dropper, its fitting & split pins	All rusted / damaged bolts noticed shall be replaced
19	Check the galvanization of the cantilever tubes	If rusted replace /paint as required
20	Check & tighten ACC (Cat, double susp. clamp. U bolts)	
21	Check the condition of ACA / FTA / BWA	
22	Check the condition of foundation	if it is on the bank check for soil exposure
23	Check the condition of muffing for any breakage	If it is found broken repair the same
24	Check the condition of galvanization of the supporting structure/mast	If it is rusted, painted by cold galvanizing paint
25	Check the rail level with respect to the marking on the mast	If deviation is more then 20 mm, inform concerned SSE (P.way)
26	Check the markings on the mast viz. rail level, implantation, telephone socket direction, ATD upper, normal & lower level etc.	Checked and painted, If faded
27.	Check the condition of catenary wire in the Suspension clamp and presence of lock plates	In case of abnormality attend it.

Sr.	OBSERVATION	ACTION TAKEN
28.	Check the jumpers condition in the span	Normal sag, proper direction & spacing including fixing of PG clamps
29.	Check the condition of splices	No abnormality
30.	Check horizontally of RT	Horizontal
31.	Check steady arm dip	It should be 25 to 30 cm
	Remarks, if any	

Signature of the supervisor Signature of the technician

Initials of depot in-charge

6.3 Annual Maintenance of Isolator

1. Section:
2. Location:
3. .Line:
4. Date of Inspection:
5. Identification:

Sr.	OBSERVATION	ACTION TAKEN
6	Check the presence and condition of the number plate	If missing provide, clean with waste cotton
7	Check the tightness of operating rod, operating rod handle base plate and isolator base frame bolts	Tighten, if required.
8	Check the condition of locking arrangements to the operating handle and provision of pad lock.	Lock provide
9	Check the isolator for smooth operation and correct alignment of contacts.	Should be free movement
10	Clean the fixed and moving contacts of isolator	Apply petroleum jelly.
11	Check the fixed spring contact tension	Tighten
12	Check the distance between fixed and moving contact in fully open position and record.	Min 380 mm to 500 mm max.
13	Clean the pedestal insulators with dry cloth and check for any cracks or flash over	Cleaned and replace crack of flash over insulator
14	Measure and record IR values of tie rod insulators with megger and check for any cracks or flash-over.	Measure IR by 2500 V megger & replace crack of flash over insulator
15	Lubricate all moving parts of the isolator.	Lubricated
16	Check the tightness of the connectors on the isolator and check for any over heating marks	Replace rusted nuts, bolts & washers and over heated connectors
17	Check the alignment of guide ring and operating pipe	No infringement
18	Check flexible earthing between operating handle and fixed structure	Intact
19	Check arching horn if applicable	Any abnormality

Signature of the Supervisor Signature of the Technician

Initials of depot in-charge

6.4 Quarterly, Half yearly and Yearly Maintenance of Motorised Isolator

1. Section:
2. Location:
3. Line:
4. Date of Inspection:
5. Identification:

a. Quarterly Schedule

S. No.	OBSERVATION	ACTION TAKEN
1	Open the cover of control box. Check the interior & remove the accumulated dust	By using dry cloth or vacuum cleaner.
2	If any part of the panel found rusted indicating entry of moisture	Find out the cause, plug the holes and repaint the rusted part.
3	Check weather proof gasket	For their good condition.
4	Check the connection of terminal connector nut, bolt and washer.	For tightness and corrosion
5	Check clearance between blades in open condition. Check the correct alignment of isolator for its firm grip while isolator in closed condition.	It should be 500 mm. and adjust, if required.
6	Check the operation manually as well as electrically in local and remote, keeping the control door open condition	Mechanism and operating rod functions smoothly without any rubbing or obstruction.
7	Check wiring connections	Tighten and secured
8	Check healthiness of relays and contactors.	working
9	Check the working of heater	Working
10	Check the earthing connections	Proper tightness
11	Check locking arrangement.	working
12	Grease and lubricate all moving parts	Greased & Lubricated

b. Half Yearly Schedule

S. No.	OBSERVATION	ACTION TAKEN
1	In addition to quarterly schedule, carry out following activities	
2	Clean the male/female blade/Jaw of isolator with kerosene oil	Cleaned with dry cloth and apply vaseline lightly. Wipe off the jelly to avoid accumulation of dust.
3	Check limit switches, auxiliary switches & contacts.	Overheating, looseness and proper working
4	Check correct setting and alignment of arcing horn	Adjusted if required

c. Yearly Schedule

S. No.	OBSERVATION	ACTION TAKEN
1	In addition to quarterly and half yearly schedule, carry out following activities	
2	Check the winding resistance of the 110V DC motor.	In permissible limit
3	Clean the commutator	Cleaned
4	Check carbon brushes	Measured length
5	Lubricate the operating mechanism and main contacts	Lubricated

Signature of the Supervisor Signature of the Technician

Initials of depot in-charge

6.5 Annual Maintenance of Level Crossing Height Gauge

1. Level crossing gate no:
2. Between location no:
3. Line reference:
4. Gate particulars:

S.No	OBSERVATION	ACTION TAKEN
5	Measure the height of contact wire from level crossing	It should be 5.50 m min.
6	Measure the gradient of contact wire	
7	Measure the height of height gauge form road level	It should be 4.67 m max.
8	Check the condition of height gauge	Checked for damaged of boom, foundations, upright etc.
9	Check the level of road below rail level	
10	Check the danger board	Checked for availability
11	Check and tighten the Level crossing barrier board	Checked for availability
12	Check and tighten the cross bond with in 5.0m of level crossing	Checked for availability
13	Check the earthing of level crossing barrier	Intact

Signature of the Supervisor Signature of the Technician
Initials of depot in-charge

6.6 Annual Maintenance of Cross/Along Track Feeder

1. Date of Checking:
2. Section:
3. Location:
4. Line:

S.No	OBSERVATION	ACTION TAKEN
5.	Check the drop jumper conditions (OHE)	- Tighten the PG clamps - Replace overheated nuts, bolts & washers and PG clamps - Replace damaged, overheated and strand broken jumper
6.	Check bi-metallic pipe (Strip) between feeder PG clamp and copper jumper	- Checked for availability - Replace overheated/ damaged bi- metallic pipe (strip)
7.	Jumper between Gantry to Gantry	- Tightened
8.	Check insulator	- Checked for cracked & chipped
9.	Check the strain clamps and PG clamps	- Checked for cleaness, tighten and any deficiency

Signature of the Supervisor Signature of the Technician

Initials of depot in-charge

7.0 ANNUAL MAINTENANCE BY OHE INSPECTION CAR

7.1 Maintenance of Turnout / Crossover

Point and crossing are one of the most important locations which need special attention in respect of erecting as well as maintenance because mal adjustment of OHE may lead the panto entanglement.

Sr.	DESCRIPTION	STD. VALUE
1.	Particulars of Turn-out / cross-over (Give the number i.e.1:8½, 1:12 etc.)	
2.	Point no	
3.	Section	
4.	Location No.	
5.	Date checked	
6.	Type of Arrangement - Crossed /Overlap type	
7.	Height of contact wire above rail level at support at obligatory Structure	Main line contact Wire (m), (H)
		Turnout contact wire (mts) H+50 mm

Sr.	DESCRIPTION	STD. VALUE
8.	Height of contact wire towards turnout up to 10 mtrs	Main line contact Wire m (H) Turnout contact wire mts H+50 mm
9.	Turnout span (m)	54 m (Max)
10.	Height of contact wire in overlapping zone	Main line contact Wire (m), H
		Turnout contact wire (mts) H+50 mm
11.	Pantograph should not touch the turn out/cross over contact wire while train passing main line	Turnout/ crossover contact wire (m) H+50 mm
12.	Stagger of contact wire at obligatory structure	Mainline contact wire (mm) 200 max.
		Turnout contact wire (mm) 300 max.
13.	Sag of section insulator of Turnout/Crossover	Height same as at support zero
14.	Sag of contact wire	As per RDSO's standard dropper schedule
15.	Movement of tower wagon from main line to turnout a.Take off b. Point of take off (in m from o/s)	650 mm to720 mm from centre line of pantograph ------
16.	Movement of tower wagon from turnout to main line a)Take on b) Point of take on (in m from o/s)	650 mm to 720 mm from centre line of pantograph -----
17.	Observation on obligatory location	Resister arm tube horizontal bracket plumbed deep 25-30 mm
18.	Vertical distance between register arm axis and contact plane	With drop bracket – (300 mm) With steady arm clamp – (250 mm)
19.	Stagger of section insulator of Turnout/Crossover	+/- 100
20.	Track separation at the location of section insulator (m) (a) Runners towards the centre of turnout (b) Runners away from the centre of turnout	 1.65 m min 1.45m min
21.	Condition of ATD of turnout/mainline OHE	Free to move
22.	Length of pipe provided in hex tie rod of limiting device to bridge redundant length of hex tie rod.	As per SMI No.TI/MI/0035Rev.1
23.	Setting distance (implantation) of obligatory structure (m)	3.0 min
24.	Distance of 'G' jumper from obligatory structure (m)	5.6 m
25.	Track separation at obligatory structure (mm)	150 to 700 mm

Sr.	DESCRIPTION	STD. VALUE
26.	Length of 'G' jumper. (m)	4.0 m
27.	Deviations from SEDs	
28.	Adjustments done, if any	
29.	Remarks	
30.	Name of supervisor and designation	
31.	Signature of supervisor	

Signature of supervisor Signature of technician

Initials of Depot In-charge

Picture Related to Turn Out /Cross Over

Fig-18 Diamond Crossing

Fig- 19 Pantograph of tower wagon takes up the contact wire of main line OHE

Fig- 20 Obligatory Structure & Implantation

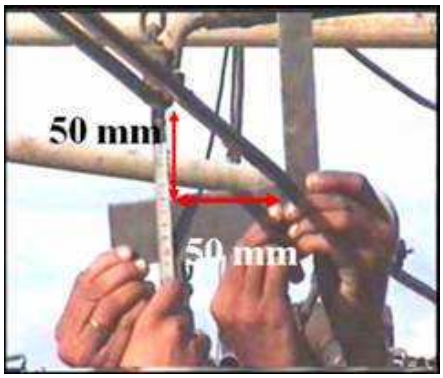

Fig- 21 Horizontal & vertical separation

Fig-22 Mainline stagger of turn out OHE should not exceed than 300 mm

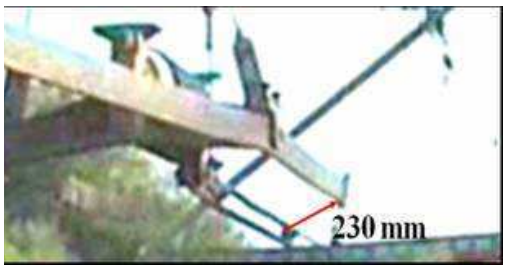

Fig-23 Clearance & Level of runners

Fig-24 Stagger of section insulator

7.2 Maintenance of Section Insulator Assemblies

1. Section:
2. Location:
3. Line:
4. Date of Checking:
5. Identification with tag:

S. No.	OBSERVATION	ACTION TAKEN
6	Clean the insulators and replace badly chipped or even slightly chipped insulators	Cleaned by cotton waste
7	Check the runners for flash marks	Attended
8	Observe for hit marks on the runners	Attended
9	Check the for excessive contact wire wear near anchor loops	Find the reason and attended
10	Check the level of section insulator cross beam assembly	Checked by sprit level and adjusted if necessary
11	Tighten the PG Clamps of the droppers and stiffeners	Tightened
12	Check and record clearance between runner to runner and contact wire	Checked runners to runners should be 460 mm max. contact wire to runner 230 mm
13	Check the pantograph passes smoothly under the section insulator	Smooth passes
14	Measure and record the IR Values of section insulator and 9 ton insulator	More then permissible limit
10	Height of SI from rail level	measured
15	Core insulator and cut -in- insulator make	Noted
16	Encumbrance at S.I	Not less then 450 mm
17	Adjust the runners for level a smooth passage of pantograph	Adjested
18	Measure the Stagger of section insulator	It hould be zero
15	Remarks.	

Signature of Supervisor Signature of Technician

Initials of Depot In-charge

7.3 Maintenance of Over Lap OHE and RRA Clamp

1. Section between:
2. Date:
3. Line Reference:
4. Type of Over Lap:
5. Span:

Sr.	OBSERVATION	ACTION TAKEN
6	Check the distance between parallel contact wire	200 mm for UIOL 500 mm for IOL
7	Stagger of in running contact wire	±200 mm (tangent) ±300 mm (curved)
8	Overlapping of contact wire	2 to 9 m
9	Cut-in–insulator of catenary and contact wire not to have longitudinal shift (Eccentricity)	It should be zero
10	Proper seating and tightness of connections at PG clamps of 'G' & 'F' jumper	Tightened, if loosen and seating
11	Make adequate looping in jumper and ensure 8 nos. of PG clamp in 'G' jumper	Checked length of jumper, if short replaced it, If PG clamp is less then 8 nos. provide it
12	Make a proper shape of jumper	Shaped
13	Check the contact wire in RRA clamp	Checked by hair crack by magnifying glass
14	Check for crack/damage to the contact wire and sharp edges/ defect in the clamp fitting.	Checked with the help of magnifying glass
15	Check for deformation of RRA clamp	If defective, replace it
16	Check for crack/damage to the contact wire in the vicinity of RRA clamp	Change the contact wire/ providing splice/ Contact wire ending clamp

Signature of Supervisor Signature of Technician

Initials of Depot In-charge

"JAHAN MILE DO TENSION LENGTH, WAHAN HO 'G' JUMPER WITH DOUBLE (P G CLAMP) STRENGTH"

7.4 Annual Maintenance of Overline Structure/Tunnels and Clearances Under Overline Structure

1. Date of Checking:
2. Section/ Station:
3. Between OHE Location:
4. Span Length:

S.No.	OBSERVATION	ACTION TAKEN
5	Check horizontal and vertical clearances	Adjust if required
6	Check for flash marks on the under side of the bridge structure	
7	Check the gradient of contact wire on either side	Checked it should not exceed 3 mm/m
8	Check the clearance of catenary or contact wire whichever is nearest to structure both ends	Checked both ends
9	Check that false catenary (contact wire) is provided	Checked for availability
10	Check that insulated sleeve is provided	
11	Check that smoke screens are properly secured and have adequate clearance	Checked and these should be attended by Engg. Dept.
12	Check the condition and availability of 25000 V danger board on screen	Checked for damaged or missing
13	Check the condition of under side of the bridge	Checked for any foreign material hanging
14	Check the side gap on FOB/ROB for water or foreign material	Checked and rectified
15	The minimum height of ROB headroom from rail level should be maintain	As per SOD (Schedule of Dimension)
16	The minimum height of FOB headroom from rail level	As per SOD (Schedule of Dimension)

Signature of Supervisor Signature of Technician

Initials of Depot In-charge

7.5 Splices

1. Date of Checking:
2. Section:
3. Line:
4. Location:
5. Make:

Sr	OBSERVATION	ACTION TAKEN
6	Check for cracks, other casting defects and abnormalities	Checked and replaced
7	Tightness of the stainless steel stud	Checked for tightness
8	Check that any slipping of the ends of two contact wire has take place when viewed through the top window	There should be no gap between the two contact wire ends
9	Normally contact wire splices should not re-used	
10	In case of catenary splice fitting tightness of the right-hand and left-hand joint sockets	

Signature of Supervisor Signature of Technician

Initials of Depot In-charge

7.6 Maintenance of OHE

1. Date of Checking
2. Section
3. Line
4. Location From----To----
5. Make of Contact Wire

S N	OBSERVATION	ACTION TAKEN
6	Check the stager of contact wire & centenary wire	As per SED
7	Check the contact wire height by height gauge	As per SED
8	Check the all nuts & bolts, 'U' pins, split pins	Tighten if loose, missing item provided
9	Check the kinks in contact wire	Kink remove by kink remover, if observe
10	Check the 'G', 'C', 'F' jumpers	Any deformation, strand broken, shaping, PG clamp tightness, Rusting of nuts, bolt & washers
11	Contact wire diameter vertically	Measured by micrometer
12	Check hogging of contact wire	Adjust by one end dropper
13	Check the height of contact wire in mid span	Calculate pre sag
14	Check gradient of contact wire profile	3mm/m
15	Check the twist of contact wire	Twist remove by twister

Signature of Supervisor Signature of Technician

Initials of Depot In-charge

8.0 PERIODICAL OVERHAUL

The object of POH is to recondition and restore the installation in the condition it was when it was first commissioned, whereas preventive maintenance has for its objective to take care of the wear and tear during normal service and forestalling possible failures by regular inspection and quick attention. The POH should be thorough and cover every part of the installation.

The POH of OHE should be intended on a programmed basis at an interval of 4 years. The aim of POH is to make a thorough inspection of the OHE and to replace such of the worn out or damaged parts by those which have been reconditioned earlier in the maintenance depots and kept ready. The parts removed are sent to the maintenance depots for dismantling, through inspection, re-conditioning.

In addition to the items detailed under annual maintenance, the following items should be attended to during POH.

8.1 Cantilever

1. Date of Inspection:
2. Loc No:
3. Road (Up/ Dn):
4. Section:
5. Type of Loc:
6. Type of Mast:
7. Insulator Make & Year Batch No (Stay, Bracket and 9t Insulator):
8. Tangent/ Curve:
9. Implantation:
10. Height and Stagger:
    i. As per SED
    ii. As recorded
    iii. As adjusted
11. Record the following parameters as shown in figure- 25 and compare with SED values.

Sr.	SYMBOL	DESCRIPTION
i.	a (dimension)	Distance between mast stay arm fitting and the center of catenary suspension bracket.
ii.	b (dimension)	Distance between the axis of the vertical swivel and the axis of catenary suspension bracket.
iii.	c (dimension)	Distance from the bottom cap of bracket insulator to the axis of register arm hook.
iv.	d (dimension)	The horizontal distance between the center of the hook of register arm hook and the axis of catenary suspension.
v.	e (dimension)	Encumbrance the distance between the axis of catenary and contact wire.
vi.	f (dimension)	The distance between contact plane and mast bracket fitting.
vii.	r (dimension)	Distance between contact plane and register arm axis. (Assume r is horizontal)
viii.	h (dimension)	The vertical distance between top fitting and bottom fitting.

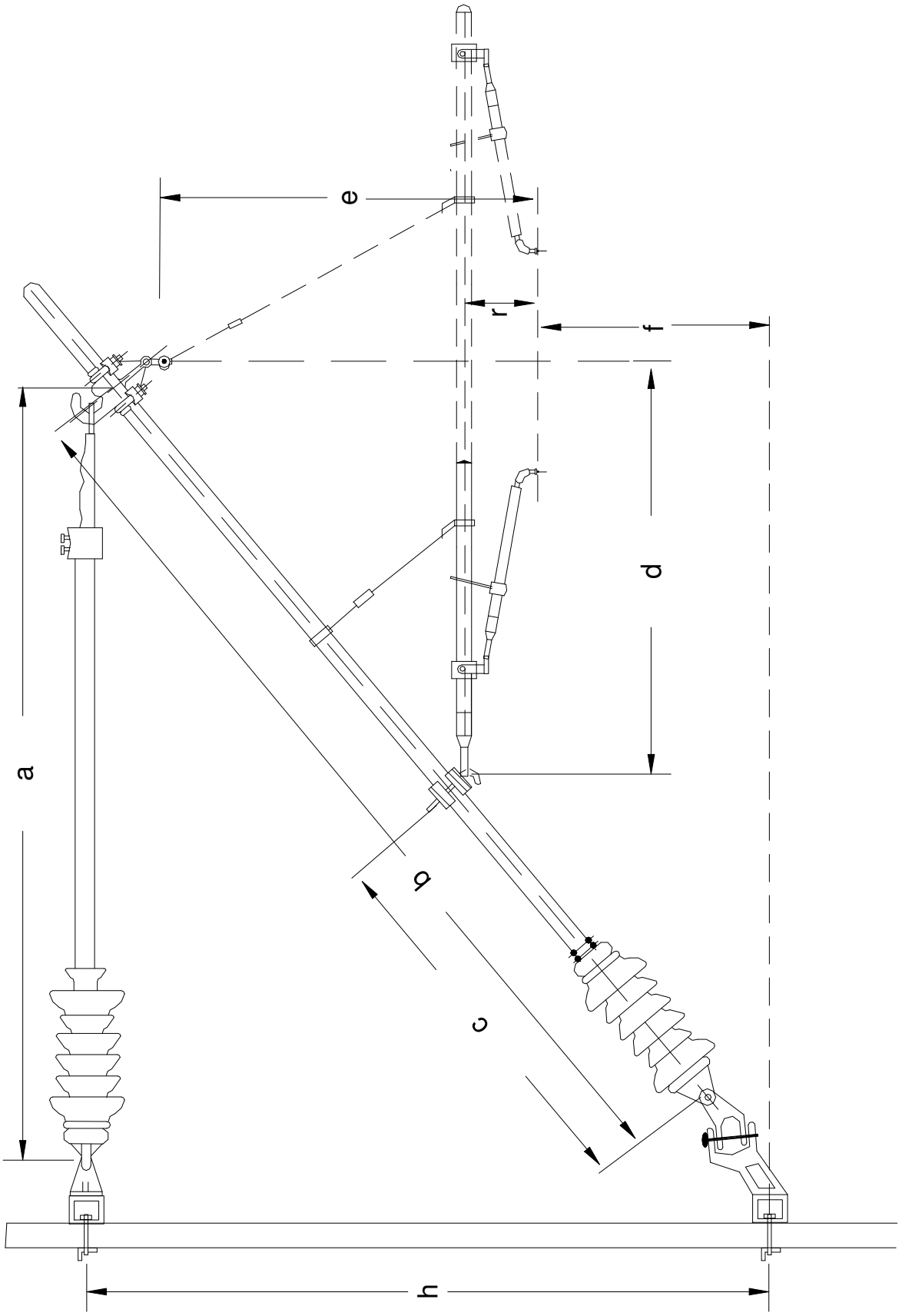

Fig – 25 Single bracket

12. At least one complete cantilever assembly per 10 track- km should be removed and taken to the depot/workshop for dismantling and detailed examination of various components after through cleaning. This test check would reveal the extent to which other cantilever assemblies have to be examined.
13. All GI fittings pipes should be examined for deterioration of galvanization. Minor chippings may be repainted by using cold galvanizing paint.
14. Aluminium bronze fittings, bolts and nuts should be cleaned and carefully checked. Care should be taken to see that the threads are in good condition. Fittings which have developed cracks or any deformation should invariably be discarded.
15. As the bracket is articulated, check the position with reference to the axis of the mast. The position will vary with temperature and distance from anti-creep. The register arm and steady arm should be in the same plane as the bracket.
16. Check adjustments of cantilever assemblies, their slope and displacements at every structure for compliance with the 'as erected SED's.

Signature of the supervisor Signature of the technician

Depot in-charge initials.

8.2 Regulating Equipment

In periodical overhaul Schedule complete set of Drum / pulley is removed from the mast & new overhauled set is replaced instead of the old one. Periodical maintenance schedule is carried out at each location after every 4 years. The POH schedule must be done very carefully to avoid the failure on line.

1. Location No:
2. Half tension length:
3. Type of ATD:
4. Make of the equipment:
5. Make & batch/year of mfg. of 9 ton insulator:
6. Make & batch/year of mfg. of SS wire rope:
7. Make of cat. wire ending cone:
8. Make of cont. wire ending cone:
9. Date of maintenance:
10. All regulating equipment should be replaced by previously overhauled/new ones and the removed equipment should be sent to the depot/workshop for overhaul.
11. The regulating equipment should be dismantled and every part should be checked and cleaned.
12. Cleaning must be done by using kerosene & cloth.
13. The bearing should be replaced after each POH with a new bearing procured from the manufacturer or its authorized representative.
14. Bearings must be removed using bearing puller jig with due care. Hammering with local arrangement must not be done it may damage the housing & bearings.
15. Rubber washer/rings should be replaced where necessary.

16. Any grazing or rubbing on pulleys should either be repaired if possible or the damaged equipment should be replaced.
17. All lubricating holes should be free for passage of grease.
18. The stainless steel rope should be closely checked for damage to the strands.
19. Particular attention should be given to the end fittings on the stainless steel rope.
20. Ensure that use approved type of lubricant for regulating equipment components.
21. Check thoroughly the condition of stainless steel wire rope through magnifying glass for loose wires/strand; broken wires/strands, rusting, pitting/corrosion and bird caging. If any of these defects is observed, the wire rope should be replaced immediately with new lubricated wire rope.
22. Check the pulley, bent arms & bearing housing for any change in dimension and if found deformed, if should be repaired/replaced.
24. Aluminium bronze fittings, bolts and nuts should be cleaned and carefully checked. Care should be taken to see that the threads are in good condition. Fittings which have developed cracks or any deformation should invariably be discarded.

8.2.1 Replacement of ATD at Site

After getting power block with proper message confirmation & testing & putting discharge rods on OHE. Following steps is carried out:-

1. Measurement of X, Z & Y values & analysis of X, Z & Y value for adjustment during the schedule.
2. Putting cum- along clamps of contact & catenary wire.
3. Using pulley arrangement putting tirfor 3- tons for OHE & 1.5 -tons for balance weight.
4. Taking load so as to lift the balance weight & pull the catenary to enable to release the ATD drum/pulley set.
5. Remove the old set & fix the new overhauled set.
6. Setting the OHE & balance weight in its original position.
7. Measurement of X, Z & Y values.

Picture Related to Regulating Equipment POH

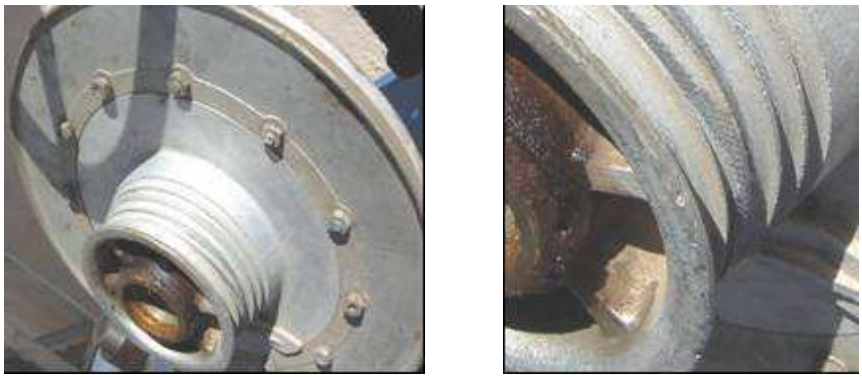

Fig- 26 Checking for damage of groove using GO - NO -GO Gauge

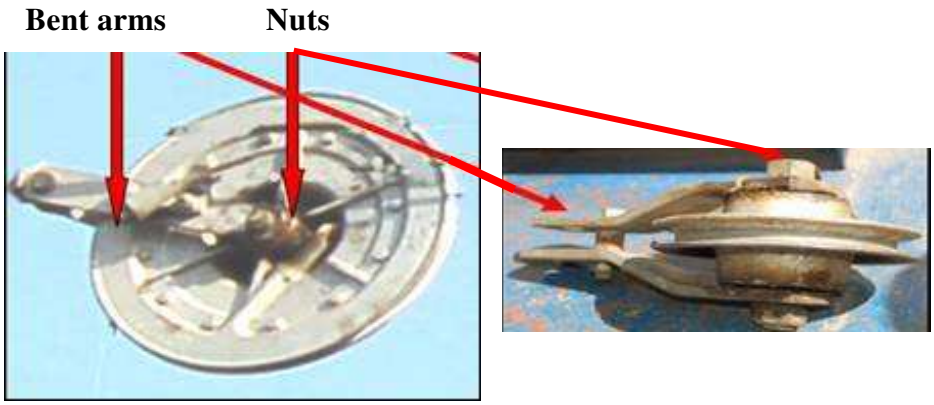

Fig –27 Bent arms & nuts

Fig-28 Checking of housing with GO -NO -GO gauge

Fig-29 Bearing jig and damaged housing & bearings

Fig-30 Bearing of NBC 6305 LLU or SKF 6305 2RS1

Fig-31 Fitment of drum/pulley after POH

Broken Strands

Caging at bend

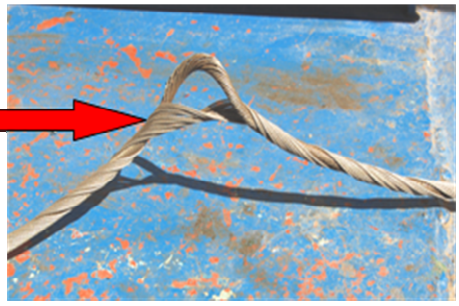

Fig-32 Damaged SS wire rope

8.3 Catenary and Contact Wire

i. Dismantle all jumpers, clip connections etc. and clean the conductors with the help of emery paper in case of copper or bronze conductor and metallic brush in case of aluminium conductors.

ii. If wire shows sign of overheating, because they are not tightened properly or the clips are deformed contact surface is insufficient. Clip should be replaced.

iii. In the case of contact wire, groove has to be cleaned with either a fine metallic brush or emery paper.

iv. The use of scraper or file is forbidden.

v. Remove kinks if found.

8.4 Jumpers and PG Clamps

i. All jumpers and PG clamp should be replaced by previously overhauled/new ones and the removed jumpers and PG clamp should be sent to the depot/workshop for overhaul.

ii. All jumpers and PG clamp should be checked for detailed examination of damaged or frayed and through cleaning of jumpers.

iii. Proper bonding and tin soldering of jumpers end.

iv. Check and clean oxide from PG clamp surface with the help of emery paper in case of copper or bronze item.

v. Bolts, nuts and washers should be replaced in POH, if rusted.

vi. Apply corrosion inhibiting compound.

8.5 Insulated and Un- Insulated Overlaps

i. Check the position of contact wire with respect to tracks to comply with SED's.

ii. Ensure that insulators of anchoring wires are crossing the plane of OHE in correct position as per plan.

8.6 Overline Structure

i. Check the height and gradient of the contact wire adjust the same with drawings.

ii. Check the long time and short time clearances

8.7 Overhead Cross-feeder, Return Conductor and 25kV Feeder

i. Check wire for frayed strands, overheating, pinching or corrosion, especially at suspension clamps and PG clamps.

ii. Ensure that all joints are properly coated with vaseline during tightening PG clamps.

iii. Check tension in wire and adjust if necessary.

iv. Other overhead wire such as bypass feeders and earth- wire should be checked. The insulator attachments should be dismantled and cleaned, overhaul and put back in poison.

8.8 Contact Wire & Catenary Wire Ending Clamp

i Visual inspection should be done during POH (Once in four year).

ii. Replace the fitting once in eight years (alternate POH) and carried out necessary adjustment

9.0 RE-TENSIONING OF UNREGULATED OHE

The re-tensioning of unregulated OHE in accordance with the tension-temperature chart should be done normally at the end of 6 months from the date of erection and again at the end of 12 months. There after the tension should be checked up once in 2 years and re-tensioning done as required.

10.0 CONDITION BASED MAINTENANCE THROUGH THERMO VISION CAMERA

Failure of electrical & mechanical devices is because of component failure or electrical loose connections. Failures such as overhead line problem, problem in electric connections, overheating, hidden faults and insulation defect etc. results in thermal heating.

Thermal imaging infrared camera identifies electrical and mechanical problems like hot spots, heat development on loose connections etc. before they result in failures. It is a non-contact device which detects infrared radiations and converts it into electronic signals. These signals are then processed to produce thermal image of the object.

The main advantages of thermal imaging infrared camera are:

i. It helps to find out electrical hot spots and faulty equipments in incipient conditions.
ii. It is an ideal means to monitor electrical connections for its healthiness and reliability when conducting routine surveys of electrical systems, switchgear and electrical components.
iii. It is a light weight, comfortable and sensitive test instrument with touch screen, text features.

The following items are to be checked by thermal imaging infrared camera in 25kV AC OHE as follows.

i) All types of jumpers and their PG clamps
ii) Catenary splice, ‘U’ clamps and bulldog clamps
iii) Contact splices
iv) Isolators contacts, connectors, jumpers and their PG clamps
v) Feeder wire jumpers connected with OHE and their PG clamps

Schedule

The depot /OHE in-charge (SE/JE) should inspect his entire section (OHE) once in a year and should also OHE Ghat section in a six months.

Photograph of overheating jumper/ splice connections

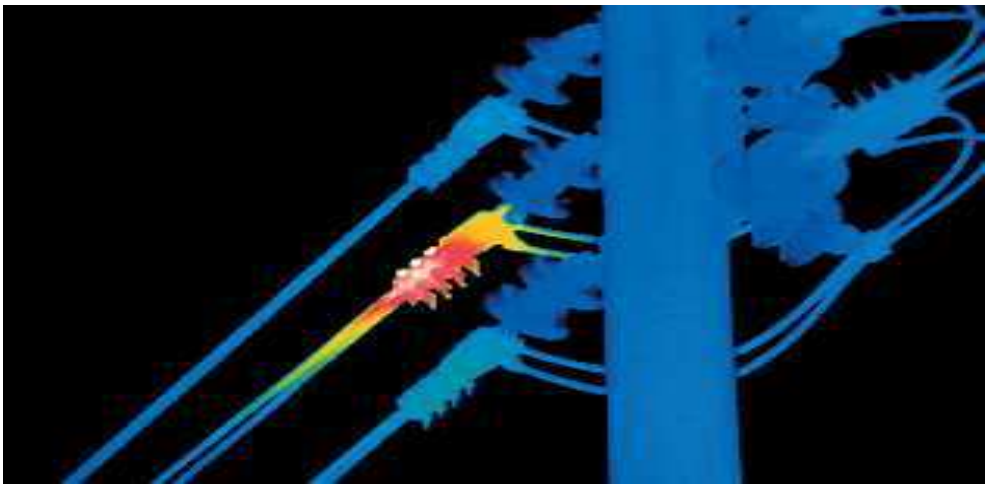

Fig –33 Over heating loose connection

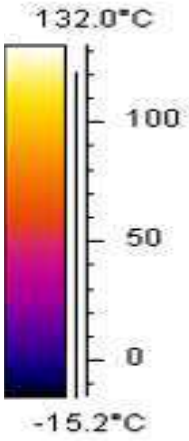

Fig –34 Over heating temperature chart

11.0 RECOMMENDED PROFORMAS OF MAINTENANCE SCHEDULES FOR OHE

PROFORMA No. 03-01

..... RAILWAY

..... DIVISION

TRACTION DISTRIBUTION SECTION

Daily Progress Register

Ref : Rly Bd's L.No. 2004/RE/161/1 Pt- III (ACTM) Corr. Slip 13

1. Power Block on sub-sector / Elementary section: Date:

   i. Time asked: ii. Time received:

   iii. Time returned: iv. Remarks:

2. Staff utilized:

   i. Skilled: ii. Semi skilled: iii. Un skilled:

3. Details of work carried out in power block:

S No.	Type of work	Locations	Staff/Supervisor
3.1	Cleaning of Insulator – ST,BT & 9T		
3.2	Section Insulator		
3.3	OHE checking & adjustment		
3.4	Height & stagger of contact wire		
3.5	Dia of contact wire measured in mm		
3.6	Clearance checked at locations in mm		
3.7	i. Checking of gap insulated overlap locations ii. Checking of gap un-insulated overlap locations		
3.8	ATD Locations		

4. General report on OHE of the section. Preventive action suggested _____
5. Report on catenary/jumper damage in the section. Preventive actions suggested _____
6. Details of work carried out under non-power block

SNo.	Type of work	Locations	Staff/Supervisor
6.1	Muff cleaned		
6.2	Bond checking		
6.3	Rail level and implantation checked		
6.4	Repainting of RL and implantation		
6.5	Tree trimming		

7. Report of foundation/muff condition,, Leaning of masts Preventive action suggested_
8. Report on changes in RL/Implantation, preventive action suggested_____

Station:

Signature of Supervisor Signature of Technician

Name & Designation

Initials of Depot In-charge

PROFORMA No. 03-02

..... RAILWAY

..... DIVISION

TRACTION DISTRIBUTION SECTION

Register for Foot Patrol

Ref : Rly Bd's L.No. 2004/RE/161/1 Pt- III (ACTM)
Corr. Slip 13

Patrolling section:
Km.:--------- To-------

S. No.	Location	CategoryA/B	Date of noticed	Noticed by	Supervisor's remarks			Date attended
					Name/Sign	Date	Action proposed with PDC	

Category 'A' means defect related to safety and train operation
Category 'B' means all other excluding 'A'
Note: Each page should be allotted for every Km.

PROFORMA No. 03-03

..... RAILWAY

..... DIVISION

TRACTION DISTRIBUTION SECTION

Tower Wagon/Cantilever Assembly Maintenance Register

Ref : Rly Bd's L.No. 2004/RE/161/1 Pt- III
(ACTM) Corr. Slip 13

S.No.	Type of location	No.of C/L	Attention				Insu. Make / Batch			Contact wire		Clearance.	Condition of fitting	Sup./Staff Name & Signature	Remarks
			Dt. of checking	Work done	Sch/ Un sch	Due date	9T	ST	BT	Ht.	Stg.				

Note - 1. Each km should start with a fresh page

PROFORMA No. 03-04

..... RAILWAY

..... DIVISION

TRACTION DISTRIBUTION SECTION

Record of Contact Wire Wear and Splices (Proforma 04 & 15 merged)

Ref : Rly Bd's L.No. 2004/RE/161/1
Pt- III (ACTM) Corr. Slip 13

S.No.	Type of Location(Specify if stop signal/hard spot location/tunnel/ROB/FOB/Label crossing gate or any other location)	Location No.	At support		At mid span		Dt of provision of CW splice	Observation	No. of catenary strands cut	Dt of provision of catenary splice	Sup./Staff Name & Signature	Remarks
			Thickness	Wear since last check	Thickness	Wear since last check						

PROFORMA No. 03-05

..... RAILWAY

..... DIVISION

TRACTION DISTRIBUTION SECTION

Register for Features of Over Line Structure

Ref : Rly Bd's L.No. 2004/RE/161/1
Pt- III (ACTM) Corr. Slip 13

FOB/ROB---------- Between Locations ----------
Station/Section----------

Line	Date	Span in mtr.	Contact wire height in mtr.	Clearance in cm.		Feature present						Sup./ Staff Name& Signature	Remarks
				END 1	END 2	Crossing	Pipes	Protective screen	Caution Board	Earthing	Pr. of Ins.Cat./ double CW		

PROFORMA No. 03-06

..... RAILWAY

..... DIVISION

TRACTION DISTRIBUTION SECTION

Register of Earth Resistance Measurements

Ref : ACTM Pt-III Para no. 20349

Station/Section :
Nearest location:
Earth pit No.:

S.No.	Date of test	Resistance in ohms	Overall Resistance	Initial of supervisor	Remarks if any

PROFORMA No. 03-07

..... RAILWAY

..... DIVISION

TRACTION DISTRIBUTION SECTION

Record of Current Collection Tests

Ref : Rly Bd's L.No. 2004/RE/161/1
Pt- III (ACTM) Corr. Slip 13

Date:

Timing:

Train Number:

Section From…….To……

S.No.	Location	Observation / category			Corrective action	Date of Corrective action	Supervisor / staff Name Signature	Remarks
		Heavy	Medium	Light				

PROFORMA No. 03-07 'A' (New)

..... RAILWAY

..... DIVISION

TRACTION DISTRIBUTION SECTION

Register for Current Collection by Oliver - G

a) Date:
b) Timings:
c) Train Number:
d) Train Departure:
e) Train Arrival:
f) Section

Ref: i. Central Railway CSTM Latter no.L/ 574/TRD/Policy dated 14.11.06
ii. 28th MSG TRD at SCR on Feb 2011 item no. 28.19

From…….To……

g) Loco Number & base:

S.No	By whom done	Location	Flashes in the unit of Mega Pixel			Date of attend high intensity (with in a week)	Date of attend medium intensity (with in a fortnight)	Date of attend low intensity (with in a moth)	Reason for flashing	Remarks
			High Intensity (more then 100 units) Red color	Medium Intensity (between 60-100 units) Blue color	Low Intensity (between 40 – 60 units) White color					

PROFORMA No. 03-08

..... RAILWAY

..... DIVISION

TRACTION DISTRIBUTION SECTION

Record of Implantation & Foundation (Proforma 08– 013 merged)

Ref : Rly. Bd's LNo. 2004/RE/161/1
Pt- III (ACTM) Corr. Slip 13

Section:

S.No.	Location No.	Dt. of checking	Foundation type & condition	Implantation		Step distance	HRL mark height above rail level	Amount of leaning in mm at cont. wire level		Amount of leaning in mm at 1.85 mtr from HRL		Reason for leaning	Action taken	Staff / Signature Supervisor name & Signature
				As per SED	Actual			Towards track	Away from track	Towards track	Away from track			

Note: One page in the register to be allotted for each location

PROFORMA No. 03-09

..... RAILWAY

..... DIVISION

TRACTION DISTRIBUTION SECTION

Register of Breakdowns / Accidents Involving OHE

Ref : ACTM Pt-III Para no. 20349

S.No.	DESCRIPTION	OBSERVATION
1.	Date of accident / breakdown	
2.	Station	
3.	OHE Locations affected	
4.	Detail of damages	
5.	Probable cause	
6.	Brief description and remedial action taken	
7.	Reference to detailed reports sent	
8.	Remarks if any	

Note : One page in the Register to be allotted for each case

PROFORMA No. 03-10

..... RAILWAY

..... DIVISION

TRACTION DISTRIBUTION SECTION

Regulating Equipment

Section:

Line:

Location no:

Type of location other end: Ref : ACTM Pt-III Para no. 20349

S.No.	Date of checking	Tension length	Noted Value			Adjustment Required		Date of Adjustment	Adjustment done			Temp.0c	Final Value		Whether greased	Whether replacement of ATD done with the over hauled one
			Temp 0c	X/Z mm	Y mm	X/Z mm	Y mm		BY turn buckle	Wire cut			X/y mm	Y mm		
										Catenary	Contact					

PROFORMA No. 03-11

..... RAILWAY

..... DIVISION

TRACTION DISTRIBUTION SECTION

Isolator Switches

Isolator Switch No…….
Section/Station……
Make & Batch No…..
Elementary section….
Integral lock Key No…….
Pad Lock Key No……. Ref : ACTM Pt-III Para no. 20349

S. No	Date checked	Location	Particular of Isolator switches	Elementary section connected	Condition	Gap between contacts	Particulars of work done, if any	Remarks

PROFORMA No. 03-12

..... RAILWAY

..... DIVISION

TRACTION DISTRIBUTION SECTION

Turnout and Crossover

Turnout/Crossover No……. Ref: ACTM Pt-III Para no. 20349
Location between ……..
Section/Station…….

S. No.	Particular of Turnout/ crossover	Date of check	Whether cross type or overlap type	Height of		Stagger of		Adjustment done, if any	Remarks
				Main line contact wire, m	Turnout/ crossover contact wire, m	Mainline OHE mm	Turnout /Crossover OHE mm		

PROFORMA No. 03-13

..... RAILWAY

..... DIVISION

TRACTION DISTRIBUTION SECTION

Level Crossing Height Gauges

Ref: Rly Bd's L.No. 98/Elect (G) 113/7/ACTM

SNo.	Location of Level crossing	Line	Date of checking	Height of contact wire	Condition of height gauge	Height of height gauges from road level	Whether manned or un-manned	Remarks

PROFORMA No. 03-14 (New)

..... RAILWAY

..... DIVISION

TRACTION DISTRIBUTION SECTION

Maintenance Record of Insulated /Un-Insulated Overlap

Ref: ACTM Vol. II (pt-1) para 20326

Section:

S. No.	Date	Line	Type of overlap	Clearance between two OHE	Length of parallelism	Condition of jumper	Condition of RRA clamp	Remarks

PROFORMA No. 03-15 (New)

..... RAILWAY

..... DIVISION

TRACTION DISTRIBUTION SECTION

Maintenance Record of Section Insulator Assembly

Section:
Location between:
Identification no:

Ref : ACTM Vol. II (pt-1) para 20326

S.No.	Date	Stagger	Sag	Condition of Insulators	Condition of Runners	Leveling	Condition of Anchor clamp	Condition of droppers & stiffeners	Remarks

PROFORMA No. 03-16 (New)

..... RAILWAY

..... DIVISION

TRACTION DISTRIBUTION SECTION

Maintenance Record of BBPC Make Neutral Section

Ref: OEM's Instruction manual

S. No.	Date of Checking	Stagger of PTFE	Height of PTFE	Condition of beads	Any grease collection	Action taken	Remarks

PROFORMA No. 03-17 (New)

..... RAILWAY

..... DIVISION

TRACTION DISTRIBUTION SECTION

Maintenance Record of OHE by Thermo Vision Camera

Ref: i. Central Railway CSTM Letter no. L/ 574/TRD/Policy dated 14.11.06
ii. 28th MSG TRD at SCR on Feb 2011 item no. 28.19

Section……..
Line……..

S.No.	Date	By whom done	Location	Temperature of Jumpers and PG clamp in °C	Temperature of Catenary splice in °C	Temperature of Contact splice in °C	Temperature of 'U' clamps and bulldog clamps in °C	Temperature of Isolators contacts, jumpers and their PG clamps in °C	Temperature of Feeder wire jumpers connected with OHE and their PG clamps in °C	Remarks

NOTE: The temperature of hot spots shall be compared with adjacent/ nearby similar components. The variation of temperature shall be taken as follow:

i) Variation more then 20°C - To be attended within 24 hrs.
ii) Variation more then 10°C and less then 20°C - To be attended within 10 days.
iii) Variation more then 5°C and less then 10°C - To be attended within a month.
iv) Variation less then 5°C - Normal

REFERENCES

1. Manual of AC Traction Maintenance and Operation Volume II (Part–I) Fixed Installations 1994

2. RDSO's Specifications no. TI/MI/ 0018 REV-3, TI/MI/ 0028 REV-2, TI/MI/ 0029 REV-3, TI/MI/ 0034 REV-0,TI/MI/ 0035 REV-1, TI/MI/ 0037 REV-2,

3. Indian Railways Institute of Electrical Engineering NASIK.

4. Study of maintenance practices in the field.

5. Maintenance Schedules received from various Railways WR, CR, and SCR, SR etc.

6. Manual of OLIVER-G plus M/s. Total Solution, Bhopal

7. Details of Thermo Vision Camera 28th MSG TRD at SCR on Feb 2011 item no. 28.19

8 Railway Board latter no.2004/RE/161/I Pt-III (ACTM) Correction Slip no. 13 dated 01.07.2005

OUR OBJECTIVE

To upgrade maintenance technologies and methodologies and achieve improvement in productivity, performance of all Railway assets and manpower which inter-alia would cover reliability, availability, utilisation and efficiency.

If you have any suggestions and any specific Comments please write to us.

Contact person	:	Director (Elect.)
Postal Address	:	Indian Railways Centre for Advanced Maintenance technology, Maharajpur, Gwalior. Pin code – 474 005
Phone	:	0751 – 2470740 0751 – 2470803
Fax	:	0751 - 2470841