

CHANGI AIRPORT

LAYING OF CABLES AT SOUTH

CROSS VEHICULAR BRIDGE

METHOD OF STATEMENT

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method statement for electrical work shall help you understand the requirements before and during the cables and wires pulling process. The document is very helpful for MEP QA/QC engineers to develop the professional electrical method statement for their project.

Below is the list of equipment / Tools required for installation of cables and wires, which can be used for different projects after doing the customization as per the project requirements.

1. Cutting Tools
2. Hydraulic Crimping Tools
3. Manual Crimping Tools
4. Boom Lift
5. Cable Drum Trolleys
6. Cable Spindle & Jacks
7. Measuring Equipment
8. Megger
9. Pulling Wires, Rope, Lubricant (Soap Based, Wax Based)
10. Hand Gloves, Fall Protection & Other Necessary PPE'S.

Process of works:

- Pre-con survey of site.
- Marking on the vehicular bridge to install the Gi Trunking on bridge area (50x50).
- Install the junction boxes on both end of vehicular bridge including mcb and rccb.
- Laying the single phase cable from Junction box to the street light on bridges of both sides including termination only in Junction box.
- Apply for WAH Permit For Using Boom Lift.
- Laying Gi Trunking From DB Box To Both Side Junction Box below the vehicular Bridge (Use Boom Lift).
- Laying the Three Phase Cable form DB Box to Both Sides Junction Boxes (Use Boom Lift).
- Termination of three phase Cable from Junction Box.
- Termination of cable in all the 72 lights present on bridge.



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- Termination of main outgoing from DB BOX.
- Testing & Commissioning of all the works by on the main power from DB and check all lights are working.



Installation Of Wires & Cables

- All materials intended for cables & wires shall be submitted for approval of the consultant as per the standard procedure using the Notification of permanent material received at site. Material samples shall be submitted as required by the consulting engineer for approval.
- The Supervisor will complete the inspection checklist and follow the Inspection & Test Plan detailed in this procedure. The intent of this procedure is to establish a high level of assurance that the end product meets the specification requirements.
- The QA/QC Inspectors should verify the approved procedures are followed and the inspections and testing records are completed.

Training & Qualifications Of Personnel

- All operatives will attend safety induction along with the relevant document copies i.e. valid visa company ID copy, and copy of previous experience and training in the same job which proves his competency.
- Supervisor should closely monitor the activity, if he finds any operative is lagging on safe work competency, he will be sent for re-induction and even retraining if deemed necessary.
- Examine the areas to execute the work and the conditions under which the work will be performed. Identify conditions detrimental or unsafe for the proper and timely completion of the Work. Do not proceed until unsatisfactory or unsafe conditions have been corrected.

Inspection & Storage of Materials

- Submit Notification of Permanent Material Received on Site i.e. Material Inspection Request upon receipt of materials delivery to site. Attach Delivery Receipt, Material Submittal Approval and other documents to show complete compliance with specifications and QA/QC Plan.
- Any material found not as of approved material or with surface damage which is not rectifiable will be set aside. These materials will be labelled and returned to supplier warehouse and a Non-conformance Report will be issued to the supplier by QA/QC superior.
- Store materials in protected dry location off-ground in accordance with

manufacturer's instructions and to protect from mechanical damage or weather effects etc. Extreme care shall be taken while handling the subject materials.

- Lay down area at site to be coordinated with MAIN CONTRACTOR and arrangements to be made for unloading and / or mobilization of materials.
- Prior to commencement of work, the Engineers & Supervisor/Foreman will inspect all materials delivered to work place are checked for with their shipment check list and ensure they are the relevant piece for the site and materials are not damaged, without excessive scratches or visible corrosion.
- Only required materials to be shifted to site and stored temporarily and ensure extra materials are not dumped to site and congest the working area.
 - Once work is completed extra materials and tools to be return back to stores, work area to be kept clean.

Pre-Installation Requirements of Cables and Wires

- Ensure all drawings and electrical method statement are approved and available to the installation team.
- Prior to the installation of cables in any area, cable ladders or any containment system must be inspected and approved. Ensure that the factory test reports for continuity of the cables is provided and reviewed to ensure the fault free installation.
- Check that ladders/trays are free from any sharp edges and have sufficient space for installing the cables.
- Ensure that ladders/trays are provided with purpose made bends to accommodate the minimum bending radius of the cable. This is to ensure that cable is not given undue stress.
- PVC sleeves shall be installed for all cables passing through brick, block or concrete or similar structures in case there is need for future withdrawal.
- Non-ferrous spacer clips for multiple runs and single fixing non-ferrous clips for single runs will be provided for cables fixed directly to the structure.
- Collect and keep ready at site materials such as cable pulling sleeves, tools, rollers and tackles etc.
- Complete a mock-up installation before main works and get its approval.

Method

- Make sure that all conduits and boxes in both ends are free from damages and blockages etc and installation is approved.
- Blockage shall be checked by inserting the draw wire and checking that it reaches to the other end without any disturbance.
- Once the conduit is not blocked the wires shall be pulled using the draw wires while ensuring no damage occurs while pulling.
- Pulling compound or lubricant shall be used for pulling the wires where required.
- Use soap-based pulling compound for short runs i.e. less than 20 meters for semi conductive insulated wires.
- Use wax based pulling compound for the runs greater than 20 meters for semi conductive insulated wires.
- While pulling the wires care should be taken to not insert the pull tension greater than the manufacturer allowed limits.

Cable Pulling & Termination

- Transport and place the cable drums as per drum schedule and at the locations where space is available for working. The cable drum shall be placed on a jack & spindle arrangement to ensure free rotation of the drum. Erect scaffolding where required as per the site requirements.
 - Cable rollers shall be placed under the cable during pulling over longer distances and standoff rollers for acute bends, to ensure that the cable is pulled with minimum effort and the cable outer jacket is free of scouring lines. The cable shall be pulled by using pulling means such as fish tape, rope and basket weave wire/cable grips so as not to damage cable or its containment system, Care will be taken to ensure that the maximum pulling tension of all the cables is not exceeded at anytime.
 - Cable should be free of any static load i.e. to be placed side by side parallel on the cable tray or ladders. Any kind of dead weight on the cable shall be avoided. At all times the cable schedule & section drawings for the relevant area will be referred to ensure proper location of cable on the required ladder and to ensure compliance with project specifications.
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- A pulling compound / lubricant shall be used where necessary as per site conditions

underground conduits etc, the lubricant should not deteriorate the cable insulation. The cables shall be secured to the containment system using approved cable ties for horizontal runs and cable cleats for vertical runs. All control cables will be installed at a minimum distance of 100 mm from power cables unless otherwise agreed with consultant as per conditions.

- Earth (green/yellow) cables shall also be pulled along the power cables. At the time of pulling, mark both power and earth cables for pairing them on both sides of connection i.e. at sending and receiving ends. Before termination complete length and route of the cable shall be inspected by QA/QC engineer, after which a WIR shall be raised for consultant approval. Cable shall be capped and sealed at both ends after installation until termination is done.
- Termination shall be done by using the approved termination materials that include glands, lugs and other accessories part of termination kit, by using proper crimping tools. Matching colour gland sheaths shall be provided. All termination shall be provided with tight fitting covering sleeves.

Insulation Resistance Test

Set the Meggar meter to 1000 volts DC for cables and 500 volts DC for wires. Take reading between phase, phase and neutral, phase and earth neutral and earth. Note that resistance reading must not exceed 2 mega-ohms (MO). Check and record the resistance readings as per specification on pre-approved insulation resistance test forms.

Cables Identification

- Install the tags / labels as per project specifications and as per approved material submittal for Cables and Wires.
- Cables shall be identified at feeders i.e. the sending and receiving ends (outgoing cables in SMDB's and final DB's) about 50mm below the gland.
- Identification labels shall be provided at all positions where cables and wires change direction and each side of the wall or floor slab and where cables are in multiple runs.
- Cores of cables connecting control gear, thermostats, valves etc will also be identified and shall be fitted with identification sleeves bearing the same marking as the terminals of the apparatus to which these are connected.
- For cables at feeders, identification will be done as per specification and approved materials.