




DOCUMENT CONTROL


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Title of Document	STRINGING AND SAGGING IN HT OVERHEAD LINE	
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	OCP - STRINGING AND SAGGING IN HT OVERHEAD LINE	Rev. No. /Dt: 00 / 01.12.2021

Amendment Details:

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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. Stringing and sagging in HT/LT over Head line

2. SCOPE OF DOCUMENT

- 2.1. The scope of this document is to define a structured activity-level flow for Stringing and sagging in HT/LT Over Head line
- 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 Stringing and sagging in HT/LT Over Head Line 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. 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) O&M of Overhead Line components
 - (2) 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. Stores for material issuance
- 8.2. Control Room/NPC for Outage and temporary switching 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. Tool bag
- 9.5. Tools for excavation
- 9.6. Ladder as per site requirement.

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9.7. Chain pulley block as per site requirement.

9.8. Pipe Wrench

9.9. Spanner for twisting joint

9.10. Live line detector

9.11. Telescopic Discharge rod

9.12. Crimping Tools

9.13. Torch if required

10. PERSONAL PROTECTIVE EQUIPMENTS / SAFETY TOOLS

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

10.1. Safety Shoes/Gum boots.

10.2. Safety helmet

10.3. Full Body Harness/Lanyard with double hook instead of Full Body Harness/Lanyard

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: Low

12. PROCEDURE

12.1. JOB PREPARATION.

- (1) Visit the site location for prelims for necessary tools, manpower and material requirement.
- (2) Ensure that the contractor /technician gang has necessary manpower to carry out the job and all the persons to work at site should have valid gate pass issued by HR department, TPL.
- (3) Issue the material & Transfer material and tools to site.
- (4) Main Line Conductor: Various type & size of conductors are being used. Generally, ACSR conductors are being used size of which are as under.
 - (a) ACSR Panther (0.2),
 - (b) ACSR Dog (0.1),
 - (c) AAAC Weasel (0.06)
 - (d) PVC Coated Dog (0.1)

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 any live network and maintain safe clearance and safety while working and if required isolate the same.
- (3) Use all required PPEs during execution of the job.
- (4) Following steps to be followed for working at height.
- (5) Person who has to climb on the pole must use full body harness with lanyard which must be hooked & locked properly on pole at convenient height where the person has to perform the job.
- (6) Ladder is to be erected in safe working condition and its top end is to be tied with pole by means of rope.
- (7) 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 should be strictly avoided.
- (8) All the persons working shall wear helmets.

12.3. ISOLATIONS

- (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) Authorized person issue “Permit to Work” as applicable to competent person after required isolation and local earthing

12.4. WORK PROCEDURE

- (1) Laying Out of Conductor:
 - (a) For paying out of the conductor wooden support should be placed at suitable intervals on the ground, so that the conductor does not get damaged while paying out and should be pulled by keeping the conductor over the wooden support & passing over through snatch pulley block suspended on the poles. The conductor should be pulled with uniform speed and there should be some breaking arrangement for the drum to stop the rotation in emergency. Pulling jerks should be avoided.
 - (b) Where the length of conductor in the drum is not sufficient to cover the entire span from one tension point to next tension point, the conductor should be laid out as far as possible. For remaining spans; the conductor should be laid out from another drum from the next tension point backward. The ends of the two conductors should be joined properly as described below.

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(2) Jointing of Conductor

- (a) The mid span joint can be made by using compression joint or twisted joint sleeves. The compression joint requires 100 tonne hydraulic compressor and hard steel dies of relevant size of ACSR conductor both for steel as well as Aluminium conductor. Compression joints are preferred in case of long span as well as for higher size of conductor. As far as possible mid span joint should be avoided.
- (b) Making joint by means of twisting joint sleeve in overhead line.
 - I. Up to ACSR panther conductor jointing by means twisting joint sleeves is preferable & simple. For this set of twisting spanner is required. The conductor ends are passed through the jointing sleeves from opposite ends, so as to project slightly beyond sleeve ends. Before this operation, ends of conductors are thoroughly cleaned and greased (in habitant compound) up to the length of conductor which will be inside the sleeve. The projected wires are then given sharp bends so that the conductors are held in the sleeves and do not slip out. The two ends of the sleeve are then gripped tightly by twisting spanner and given 4 to 5 turns in anticlockwise direction. Due to this, the two ends of the conductor are intimately joined and will not slip out or separate out when the conductor is in tensioned.

(3) Tensioning, Sagging and Re-sagging of conductor

- (a) Tension:
 - I. After paying out of the conductor & jointing of the same, tensioning work should be taken up. The end of the conductor is tied or clamped properly with the shackle insulator in case of LT OH line & a strain clamp in case of HT OH line. This is than fixed upon the tension pole. After this the conductor is pulled manually at the other tension pole to certain extent, after which the come along clamp is fixed to the conductor at required distance. The other end of the come along clamp is attached to a double sheaved pulley & gradually pulled to a required tension.
- (b) Sagging:
 - I. In order to have adequate ground clearance, the conductor has to be tensioned and sagged as per the design & required ground clearance across the span. The sag of conductor between supports is worked out according to span length for required size of conductor being used. The conductor is being pulled/tensioned till the sag is obtained. An experience lineman/ engineer can judge the proper sag by his eye standing at a distance from the centre of the span. To check the sag two wooden templates are fixed on two supports below the conductor at a distance exactly equal to required sag and in level. Then a person will sight the sag from the next pole. The conductor should be tightened or loosened till the lowest part of conductor is in line sight of the person with two wooden templates. Usually, a conductor is tensioned slightly more than the above to allow for subsequent slight increase in sag due to setting of the conductor. For

correct sagging of the conductor, the tension in each span has to be same. This is achieved by using snatch blocks on intermediate poles which reduce the friction, chances of unequal sag in various spans & chances of damage of conductor strands due to friction.

- II. When sagging is completed, the tension clamp should be fitted without releasing the conductor tension. The conductor is pulled sufficiently to allow the insulator assembly (already fitted on the pole) to be fitted to the clamp. The extra tension may then be released gradually without jerks. Ensure that "W" Pin / "R" Pin is properly inserted in Groove of socket Eye of Disc Insulator to interlock GI Ball shank in the socket eye.

(4) Binding & Jumpering of conductor:

(a) Binding:

- I. After sagging is completed, the conductor on each intermediate support should be removed from snatch blocks & conductor to be placed on the groove of the pin insulator on the pole and fastened to its by means of aluminium binding wires. A good tie should be provided by secure binding between the line conductor & insulator & should wrapped the conductor on both side of the insulator.

(b) Jumpering:

- I. For continuity of the line, the conductors on two sides of the tension on the pole have to be connected. This can be done by keeping extra length of conductor up to 3 to 4 feet beyond the tension clamp. These lengths are either joined in the form of loop by means of required size of PG clamps or crimping by means of required size of Aluminium lugs & then connecting the same by means of bolt, nut & washers. In place of bare wire jumpers, HT XLPE insulated conductors of required size can be used to reduce the flash over due to dropping of any conductive material on the pole (particularly this happens during nesting season)

(5) Stringing and Sagging of Guard wire:

(a) 7/14 Hot dip GI wire is being used as guard wire in HT System.

(b) If new guard wire is to be installed

- I. The guard wire is being laid along the required spans.
- II. Then it is it is being strung from one end by means of binding the same on the base of cross arm at centre where the hole is provided. The conductor is then passing through cross arm mounted on the pole in between. Preferably at every 5th /6th pole same is to be terminated on the pole as per the site location.
- III. The other end of guard wire is being tied with rope.
- IV. Then the rope is passed through pulley anchored on the pole.
- V. The other end of the rope is then pulled through the pulley from

ground.

- VI. While sagging of the guard wire clearance between guard wire & bottom-line conductor shall be maintained across the span. The clearance between the guarding and phase conductor should be checked for adequacy and maintain accordingly throughout the span. The other end of guard wire then is tide on the holes on bottom of cross arm at the centre, which is mounted on the pole.
 - VII. On each pole the guard wire is to be connected with cross arm firmly by bearing the guard wire from both the side.
 - VIII. Earthing connection of all connected fittings to the Guard wire by common earth terminal & same is to be earthed by means of pole earthing.
- (c) If old damage guard wire is to be attended
- I. The damaged wire is to be lowered from one end. The wire is to be tied with rope.
 - II. Then the other end of the rope is to be passed through pulley anchored on the pole.
 - III. The rope is then pulled & guard wire gets loosen.
 - IV. The connection of guard wire is then removed from pole fitting & then rope is being released & guard wire is lowered.
 - V. The damage portion is then checked for its extent of damage.
- (d) If the damaged wire is required to be replaced by new one (If more than three stands are broken, the damage wire is to be removed.)
- I. Cut & remove the damage wire from the damaged span in such a way that remaining portion of guard wire already strung on line can be terminated on the preceding pole from which damage guard wire has been removed.
 - II. Lay new guard wire along the span from which guard wire has been removed.
 - III. Tide the one end of the guard wire on the bottom of cross arm at centre & other end of the same is to be tide with rope.
 - IV. Then the rope is to be passed through pulley anchored on the pole.
 - V. Pull the other end of the rope through pulley & re-sag the guard wire keeping clearance between lowest line conductor & guard wire.
 - VI. Tide the guard wire with binding the same on terminal channel.
 - VII. Give earth connection to it by baring wire by means of binding it with common earth point on pole.
- (e) If the damaged wire is required to be attended by barring the damage portion (If less than three stands are broken, the damage wire can be attended by means of barring the damage portion.)

- I. Bind the damage portion by means of barring the wire using 14 gauge GI wires.
 - II. Then the rope is to be passed through pulley anchored on the pole.
 - III. Pull the other end of the rope through pulley & resag the guard wire. While sagging of the guard wire clearance between guard wire & bottom-line conductor shall be maintained across the span. The clearance between the guarding and phase conductor should be checked for adequacy and maintain accordingly throughout the span. The guard wire is to be connected with cross arm firmly by bearing the guard wire from both the side.
 - IV. Earthing connection of all connected fittings to the Guard wire at common earth terminal & same is to be earthed by means of pole earthing.
- (6) Stringing and Sagging of Aerial Bunch Conductor wherever required:
- (a) The 11/22 kV Aerial Bunch Conductor is to be loaded and transported in a suitable vehicle to the site.
 - (b) The 11/22 kV ABC stringing is to be carried out from one tension point to other and hence the coils of 11/22 kV ABC are unloaded near the tension locations with due care so that conductor and outer insulation are not damaged.
 - (c) Pole Fittings for 11/22 kV ABC Line
 - I. On each Shackle pole following fittings are to be mounted.
 - II. Pole top fittings: Pair of one foot long “C” channel (of size 100mm X 50 mm X 5mm thick) with required hole is to be mounted back-to-back on pole at @ 1 foot below from its top. This for clamping arrangement of tension clamp.
 - (d) Terminal channel Fittings:
 - I. One Pair of terminal channel @ 1575 mm long (of size 100 mm X 50 mm X 5 mm thick) with required holes are to be mounted back to back on the pole at @ 150 mm height from the top of the pole. The above terminal channels are clamped off centred on the pole. This for supporting 11/22 KV jumpers of outdoor termination. The jumper of each phase will be placed & rested in the groove of pin insulator which is mounted on above terminal channel.
 - II. Similar Terminal channel will be mounted on the pole about 1 foot below the pole top fitting. The above terminal channels are clamped off centred on the pole. This is for clamping outdoor termination of 11/22 kV ABC / 11/22 kV Cable on that pole.
 - III. Above two terminal channels are clamped with bracing strips. & bottom terminal channels are then clamped with bracing strips on main pole with clamping the same through stay clamps. Above clamping arrangement using bracing strips is required to ensure that terminal channel will remain in horizontal position even though

vertical load exerted on one side of the channels due to self-weight of outdoor terminations as well as HT jumper clamped on above channels.

- IV. On each suspension pole, following fitting is being mounted.
- V. Pole top fittings: Pair of one foot long “C” channel (of size 100mm X 50 mm X 5mm thick) with required hole is to be mounted back-to-back on pole at @ 1 foot below from its top. This for clamping arrangement of suspension clamp.

(e) Laying Out of 11/22 kV Aerial Bunch Conductor:

- I. For paying out of the 11/22 kV ABC wooden support should be placed at suitable intervals on the ground, so that the 11/22 kV ABC does not get damaged while paying out.
- II. In 11/22 kV ABC line the mid span joint is not recommended. Also, the span length varies from 25 meter to 30 meter & longer span more than 30 meters is not advisable due to more weight of the 11/22kV ABC across the span. It is also recommended to make shackle point at every 5th or 6th pole so that it will be easier to string the line. Also, in future whenever it is required to connect any new distribution S/S or 11/22 kV HT consumer on the same, it would be easier to connect the same by laying 11/22 kV cable up to that nearby shackle pole of the 11/22 kV ABC line & making termination both on 11/22 kV ABC line as well as on the looping cable for proposed distribution s/s or 11/22 kV HT consumer and then making jumper connection.
- III. On each pole, stays are being provided on both sides of the poles along the line. This is to facilitate the pole to remain in plumb position while taking sag of 11/22 kV ABC on each pole during stringing.
- IV. During paying out of the conductor from one shackle pole to another shackle pole, due care is to be taken that PVC tape wrapped overall on the 11/22 kV ABC conductor is not get open.
- V. Also, all three 11/22 kV XLPE insulated conductor are wrapped evenly on messenger wire throughout its length while paying out.
- VI. To take care of PVC non adhesive tape wrapped overall throughout its length, self-locking PVC clips are to be bound at every 1 meter distance throughout its length while paying of 11/22 kV ABC line.
- VII. Tensioning, Sagging and Re-sagging of 11/22 kV Aerial Bunch conductor

(f) Tensioning:

- I. On 1st pole or at cut point the messenger wire is being clamped with required size of tension hardware. The one pulley of double sheave rope pulley assembly is to be anchored on pole top fitting. 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. The tension hardware is anchored in the hook of lower pulley & then rope is being pulled. The lower pulley will

be lifted vertically, and ABC wire also be lifted along with above pulley when the lower pulley comes near to pole top fitting, support the ABC wire on pole & release the tension hardware from the hook of lower pulley & clamp it on the pole top fitting. Release the ABC wire as well as double sheave pulley assembly from above pole.

- II. Go to next subsequent pole. Clamp the double sheave pulley assembly on that pole-on-pole top fitting. The small length of cotton rope is being looped & tied with ABC conductor laid near the pole & the loop of the same is being anchored in the hook of the lower pulley of above double sheave pulley assembly.
- III. Pull the rope of above pulley assembly such that lower pulley will be lifted vertically upward. As ABC wire is also hooked on it, it will be also lifted upward. The conductor is being pulled/tensioned till the sag is obtained. When the ABC wire comes near to pole top fitting, an experienced lineman/ engineer should judge the proper sag by his eye standing at a distance from the centre of the span. The conductor should be tightened or loosened till the proper sag is not been achieved. Usually, a conductor is tensioned slightly more than the above to allow for subsequent slight increase in sag due to setting of the conductor. Earmark the location on messenger wire where the suspension clamps. After clamping suspension clamp on messenger wire anchored the same on pole top fitting with required bolts, nuts & washers.
- IV. Repeat the same on all subsequent suspension poles.
- V. The pole on which 11/22 kV ABC loop is to be made on that pole shackle point is to be made. For that line is to be sagged as described above. The loop of @ 7 to 8 meters in length is being kept for making termination on it in future as & when required as per the system requirement. The mark the location on messenger wire near to the pole & also further to 6 meters from this mark. Cut the messenger wire at above two locations and remove the piece of messenger wire in between above cut points. Clamp the tension hardware on both ends of above messenger wires. Anchor above two tension hardware back-to-back in the holes of pole top fittings.
- VI. The wooden clamps are to be clamped on bottom terminal channel back-to-back. The loop of ABC wire in between is to be given proper "D" shape and same is to be clamped on above wooden clit in the wooden clits suitable. The length of loop of each phase conductor in between above clamping arrangement is supported in the groove of 11/22 kV Pin Insulator mounted on top terminal channel on the pole.

(g) Earthing of ABC Line:

- I. On all poles the messenger wires which are being clamped either through suspension clamp or tension clamp are to be given earth connection through binding wires.
- II. Each shackle pole is to be earthed as per the standard practice.

(h) Preparing 11/22 kV ABC Outdoor termination

- I. 11/22 kV ABC outdoor terminations are being made at shackle point from where the connection is to be given to respective distribution s/s or HT consumer through HT cable. The 11/22 kV ABC outdoor is to be made as per the procedure recommended by the kit supplier. However above termination is to be made at about height of 15 feet on pole, the proper PPEs and tools & tackles are to be used as per the site requirement.
- (i) Clamping of 11/22 kV ABC outdoor Termination on pole.
 - I. On pole where the 11/22 kV ABC terminations are made, the same is required to be clamped properly on that pole. The Wooden clit for 11/22 kV ABC is to be clamped on the bottom terminal channel suitably and the looped of 11/22 kV ABC is to be clamped in above wooden clit near the trifurcation made for above outdoor termination.
 - II. On other side similar clamping arrangement is to be made for clamping outdoor termination other side of ABC termination.
 - III. For any Tee-off connection on above shackle pole can be made by fixing additional terminal channel & clamping outdoor termination of above Tee-off connection on it as described above.
- (j) Making Jumper on 11/22 kV ABC Line.
 - I. 11/22 kV jumpers on 11/22 kV ABC line is being carried out on each shackle pole where the outdoor terminations have been made or where the Tee-off connection is to be made for giving supply to either distribution s/s or HT consumer as per the system requirement.
 - II. For jumper connection for each phase, 11/22 kV 120 sq mm XLPE insulated conductor without any conductive screening & overall PVC sheathed cable is being used. Required length of jumpers for each phase is to be measured and then crimped both ends of jumpers with 120 sq mm double hole aluminium lugs.
 - III. Above jumpers are then being connected with outdoor terminations phase wise. The jumpers are being clamped suitably on pin insulators mounted on top terminal channel such that clearance between phases can be maintained and also it will not exert any tension on the trifurcation point of termination which may results into failure in long term.
- (7) Replacement of OH Conductor:
 - (a) If required, provide stay/ support pole to the pole wherever necessary as per standardised procedure.
 - (b) Dismantling of existing Overhead conductor.
 - I. Loosen the conductor by removing binding from the pins from all poles.
 - II. First lower outer most conductors (i.e., normally R phase & B-phase) to be lowered so that unbalance load will not be exerted on the pole

while dismantling conductor and then middle conductor (normally Y-phase) to be dismantled.

- III. At one end of shackle pole, anchor the two Nos. of double sheave pulley assembly on the pole top fitting (Terminal channel) near to tension hardware fitting for outer most conductor.
- IV. Release the rope in both above pulley assembly such that lower pulley can be anchored in the eye of the come along clamp.
- V. Each outer most conductor is to be gripped in the groove of sliding contacts of come along clamp & eye of which is to be anchored in the hook of lower pulley.
- VI. Pull the loop of rope through this double sheave pulley assembly.
- VII. When they come along clamp come in tension, release the ball shank of disc insulator from the socket eye of tension hardware by removing “W” or “R” pin.
- VIII. Slowly release the rope through the double sheave pulley assembly and lower the conductor.
- IX. Dismantle the conductor from far end shackle pole.
- X. Repeat the same for middle conductor.
- XI. The recovered conductors are to be wind on the empty drum or to be made coil as per the site situation.
- XII. For stringing sagging new conductor on Overhead line, follow the procedure as mentioned above.

(8) Do's and Don'ts during stringing and sagging:

(a) Do's

- I. Use proper equipment for handling aluminium conductor at all times.
- II. Examine the conductor drum before unwinding for presence of any nails etc. which may damage the conductor.
- III. Rotate the drum in correct direction or coil while unwinding the conductor.
- IV. Control the unwinding speed by means of suitable breaking arrangement.
- V. Use wooden support/guard at suitable interval while pulling it over barbed wire fences, rock or similar obstructions.
- VI. Use free running sheaves or blocks for paying the conductor.
- VII. Make all joints with proper tools. Use twisting spanners/ wrenches for twisting joints.
- VIII. Check the adequate clearance between jumper & same may be supported by means of pin insulator.

- IX. Check the adequate ground clearance from lowest conductor.
- X. Check the guard wire is properly strung & having sufficient clearance from each phase conductor & are properly clamped tied at each pole fittings properly.
- XI. In case of XLPE insulated conductors are being used, cradle guarding is to be provided.
- XII. Check the string tools are smooth & have uniform grip.
- XIII. Use proper size of jointing sleeves.
- (b) Don'ts
 - I. Do not handle the conductor without proper tools at any stage.
 - II. Do not pull the conductor without ensuring that there is no obstruction on the ground.
 - III. Do not pull excessive quantity of conductor otherwise it will form kinds & the conductor will get spoiled.
- (c) Before jumpering clean the conductor surface by sandpaper & wire brush & then apply inhibiting tube before crimping the same or connecting the same with PG clamp or by means of binding wires.

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) Remove the barricading and sign board.
- (5) Prior to carryout normalisation clear the "Line Permit". And after cancellation of the same carryout switching for normalisation.
- (6) 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.
- (2) Inform GIS regarding Updation of new/modification in the system with SAP Notification.

13. IMPACT ANALYSIS OF SIGNIFICANT RISKS

13.1. QUALITY MANAGEMENT SYSTEM

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- (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 MANAGEMENT SYSTEM

- (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
 - (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

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- (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 that no authorized person should be work in equipment testing zone
- (b) Ensure that zero potential is there at equipment by using detector
- (c) Ensure use of proper PPEs
- (d) Ensure working area is properly barricaded
- (e) 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) Work as per OCP and checklist
 - (b) 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 *****