
	Torrent Power Ltd. – Distribution Franchise	Doc. No.: TPDF02-DIS01-OCP-022
	OCP - ERECTION OF HT OVERHEAD LINE COMPONENTS	Rev. No. /Dt: 00 / 01.12.2021

DOCUMENT CONTROL


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1	1	0	01.12.2021	First Issue	Shilajit Ray Satish Shah	Snehal Shah Abdulrashid Shaikh
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1. PURPOSE

- 1.1. Erection of 11/22 kV OH Line Components

2. SCOPE OF DOCUMENT

- 2.1. The scope of this document is to define a structured activity-level flow for Erection of 11/22 kV OH Line Components.
- 2.2. The process document aims to define the guidelines to ensure the process effectiveness as required by the Integrated Management System.

3. FIELD OF APPLICATION

- 3.1. This procedure is used for Erection of 11/22 kV OH Line Components in TPL-D's licensed areas of Ahmedabad.

4. FREQUENCY

- 4.1. As and when required

5. AUTHORITIES AND RESPONSIBILITY

- 5.1. The Head of Department is responsible for Execution & implementation of this procedure for effectiveness

6. REFERENCES

- 6.1. Operating manual of OEM
- 6.2. OCP # TPDF02-SAQ02-OCP-006 (Operational Control Procedure for Handling, Collection, Storage and Management of Hazardous Waste)
- 6.3. Guideline # TPDF02-DIS01-GDL-003_Guideline for Applicable Legal Requirement

7. SPECIFIC COMPETENCY REQUIREMENTS


- 7.1. Technician/GET/Jr. Exe/Exe/AM/M should have Knowledge of
 - (1) Safe working practices and use of PPE
- 7.2. Technician/GET/Jr. Exe/Exe/AM/M shall have authority for electrical isolation and issue of PTW

8. INTERFACE WITH OTHER DEPARTMENTS/SECTIONS, IF ANY

- 8.1. Store for material issue and return.
- 8.2. Control room/NPC for outage information.

9. TOOLS AND TACKLES

- 9.1. Sling /nylon ropes and D-shackle for lifting as per equipment/material to be transported
- 9.2. Cotton ropes.
- 9.3. Cotton Belt
- 9.4. Tools bag

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- 9.5. Chain pulley block as per site requirement.
- 9.6. FRP Ladder as per site requirement
- 9.7. Crimping Tools
- 9.8. Torches if required

10. PERSONAL PROTECTIVE EQUIPMENTS / SAFETY TOOLS

Following PPEs shall be used to carry out work at site.

- 10.1. Safety Shoes
- 10.2. Safety helmets
- 10.3. Full body harness with lanyard/ double hook
- 10.4. Reflective jacket

11. SIGNIFICANT RISK PARAMETERS

- 11.1. Quality Management System: Low
- 11.2. Impact on Environment: High
- 11.3. Health and Safety Risk: High
- 11.4. Energy Management: Low
- 11.5. Asset Management Risk: High


12. PROCEDURE

12.1. JOB PREPARATION

- (1) Visit the site location for prelims for necessary tools, manpower and material requirement
- (2) To where the material is to be unloaded to check the site feasibility for transporting unloading etc.

12.2. PRECAUTIONS

- (1) Barricading the working area by barricading tape with appropriate sign board shall be displayed near the barricade.
- (2) Aware all persons for nearby live switchyard equipment / bus / conductors and maintain safe clearance and safety while working.
- (3) Use all required PPEs during execution of the job.
- (4) Following steps to be followed for working at height.
 - (a) Person who has to climb on the pole must use full body harness with lanyard which is be hooked & locked properly on pole at convenient height where the person has to perform the job.
 - (b) Ladder is to be erected in safe working condition and its top end is to be tied with pole by means of rope.

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- (c) All the materials should be lifted or lowered by means of hand line only and nothing should be thrown up by the ground helper or thrown down by the lineman. As there is tendency, many times on the part of the work man to throw smaller items such as spanner, bolts, nuts etc. from the ground to the top or from the top to the ground to save the labour and time which may lead to an accident hence it is should be strictly avoided.

12.3. ISOLATION


- (1) For isolation equipment from the system follows the procedure as per OCP No: TPDF02-DIS01-OCP-005 for Distribution Network Isolation and Normalisation as per the switching requirement.
- (2) Authorised person issue “Permit to work” as applicable to competent person after required isolation and local earthing.

12.4. WORK PROCEDURE


- (1) Erection of Drop out Fuse Assembly.
 - (a) Erection of DO Fitting/DO channel.
 - I. If DO assembly is to be erected in the centre of the two-pole structure DO channels is to be erected with clamping its two sides on the poles using required size of D clamps as per the type of poles. The above channel is to be erected at @ 17 feet height from the ground level.
 - II. If DO assembly is to be erected on one of the poles of two pole structure, DO fitting is to be erected with clamping its mounting channel on the poles using required size of D clamps as per the type of poles. The above fitting is to be erected at @ 17 feet height from the ground level. Also, entire DO fitting assembly is to be fitted with bracing strip the other end of which is to be clamped with main pole.
 - III. Mounting two Nos. of Post insulators.
 - i. In case of DO channel, mount 2 Nos. of post insulators on above channels using proper size of nuts, bolts and washers. Provision of the holes for the same is made in the channel.
 - ii. In case of DO Fitting, Fix the 2 Nos. of post insulators on above fitting using proper size of nuts, bolts and washers. Provision of the holes for the same is made in the channel of the DO fitting.
 - iii. Fix DO strip on the base of two post insulators mounted on above DO assembly/ DO fitting.
 - iv. Fix three Nos. of DO Unit on above DO Strip, keeping 600 mm distance between phase using proper size of bolt, nut & washers.
 - (b) HT Jumper Work on DO Units.

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- I. Line to DO Jumpers.
 - i. Take the measurement from each phase conductor to top contact of DO unit of respective phase.
 - ii. Use 120 sq. mm/. 95 sq mm HT XLPE wire for above jumpers. Crimp the suitable size of "Al" lug on one end which is to be connected on respective DO unit.
 - iii. Other end of each jumper is to be connected on main line conductor by means of socket /barring the jumper with main line as per the site requirement.
 - iv. If the pole is shackle & tails of the main line conductor is available same may be connected with DO jumpers by means of crimping suitable size of lugs.
 - v. If connection by means of crimping lug is not possible DO jumpers are to be connected with main line conductor by means of binding barring wires. The binding should cover @ 150mm length of jumper wire on the main line conductor.
- (c) D O to transformer/ HT outdoor cable termination.
 - I. Use 95 sq.mm HT PVC cable for above jumpers Crimp the suitable size of "Al" lug on both ends.
 - II. Connect the jumpers on DO unit as well as on transformer HT bushing/ outdoor HT cable termination for respective phase.
- (d) Earthing of DO Assembly
 - I. Making body earth connection of DO Assembly with Common earth terminal using GI wire / Earthing Strip, for earthing the pole follow the OCP No: TPDF02-DIS01-OCP-012 for earthing of electrical distribution equipment.
- (2) Erection of Isolation Devices In 11/22KV OH Line
 - (a) Erection of DL Fitting
 - I. If the DL assembly is to be erected in the centre of the two-pole structure,
 - i. Two Nos. of DO channels is to be erected @ 380 mm apart with clamping its two sides on the poles using required size of D clamps as per the type of poles. The above channel is to be erected at @ 17 feet height from the ground level.
 - ii. The 2 Nos. double sheave rope pulley assemblies are to be anchored on double pole top fitting on their extreme side near to the pole. The rope looped in between above two pulleys then be separated by releasing the rope loop through these pulleys such that the lower pulley comes on the ground.

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- iii. The small length of cotton rope at both ends are being looped & tied with DO fitting terminal channel & the loop of the same is being anchored in the hook of the lower pulley of above double sheave pulley assembly at both ends.
- iv. Pull the rope of above pulley assembly such that lower pulley will be lifted vertically upward at both ends simultaneously. As DO fitting channel is also hooked on it, it will be also lifted upward. When the channel comes near to pole height of @17 feet from the ground level, mount the channel using required “D” and “C” clamps as per the type of the pole.
- v. Similarly erect second DO fitting channel on the pole structure @ 382 mm apart from above channel.
- vi. Mount the 2 Nos. of 11/22 KV Post insulators on each DO fitting channel erected on pole structure. The double sheave rope pulley assembly is to be anchored on pole top fitting on each pole of two pole structure. The rope looped in between above two pulleys then to be separated by releasing the rope loop through these pulleys such that the lower pulley comes on the ground.
- vii. Place the DL fitting assembly near to the pole structure on the ground such that its fix contact mounting assembly remains on top and moving contact mechanism assembly remains on bottom.
- viii. The small lengths of cotton rope at both ends is being looped & tied with above DL fitting assembly on its mounting channel fitting & the loop of the same is being anchored in the hook of the lower pulley of above double sheave pulley assembly.
- ix. Pull the rope of above pulley assembly such that lower pulley will be lifted vertically upward simultaneously on each pole. As DL assembly is also hooked on it, it will be also lifted upward. When the DL assembly comes near to pole height of @17 feet from the ground level, match the holes of mounting channels with holes of 11/22 KV Post insulators. Mount the DL assembly on the base of above four Nos. of Post insulators mounted on DO fitting channels.
- x. Clamp the vertical operating rod on the main moving shaft rod near to one of the poles of two pole structure such that locking arrangement of operating handle can be suitably mounted on that pole.
- xi. Adjust the height of the vertical operating rod such that clamping of pad locking arrangement of operating handle can be suitably done on the pole.

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xii. Clamp the pad locking arrangement on the pole.

II. If the DL assembly is to be erected on single pole structure.

- i. The double sheave rope pulley assembly is to be anchored on pole top fitting on the pole. The rope looped in between above two pulleys then be separated by releasing the rope loop through these pulleys such that the lower pulley comes on the ground.
- ii. Place the DL fitting assembly near to the pole on the ground such that its fix contact mounting assembly remains on top and moving contact mechanism assembly remains on bottom.
- iii. The small lengths of cotton rope at both ends are being looped & tied with above DL fitting assembly on its centre of mounting channel fitting. & the loop of the same is being anchored in the hook of the lower pulley of above double sheave pulley assembly.
- iv. Pull the rope of above pulley assembly such that lower pulley will be lifted vertically upward. As DL assembly is also hook on it, it will be also lifted upward. When the DL assembly comes near to pole height of @17 feet from the ground level, clamps the mounting channels with main pole with suitable size of channel pieces which is already provided in the fitting assembly.
- v. Check the “ON”/ “OFF” operation.
- vi. While making “ON” operation ensure that moving contact blade penetrate fully in the fix contacts mechanism. Also, during penetration, the moving contact of each phase shall not either under travel or over travel. For that setting arrangement is given on horizontal operating shaft which can control the movement of above shaft while operating it through vertical operating rod.
- vii. Also, while making “OFF” operation moving contact of each phase should separate from fix contact simultaneously & while locking the operating handle in pad lock arrangement, distance between fix & moving contact shall be maximum & as per the design. For this clamping arrangement of pad locking arrangement should be set accordingly.
- viii. After ensuring above operation, clamp the pad locking arrangement of operating handle.

(b) 11/22 kV Jumper Work on DL

I. Line to DL Jumper

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- i. Take the measurement for each phase conductor of line to DL contact both for Incoming as well as outgoing jumpers.
- ii. Use 120 sq. mm 11/22 kV XLPE wire for above jumpers. Crimp the 120 sq mm double hole “Al” lug on one end of jumpers which are to be connected on DL fix and moving contacts for each phase.
- iii. Other end of each jumper is to be connected on main line conductor by means of socket /barring the jumper with main line as per the site requirement.
- iv. If the pole is shackle & tails of the main line conductor is available same may be connected with DL jumpers by means of crimping 120 sq.mm double hole “Al” lugs.
- v. If connection by means of crimping lug is not possible DL jumpers are to be connected with main line conductor by means of binding barring wires. The binding should cover @ 150mm length of jumper wire on the main line conductor.

(c) Earthing of DL Assembly.

- I. Connect the DL body earthing terminal through GI wire / GI strip with Common earth terminal on pole.

(3) Site housekeeping

- (a) After completion of work remove all packing, waste material and dump, collect & submit to stores.
- (b) Remove barricades, temporary stakes etc.
- (c) Clean the whole area.
- (d) Remove barricades, temporary stakes etc.
- (e) Ensure the backfield areas are level with ground surface

12.5. RESTORATION


- (1) If isolation of the system is taken then, after completion of pole erection, take clearance from concerned person and Cancel “Permit to Work”
- (2) Remove the local shorting & earthing.
- (3) Open the mechanical /electrical locks of the isolation devices.
- (4) For normalisation of above switching follow the procedure as per OCP No: TPDF02-DIS01-OCP-005 for Distribution Network Isolation and Normalisation.

12.6. WORK CHECKLIST

- (1) Update entries in Standard Format (Field Force Application or Hard copy)

12.7. UPDATION

- (1) Material reconciliation is to be done.

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- (2) Update in GIS / SAP, if applicable.

13. IMPACT ANALYSIS OF SIGNIFICANT RISKS

13.1. QUALITY MANAGEMENT SYSTEM


- (1) Details of Quality Issues involved
 - (a) Incompetent manpower (Improper Execution of work)
- (2) Details of Quality Assurance plan
 - (a) Work Quality/OCP Training
 - (b) Effective supervision
 - (c) Penalty mechanism

13.2. ENVIRONMENT

- (1) Details of Environmental impact
 - (a) Resource Depletion
 - (b) Land Contamination
- (2) Precautions to minimize Environmental impact
 - (a) Ensure that all persons working at site are aware about the significant environmental impacts
 - (b) Ensure that all type of generated waste including hazardous waste should be collected and submitted to stores as per OCP no: TPDF02-STO01-OCP-006.

13.3. HEALTH AND SAFETY

- (1) Details of Health and Safety Hazard involved
 - (a) Person working at site without TPL supervision
 - (b) working/travelling in extreme weather condition
 - (c) Animal/ insect bite
 - (d) Contact with Live terminal/ cable/ wire/ busbar
 - (e) Working in congested area
 - (f) Use of faulty Tools
 - (g) Negligence of use of safety PPEs / Non usage of PPEs/ Use of faulty PPEs
 - (h) Accident to public due to Working without Area barricading
 - (i) Fall of external object
 - (j) Fall of overhead line
 - (k) Working in unhygienic area

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- (l) Contact with sharp edges
- (m) Fall of person from Height
- (n) Slips, trips and Falls of Persons
- (o) Fall of material /equipment during loading / unloading / shifting/handling
- (p) Travelling in heavy traffic
- (q) Electric shock due to improper earthing of welding / Other electrical tools
- (r) Failure of loading / unloading equipment
- (2) Health and Safety Precautions required
 - (a) Ensure use of PPEs
 - (b) Ensure use of Barricading Tape and caution board
 - (c) Ensure physical condition of Loading and unloading equipment/accessories.

13.4. ENERGY MANAGEMENT

- (1) Details of energy use involved
 - (a) Fuel consumption in transportation/ material movement
- (2) Precautions to minimise energy use
 - (a) Ensure Optimum Usage & Turn off the engine when not in use

13.5. ASSET MANAGEMENT

- (1) Details of Asset related risks
 - (a) Loss of Equipments
 - (b) Frequent Small Duration Forced Outages
 - (c) Sustained Forced Outage requiring Major Repair
 - (d) Frequent Planned Outages
 - (e) Overloading of equipment
 - (f) Mishandling by handling equipment
- (2) Mitigation plan for asset related risks
 - (a) Ensure Work as per OCP
 - (b) Ensure Training to workforce

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14. LIST OF ATTACHMENTS

Sr	Document /Record Description	Reference No.
1	Height work permit	TPDF02-SAQ02-OCP-007-F01
2	Permit to Work (PTW)	TPDF02-SAQ02-OCP-005-F02
3	Deviation Format	TPDF02-DIS00-FOR-001

***** End of Procedure *****