DOCUMENT CONTROL

Document Number	**TPDF02-DIS01-OCP-001**	
Title of Document	**HT CABLE LAYING & SHIFTING JOB**	
Document owner:	General Manager (Distribution)	
Prepared by / Modified by	Mr. Amit Magdum Manager Distribution	07.11.2021
Reviewed by	Mr. Shilajit Ray Mr. Satish Shah Assistant General Manager Distribution	22.11.2021
Approved by	Mr. Snehal Shah Mr. Abdulrashid Shaikh General Manager Distribution	30.11.2021
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1. PURPOSE

1.1. 22/11 kV Cable laying & shifting job.

2. SCOPE OF DOCUMENT

2.1. The scope of this document is to define a structured activity-level flow for 22/11 kV Cable laying & shifting job.

2.2. The process document aims to define the guidelines to ensure the process effectiveness as required by the Integrated Management System whenever implemented.

3. FIELD OF APPLICATION

3.1. This procedure is used for 22/11 kV cable laying & shifting job in TPL-D's Franchisee areas of Bhiwandi & SMK.

4. FREQUENCY

4.1. As and when required.

5. AUTHORITIES AND RESPONSIBILITY

5.1. The Head of Distribution is responsible for implementation of this procedure for effectiveness.

5.2. The Head of HT O&M/Projects at respective locations are responsible for execution of this procedure for effectiveness.

6. REFERENCES

6.1. MERC Regulations (with its latest amendments).

6.2. Central Electricity Authority (Measures Relating to Safety & Electric Supply) Regulations 2010 (with its latest amendments).

6.3. IMS Manual whenever implemented.

6.4. OCP TPDF02-STO01-OCP-006 & 008 (Operational Control Procedure for Handling, Collection, Storage and Management of Hazardous Wastes).

7. SPECIFIC COMPETENCY REQUIREMENTS

7.1. Tech/Jr. Exe/Exe/AM/M should have Knowledge of

(1) Operation of Feeders, Power Transformers, DTCs, Switchgears & Substation/switching station equipment.

(2) Safe working practices and use of PPE.

7.2. Jr. Exe/Exe/AM/M having valid authorization from General Manager Distribution shall have authority for electrical isolation and issue of PTW.

7.3. As per competency profile and assessment.

8. INTERFACE WITH OTHER DEPARTMENTS/SECTIONS, IF ANY

8.1. Safety & QAQC department for information of work execution

8.2. Other utilities for their network related information

8.3. Control Room/NPC for outage and temporary switching Information

8.4. Call centre for information to the consumer, if any

8.5. Service Providers for material and manpower

8.6. Store for material issue and return

8.7. EHV/LV Cell for cable network related information

8.8. Control room for Network updating

9. TOOLS AND TACKLES (As applicable)

9.1. Excavation tools

9.2. Measuring tape

9.3. Extension board with ELCB/RCCB (if required)

9.4. Tool kit

9.5. Cotton rope

9.6. Ladder (if required)

9.7. Pulley (if required)

9.8. Rollers

9.9. Insulated Crowbar and excavation tools

10. PERSONAL PROTECTIVE EQUIPMENTS / SAFETY TOOLS

Following PPEs shall be used to carry out work at site

10.1. Safety shoes/ Gum Boot

10.2. Safety Helmets

10.3. HT Insulating rubber hand gloves

10.4. Barricading tape

10.5. Caution board / “Men at work” sign board

10.6. Barricading cone

10.7. Reflective Jacket

11. SIGNIFICANT RISK PARAMETRS

11.1. Quality Management System: High

11.2. Impact on Environment: Medium

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) Identify scope of work and type of excavation of the other agency on the HT cable route.

Identify possible locations of pipelines/chambers/cables of other utilities such as CNG, telephones, water, storm water and sewerage lines/streetlights of BNCMC/TMC/BMC/PWD/Gram Panchayat or our own installations like transformer, MSP, FSP, HV/LV underground cables etc.

(2) Identify possible location of underground cable on / near by the excavation route with cable route drawing.

(3) Cable route and type of cable verification with drawing.

(4) Based on the requirement of excavation on the HT cable route decide the location for the trial pit to prevent cable damage and to decide route of cable.

(5) Identify details of H.T. cable to be laid: -

(a) Location and size of H.T. cable to be laid.

(b) Cable identification on cable drum in stores.

(c) Accessories as required.

(d) Reason for laying cable: -

I. Capital job

II. Under cable fault

III. Shifting job (Chargeable/Non chargeable Job)

(6) Prepare drawing showing the cable route.

(7) Seek the approval wherever required from concern authorities in verbal /written / or any other electronic mode.

(8) Plan area where excavated material, tools and working material may be stacked during work.

(9) Ensure and provide-adequate access, working space and illumination if required.

(10) Ensure that the contractor has necessary manpower to carry out the cable laying work and all the persons to work at site should have valid identity card issued by HR department of TPL.

(11) Contractor responsible person /company authorised person to be deputed at site.

(12) Ensure availability of resources.

12.2. PRECAUTIONS

(1) Wear safety shoes and safety helmet at the time of excavation work.

(2) Maintain safe distance with J.C.B. during excavation.

(3) Do not stand at the edge of open trench.

(4) Barricade the area of trial to be excavate.

(5) Necessary precautions to be taken to avoid damage to other utilities.

(6) Verify tools & PPEs.

(7) For cable shifting if isolation is required, at each location where isolation has been carried out and in which provision is there for pad locking, provide pad locking having LOTO / padlock wherever provision is there & put the NTC stickers and mention the details as under: -

Provide NTC stickers and mention the details as under wherever necessary

(a) Reason for Isolation.

(b) Date and Time of Isolation.

(c) Isolation carried out by Engineer Name/ Contact No. / Sign of Engineer.

12.3. ISOLATION (IF REQUIRED)

(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) In order to find cable route/ other UG network and for the prevention of cable damage excavate trial pits with a depth till cable/other utility asset is visible at suitable intervals of excavation route.

(2) After completion of trial pit excavation work backfill or barricade the trial pit as per requirement.

(3) For transferring material and tools to site refer OCPs No. TPDF02-DIS01-OCP-017 Loading, unloading, handling & transporting of material.

(4) Excavation

(a) Excavate trench considering installations of other utilities and development authorities.

(b) Care should be taken when working close to existing buildings or structure to ensure that foundations are not damaged by the work.

(c) Excavated material shall be dumped away from the edges of the excavated trench to avoid slipping of excavated material into the trench.

(d) Measure dimensions of the trench as required.

(e) Before starting excavation, inform all other utilities.

where required to avoid surface excavation in case of - Major roads / Concreted Road/ NH / railway line etc. thrust or directional boring (manual/machine) may be used. In such cases it is essential to adequately locate all existing cables and

services and obtain relevant permits, prior to commencement of work. (Chuha boring is not recommended to avoid any mishap due to land sliding).

(f) During horizontal boring, insulated boring machine tool is to be used. Also, person who is operating the same shall wear insulated hand gloves of 22 kV class. At road crossing or nallahs (if possible) trench shall be dug for laying cable across it and cable shall be run through 150mm dia Pipe laid in trenches and joined by couplings/ bends as necessary over full width of road/nallah. Such road crossing shall be restored to original shape and finish after lying of pipes immediately to reduce road blocking time.

(5) Prepare trench for new cable: -

(a) Width of trench shall be determined on the following basis: -

I. Minimum width of trench shall be 300mm.

II. Where more than one cable is to be laid width of trench shall be increased such that the inter axial spacing between the cables except where otherwise specified shall not be less than 150mm

III. There shall be a clearance of at least 150mm between axis of the end cables and side of the trench

(b) Ensure trench bed consists of soft soil and free from projecting stones which may puncture the cable

(c) Check trench for uniform level and minimum required depth

I. Where cable is to be laid in a single tier total depth of trench shall be 900mm. In case of vertical formation for each additional tier, depth shall be increased by 200mm.

II. Where more than one cable is to be laid width of trench shall be increased such that the inter axial spacing between the cables except where otherwise specified shall not be less than 150mm

III. In case of vertical formation for each additional tier, depth shall be increased by 300mm**.**

IV. In case of multiple tiers, after the first cable has been laid a soil cushion 300mm shall be provided after initial bed before the second tier is laid. Additional tier also shall have a soil cushion of 300mm. The top most cable shall have final soil covering not less than 150mm before the protecting tiles /cover is laid.

V. Wherever it is not possible to dig to the recommended depth of 900mm (For 11kV) & 1050mm (For 22kV) to top of cable due to technical reasons beyond the control of contractor or Torrent Power, the same shall be informed to respective authority of Torrent Power Ltd. for approval.

VI. The desired minimum clearances between cables being laid direct in ground should be as under:
Power Cable to Control Cable- 0.20 Metres
Power Cable to Communication Cable- 0.30 Metres
Power Cable to Water or Gas Main- 0.30 Metres

VII. The cable trench shall be as straight as practicable to minimize pulling tension.

(6) Utility duct/Readymade trench

I. Where cable is to be laid in readymade utility duct provided by TMC/NMMC/MMRDA/private consumer and other agencies, duct shall be uniformly surfaced and shall avoid sharp edge and turn wherever possible.

II. If utility duct is covered, half round block, muff, pipe, etc. are not required.

(7) Laying of Cable

(a) Lay cable in prepared trench manually. Due care is to be taken to ensure that cable is being laid without any twist or sharp bends. The cable should be handled carefully so that outer jacket is not damaged at any point.

(b) In case of laying cable through pipes

I. The pipe shall be carefully rounded internally to prevent edges damaging the cables during pulling.

II. The cable should be bent in large radius (shall not be less than recommended bending radius) while inserting through conduits.

(c) Place cable protecting cover on the cable.

(d) Keeping required length of cable loop with proper radius of loop considering the cable diameter (i.e., 12D to 15D, where D is the overall diameter of cable to be laid).

(e) Pit for joint as per the requirement of the type of joint kit to be used.

(8) Cable Shifting

(a) For Shifting of cable

I. If required, OCP No. TPDF02-DIS01-OCP-002 for HT Cable Fault location, tracing, and testing work with FLV of cable to be followed.

II. If required, OCP No. TPDF02-DIS01-OCP-003 for HT Cable Identification and nailing to be followed.

III. Recover the cable from the trench after excavation on the cable route, wherever possible.

IV. Relaying of the same cable in new trench for the shifting work.

V. Follow the OCP No. TPDF02-DIS01-OCP-004 for 22kV Cable jointing and termination work, if required.

(b) If cable is not recoverable due to site conditions, then new cable has to be laid in place of old cable for the shifting work.

I. New cable is to be terminated at both ends at respective substation / HT OH line pole etc. for which required termination is to be made. Follow the OCP No. TPDF02-DIS01-OCP-004 for 22KV Cable jointing and termination work.

(9) Backfill cable trench

(a) Lay excavated soil without stones in trench properly up to 300mm.

(b) Laying of Pre-warning tape over the backfill trench.

(c) Backfill the rest trench with soil without stones.

(d) Ram it thoroughly.

(e) Reinstate the road / trench through civil wherever necessary.

(10) Site housekeeping

(a) After completion of work, remove all packing waste material and dump, collect and submit to stores.

(b) Remove barricades, temporary stakes etc.

(c) Clean the area of dirt, loose soil etc.

(d) Remove caution boards, plastic cones.

12.5. RESTORATION

(1) For normalisation of above switching follow the procedure as per OCP No: TPDF02-DIS01-OCP-005 for Distribution Network Isolation and Normalisation.

(2) Inform Control room / NPC of respective zone about charging or restoration of cable.

12.6. WORK CHECKLIST

(1) Update Quality Check entries in Standard Format (Field Force Application or Hard copy).

12.7. UPDATION

(1) Upload site photographs of allocated job on respective order in SAP or Field Force Application.

(2) Intimation to draftsman for preparing cable route, joint details, length of cable, size of cables etc. at the time of cable laying & jointing work updating details.

(3) Inform GIS regarding updating of new/modified route of cable in system with SAP notification.

(4) Give the changes made in network, so that same can be updated in SDB (System Diagram Book) by Control room.

(5) Material reconciliation is to be done.

(6) Prepare the Service Entry Sheet (SES).

13. IMPACT ANALYSIS OF SIGNIFICANT RISKS

13.1. QUALITY MANAGEMENT SYSTEM

(1) Details of Quality Issues involved

(a) RO Permission

(b) Not providing of HDPE/RCC muff / Tiles for mechanical protection & Pre-warning Tape

(c) Improper Depth of Pit

(2) Details of Quality Assurance plan

(a) Work Quality/OCP Training

(b) Work Permission from authority

(c) Ensure the coordination between utility agencies

(d) Effective supervision

(e) Penalty mechanism

13.2. HEALTH AND SAFETY

(1) Details of Health and Safety Hazard involved

(a) Contact with Live terminal/ cable/ wire/ busbar

(b) Use of faulty Tools

(c) Negligence of use of safety PPEs / Non usage of PPEs/ Use of faulty PPEs

(d) Failure of loading / unloading equipment

(e) Fall of material /equipment during loading / unloading / shifting/handling

(f) Wrong Methods of lifting material

(g) Collapse of wall, auxiliary structure

(h) Pick-axe on live cable

(i) Working in congested area

(j) Contact with sharp edges

(k) Accident to public due to working without Area barricading

(l) Working in unhygienic area

(m) Slips, trips and Falls of Persons

(n) Penetration of dust particles in eyes during excavation

(o) Working in bending position / Awkward Posture

(p) Excessive work load

(q) Ingress of polluted water in excavated pit

(r) Damage to other utilities (Gas pipeline, communication line, live cable, drainage, water pipe line)

(s) working/travelling in extreme weather condition

(t) Road/RCC breaking activity by JCB Machine or Road breaker - Exposure to

continuous Hand-arm & full-body vibrations

(u) Road/RCC breaking activity by JCB Machine or Road breaker - Exposure to continuous Noise

(v) Electric shock from LT supply while using Hand Breaker

(w) Accident due to external vehicles

(x) Consumer aggression

(y) Poor illumination

(2) Health and Safety Precautions required

(a) Inform to utilities before excavation

(b) Ensure the PPE'S and tools in healthy condition during execution of the job

(c) Barricade the working area by barricading tape with barricading cones at appropriate intervals.

(d) ELCB shall be available for supply protection with insulated crocodile clip.

(e) Follow the OCP

(f) Persons' awareness

13.3. ENVIRONMENT

(1) Details of Environmental impact

(a) Resource Depletion

(b) Air Pollution

(c) Land Contamination

(2) Precautions to minimize Environmental impact

(a) Ensure that all persons working at site are aware about the significant environmental impacts

(b) Providing ear plugs by Contractors in case of engagement for prolonged period.

(c) 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 & 008.

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 Risk

(a) NIL

(2) Mitigation plan for asset related risks- NIL

(a) NIL

14. LIST OF ATTACHMENTS

Sr	Document /Record Description	Reference No.
1)	Permit to Work (PTW)	TPDF02-SAQ02-OCP-005-F02
2)	HV Cell Activity Checklist	TPDF02-DIS01-CHK-001-F05
3)	Deviation format	TPDF02-DIS00-FOR-001

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