

No: SLT16/OCGC/EMP-16/QAQC/GEN/2021/6881

Date:27.07.2021

To,

PMC-2R

Oriental Consultants Global Consortium

(OCG – OCI – NK – NKI – RITES)

Dedicated Freight Corridor Corporation India Limited (DFCCIL)

3rd Floor, Pragati Maidan, Metro Station Building Complex,

New Delhi – 110 001, INDIA.

Kind Attn.: **Mr. Pramod Kumar Aggarwal**

(Dy. Project Director, The Engineer for Employer)

Dear Sir,

Sub : Contract Agreement No. 2015/HQ/EL/Ph-II/EMP-16/8/SOJITZ-L&T dated 31.03.16 for "Design, supply, installation, testing and commissioning of 2X25 kV overhead equipment, traction sub-stations, switching stations, auto transformer stations and SCADA system on design-build lump sum price basis for JNPT-Makarpura(Vadodara) section (approx 422 kms) of Western dedicated freight corridor (phase-2) (contract package EMP-16)" : **EMP16 - Resubmission of Method Statement for Installation of Buried Earth Conductor (BEC).**

Ref :

1. Contract Agreement no. 2015/HQ/EL/Ph-II/EMP-16/8/SOJITZ-L&T dated 31-03-2016 part-2 GS.
2. PMC Letter No - L/OCGC/DFCC/CMT/EMP-16/2005/36523 dated 18.05.2020
3. PMC Letter No - L/OCGC/DFCC/ZMT-2/EMP-16/2106/670 dated 23.06.2021
4. SLT Letter No - SLT16/OCGC/EMP-16/QAQC/GEN/2021/6785 Dated 5.07.2021
5. PMC Letter No – L/OCGC/DFCC/CMT/EMP16/2107/48704 Dated 15.07.2021

With reference to letter under ref (2) & (5), we are resubmitting the method Statement for Installation of Buried Earth Conductor (BEC) with respect to revised GAD of BEC & AEC along both sides of Track with MS Flat and the details as follows.

Sl no	Description	Reference Drawing No	Remark
1	Groove making shall be carried out from Toe end at a horizontal distance of 100 to 200mm and width as required to lay BEC.	5-TP-TD-0373 Rev C	Included in clause no 8 (page no 9 of 18)
2	The BEC shall be Buried at a depth of 300mm at Toe end for open routes and 600mm depth for LC Gate locations.		Included in clause no 8 (page no 9 of 18)
3	Common bonding will be provided at 425 meter interval		Included in clause no 12 (page no 11 of 18)
4	Connections between mast to rail and rail to rail shall be done with 16 mm nut bolt		Included in clause no 12 (page no 11 of 18)

In view of the above, Engineer may kindly arrange to issue NONO to the above Documents

Thanking you and assuring you of our best services all the times,

Yours faithfully,

For Sojitz-L&T Consortium



Ratnesh Kumar Srivastava

(Contractor's Representative, EMP16 Project)

Copy to:

- CGM/ DFCCIL (Mumbai/South),
- CGM/ DFCCIL(Mumbai/North)
- CGM, DFCCIL Vadodara
- ZMT 1, ZMT 2 & ZMT 3



A Sojitz - L&T Consortium



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PMC-2R
 OCG CONSORTIUM

WDFC PHASE-2 JNPT – MAKARPURA (VADODARA) PACKAGE-16 (EMP-16)

METHOD STATEMENT FOR INSTALLATION OF BURIED EARTH CONDUCTOR (BEC)

DOCUMENT NO. DOC/EMP-16/QAQC/GEN/033 REV-2

**CONTRACTOR:**

SOJITZ - L&T CONSORTIUM
 c/o Larsen & Toubro Limited
 Railway SBG, Vatika Mindscapes Building
 Tower 'A', 8th & 9th Floors
 12/3, Delhi – Mathura Road
 Near Sarai Khawaja Metro Station
 Faridabad – 121003, Haryana

CLIENT:

DEDICATED FREIGHT
 CORRIDOR CORPORATION OF
 INDIA LIMITED
 5th Floor, Pragati Maidan
 Metro Station Building
 New Delhi – 110001

CONSULTANT:

ORIENTAL CONSULTANTS
 GLOBAL CONSORTIUM
 3rd Floor, Pragati Maidan
 Metro Station Building Complex,
 New Delhi – 110001

02	27/7/2021	VM		PGK		SKG	
Rev.	Date	Name	Sign	Name	Sign	Name	Sign
Prepared by			Reviewed by			Approved by	

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Revision History

Revision No.	Revision Date	Revision Details		Approved by
		Clause No.	Revision	
00	24.01.2020	-	Initial Submission	
01	11.03.2020	01	The document has been revised as per our response vide letter No. SLT16/DFCCIL/EMP16/QAQC/GEN/2020/4785 DATE: 12.03.2020 against Engineers letter no. L/OCGC/DFCCIL/CMT/EMP-16/2002/34356 DATE: 28.02.2020	
02	27.7.2021	02	The document has been revised and the details as follows 1. Common bonding will be provided at 425 meter interval - included in clause no 12. 2. Connections between mast to rail and rail to rail shall be done with 16 mm nut bolt - included in clause no 12. 3. Groove making shall be carried out from Toe end at a horizontal distance of 100 to 200mm and width as required to lay BEC- Included in clause no 8 4. The BEC shall be Buried at a depth of 300mm at Toe end for open routes and 600mm depth for LC Gate locations.- Included in clause no 8	



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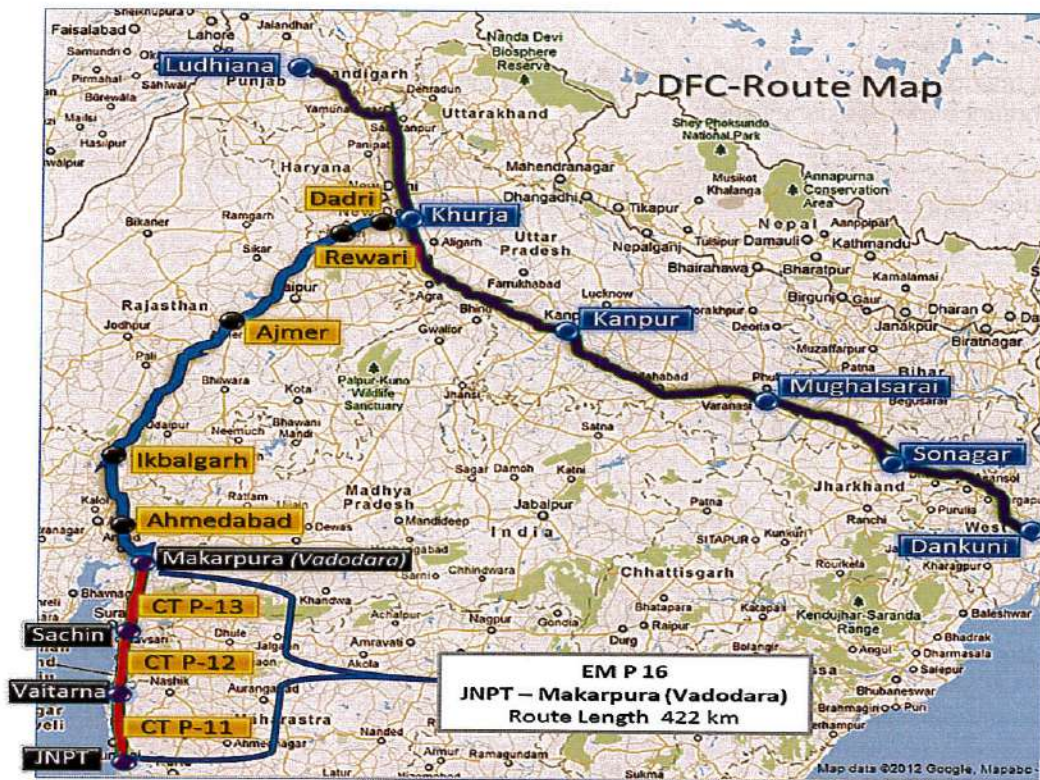
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1. BRIEF DESCRIPTION OF THE PROJECT

Ministry of Railways (MOR), Government of India has planned to construct a High Axle Load dedicated Freight Corridor (DFC) covering about 3325 km on two corridors, known as the Eastern and Western Corridors.

The Western Corridor is planned from Jawaharlal Nehru Portat Nhava Sheva (JNPT), Mumbai to Tughlakabad / Dadri near Delhi. The Western Corridor of DFC Project covers a length of about 1,480 RKM (JNPT – Ahmadabad – Palanpur – Rewari – Asaoti – Dadri). Western Corridor is planned to be implemented in two phases. The first phase envisages construction of about 915 RKM between Makarpura (Vadodara) and Rewari and second phase is of about 565 RKM consisting of Vadodara-JNPT of about 422 RKM and Rewari – Dadri of about 143 RKM. This document deals with Makarpura (Vadodara) – JNPT section of 2nd phase of the Western Corridor only.

Package-16 consists of 422 Kms of double line electrified track with 2x25 kV AC, 50 Hz, and Overhead Catenary System from Vadodara to JNPT running along the existing Indian Railway Tracks. The route is to be constructed, capable of operating at a maximum train speed of 100 km/h with an initial axle load of 25T.



Formation and bridge structure-are to be provided for 32.5T axle load and track structure for 25T axle load. Provisions to raise track and traction structures by 275 mm are considered.



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The proposed alignment between JNPT – Makarpura is located on east side of existing IR. The proposed alignment of DFC is passing generally parallel to the existing IR network between JNPT-Makarpura and taking detours to avoid city congestion. Almost 71% of the proposed DFC alignment passes parallel to the existing IR network and 29% of the alignment passes through detours.

The complete stretch from Makarpura (Vadodara) to JNPT (422 km) has been divided into three sections, viz. Makarpura (Vadodara) to Sachin of about 131 kms, Sachin to Vaitarana about 186 kms and Vaitarana to JNPT of about 102 kms.

Section	TKM	TSS	SWS (SP, SSPs)	Milestone
Makarpura (Vadodara) – Sachin	279	2	14	MS-1
Sachin – Vaitarana	380	3	17	MS-2
Vaitarana – JNPT	237	2	9	MS-3

2. PURPOSE/SCOPE OF WORK :

2.1. Purpose

To establish a method statement for installation of buried earth conductor (BEC) on both site of the UP and DOWN track of JNPT – Makarpura section of EMP-16 project in a good workmanship manner and to ensure that quality and safety requirements of the contract are met.

2.2. Scope of Work

This method statement establishes is only for installation of Buried earth conductor (BEC) in accordance with site conditions

The scope of this method statement is only for installation of Buried Earth Conductor (BEC) and interconnection of OHE mast any other activity related to earthing

3. REFERENCE DOCUMENT:

- 3.1. Project Quality Assurance Plan – DOC/EMP-16/PLNG/OTH/001 Rev. 01
- 3.2. Contract Agreement – Vol. III (Particular specification).
- 3.3. Environmental Social Management Plan.
- 3.4. Method statement for Installation OHE Mast, Erection and Grouting
- 3.5. Approved EHS Management Plan & EHS Work Procedure Plan.

4. ABBREVIATIONS:

List of frequent used abbreviations in this document are tabulated below:

S. No	Abbreviation	Expansion
1.	OHE	Overhead equipment
2.	LOP	Layout Plan
3.	CSD	Cross Sectional Details
4.	RRV	Road cum rail vehicle
5.	BFR	Bogie Flat for Rails
6.	GFC	Good for construction
7.	FBM	Foundation Bending moment
8.	CAPO	Chief accident prevention officer
9.	QA	Quality assurance
10.	QC	Quality control
11.	SAPO	Senior Accident Prevention Officer
12.	IR	Indian Railways
13.	CENO	Chief Environmental officer
14.	SENO	Senior Environmental Officer
15.	SHO	Safety Health officer

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5. ROLES AND RESPONSIBILITIES:**5.1. Project Director:**

- 5.1.1. Overall in charge of execution of project design, planning and execution of work.
- 5.1.2. Responsible for monitoring the entire process of design, construction and execution of foundation, mast erection and grouting works at site with due adherence of safety & quality.

5.2. Head Quality

- 5.2.1. Plan & monitors the overall quality of the work carried out at site. Ensure all required QA/QC infrastructure is well in place, all measuring & testing equipment are duly calibrated.
- 5.2.2. Monitors implementation of all requirements as per contract and project quality assurance plan during the execution of the work.
- 5.2.3. Directs quality personnel in accordance with the site requirement.
- 5.2.4. Analyzing the observations of site recordings and report the same to project director and mitigation of non-conformities if any as per relevant control procedures.

5.3. QC Engineer

- 5.3.1. Identify material sources and conduct materials test and ensure conformity as per relevant ITP.
- 5.3.2. Conduct routine tests on materials & workmanship as per ITP for conformance and maintain records.
- 5.3.3. Ensure that tests are performed as per ITP and values are as per acceptance limit.
- 5.3.4. Maintain the records of all the laboratory tests.
- 5.3.5. Verifying the level of the foundation and displacement from the measurements of the auto level and dial gauge arrangement respectively.

5.4. Package manager:

- 5.4.1. Will be responsible for planning and execution of day to day activities in line with contractual requirements.
- 5.4.2. Will be responsible for ensuring work being carried as per approved method statements and GFC drawings.
- 5.4.3. Will be responsible for monitoring of progress of site activities.
- 5.4.4. Will be responsible for implementing Quality control and quality assurance process and procedures in execution activities in close co-ordination with site quality team.
- 5.4.5. Will be responsible for correcting any defects and deficiencies in the erection activities in accordance with specification/norms and communicating the remedial action with quality control and quality assurance team.
- 5.4.6. Responsible for ensuring safety of man, machine by adhering to all safety norms.

5.5. Section in-charge:

- 5.5.1. Reports to the project manager and co-ordinates with the Engineer for day to day activities.
- 5.5.2. Vests the overall responsibility for construction work and site work activities at section level.
- 5.5.3. Responsible for carrying out work with approved method statement and GFC drawings.
- 5.5.4. Implementation of safety and quality procedures.
- 5.5.5. Documentation of all process related reports as per PQAP requirements, technical specifications and Engineer's instruction.
- 5.5.6. Ensure that all the workmen engaged under him are properly trained & have undergone site SHE induction before assigning any task at construction site.



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5.6. Site engineer:

- 5.6.1. Reports to the section in-charge.
- 5.6.2. Responsible for execution of foundation, mast erection and grouting of mast as described in this method statement and along with QC engineer maintain the construction record.
- 5.6.3. Carrying out work only with approved method statement and GFC drawing.
- 5.6.4. RFI submission as per the system according to the activities planned.
- 5.6.5. Co-ordinates and execute the work related to other agencies like, concrete plant, arranging all construction related material, tools & tackles, curing of foundation etc.
- 5.6.6. Understand and follow the applicable SHE requirements, ensure hazard/ aspect identification and risk/ impact assessment is done for the work.
- 5.6.7. Give pep talk on SHE requirements to the workmen under him.

5.7. SHE Director:

- 5.7.1. Formulate SHE Policy, SHE Plan, SHMoP, ESMP, ESMoP, HIV / AIDS Manual, SHE Objectives & Targets and seek top management approval.
- 5.7.2. Review and approve SHE Plan (Processes, Procedures, Work Instructions, and Programs).
- 5.7.3. Evolves PPEs Guidelines and implement it.
- 5.7.4. Provide guidelines / assistance in implementation of SHE Plan, SHMoP, ESMP, ESMoP, HIV / AIDS Manual, SHE Objectives & Targets.
- 5.7.5. Prepare & review HIRAC (Hazard Identification Risk Assessment and Control) related to various activities.
- 5.7.6. Determines, assesses and report SHE Performance Indicators including compliance with statutory requirements.
- 5.7.7. Routine and surprise SHE Audits & SHE Inspections at work sites and recommended corrective and preventive actions.
- 5.7.8. Prepare Training modules related to various work activities & conduct the awareness training programs among the employees including sub-contractor's employees.
- 5.7.9. Coordinates and interacts with the Employer / Engineer or his representatives and External Agencies on various SHE matters and implementing the same at work sites.
- 5.7.10. Plan & organize SHE events / campaigns for creating SHE awareness among the employees including sub-contractor's employees & workmen.
- 5.7.11. Capacity for building of SHE Team for safe execution of the project.
- 5.7.12. SHE Director acts as Secretary of Project SHE Committee and prepared & submit various SHE reports to the Employer/ Engineer, as per their requirement.
- 5.7.13. Responsible for giving directions and coordinating with execution team for multiple SHE obligatory requirements related various work activities to be implemented & for safe execution at work sites.

5.8. Chief Environmental Officer (CENO):

- 5.8.1. Responsible for implementation of Environmental & Social Management Plan.
- 5.8.2. Conduct Environmental management / HIV AIDS prevention program for Employees / Workers.
- 5.8.3. Prepare and implement 'Environmental Aspect & Impact' register for critical activities of the project.
- 5.8.4. Investigates incidents impacting Environmental and Social aspects of the project and recommends for corrective actions. Participate regularly in Monthly SHE committee meetings.
- 5.8.5. Organize campaigns and awareness program to promote Environmental & Social Management Plan in the project.
- 5.8.6. Day-to-day environmental management, supervision and monitoring of environmental related work activities and authority to stop work activity, if non-compliance is observed.
- 5.8.7. Ensure Environmental legal compliance (If required Environmental consent permission related to Batching Plan, DG set and Bore well from concerned authority/ SPCB /MoEF) and its compliance as and when required.

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- 5.8.8. Conduct Environmental & Social Management audit and inspection. Complying with Employer / Engineer's observations & issues related to various work sites.
- 5.8.9. Conducting training on environmental Aspects and modules as a part of training program.

5.9. Senior Environmental Officer (SEO):

- 5.9.1. Ensure effective implementation of ESMP, ESMoP at site level.
- 5.9.2. Coordinating and monitoring Environmental management at work sites.
- 5.9.3. Conducting work sites Environmental inspections at regular intervals.
- 5.9.4. Complying with Employer and Engineer's observations & issues related to his work sites.
- 5.9.5. Conducting training on environmental Aspects & Impacts and modules as a part of training program.
- 5.9.6. Assisting CENO in preparation of ESMP, ESMoP and other inspection forms.
- 5.9.7. Coordinating with Package managers, site in-charges to make sure that the Environmental Management Plan is being effectively implemented at work sites.
- 5.9.8. Keeping records of site inspections, audit reports and correspondence (related to his site).
- 5.9.9. Submission of all inspection records, monitoring reports to CENO at regular intervals.
- 5.9.10. Participate regularly in Monthly SHE committee meetings.
- 5.9.11. Implementing the corrective & preventive actions for the non-compliance, if observed at sites.
- 5.9.12. Conducting regular meetings with CENO for implementation of Environmental Management Plan and monitoring activities.
- 5.9.13. Conduct Environmental management / HIV AIDS prevention program among the employees / workmen.
- 5.9.14. Prepare and implement 'Environmental Aspect & Impact' register for critical activities of the project.
- 5.9.15. Investigates incidents impacting Environmental and Social aspects of the project and recommends for corrective actions.
- 5.9.16. Organize campaigns and awareness program to promote Environmental & Social Management Plan in the project.
- 5.9.17. Ensure Environmental legal compliance (If required Environmental consent / permission related to Batching Plan, DG set and Bore well from concerned authority / SPCB / MoEF) and its compliance as and when required.
- 5.9.18. Conduct Environmental & Social Management audit and inspection.
- 5.9.19. Keeping record of tree plantation done at work sites.

5.10. In charge plant & machinery

- 5.10.1. Responsible for healthy working conditions of machinery and equipment.
- 5.10.2. Issues fitness certificate for machinery and equipment.
- 5.10.3. Overall management of heavy equipment, plants and vehicles.
- 5.10.4. Ensure mobilization of equipment according to the mobilization plan.

6. RESOURCES, EQUIPMENT & MANPOWER REQUIREMENT:

6.1. Manpower:

- A. Site In charge – 1 No
- B. Site engineer / supervisor -1 No
- C. Safety engineer / supervisor – 1 No
- D. Quality Engineer /Supervisor -1 No
- E. P&M Engineer / Supervisor -1 No (as and when required)
- F. Skilled workers – as per site requirement
- G. Un skilled workers – as per site requirement

Above manpower requirement is indicative. This may change as per the site condition



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6.2. Material:

Materials listed in this section are generalization of all the process involved in the installation of buried earth conductor (BEC)

- A. Buried Earth Conductor size- as per requirement
- B. Straight through joint (to connect ends of two drum length of BEC) - as per requirement.
- C. 'Tee' connector (to take tap –off from BEC to OHE Mast)-as per requirement
- D. Aluminum lugs as per requirement.
- E. MS flat of size mentioned in the approved drawing – length as per requirement
- F. Fasteners (of various sizes) (as per approved drawing)- as per requirement

6.3. Equipment / Tools & Tackles:

- i. Nylon rope (of suitable diameter)- Length as required
- ii. Wire ropes / slings (of required length and sizes) – as per requirement
- iii. Hammer
- iv. Spanner set (ring/double) (of various sizes .
- v. Drum stand -1 no's
- vi. F-15 Crane
- vii. Torque wrench

7. Work Sequence:

The installation of Buried Earth Conductor (BEC) shall be carried out as per following sequence:

1. Groove cutting on formation near Mast.
2. Conductor unwinding , pulling and laying
3. Backfilling after laying of conductor
4. Connection of conductors at interconnection locations
5. Routing of BEC at bridge and culvert locations

8. PROCEDURE FOR GROOVE MARKING:

- Groove making for laying of BEC shall be carried out using manual or mechanized methods as per site condition.
- Prior to commencement of the groove marking and mark the alignment of the BEC laying in accordance with combined service drawing for particular section or as per feasibility of grooving at site.
- Moreover, the groove making equipment into location where grooving is to be commenced.
- Groove making shall be carried out from Toe end at a horizontal distance of 100 to 200mm and width as required to lay BEC.
- The BEC shall be Buried at a depth of 300mm at Toe end for open routes and 600mm depth for LC Gate locations.



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9. CONDUCTOR LAYING:**9.1 Uncoiling of the conductor from the drum**

Uncoiling of BEC conductor shall be carried out through any one of the following methods as per prevailing site conditions:

1. Using manual method
2. Using mechanized method

9.1.1 Uncoiling of BEC using drum stand / (manually):

- Before uncoiling the conductor, ensure that conductor ends is rigidly tied to avoid splitting of the strands.
- Place the drum stand firmly on the ground on one site of the termination. Place the conductor drum on the stand with support of rigid pipe. Ensure that drum on rotating condition. Uncoil the conductor from the drum manually gradually and drag the conductor manually towards the other (one /starting) end of the termination.

9.1.2 Uncoiling of BEC using mechanized method:

- Load the conductor drum at the stand fixed on the road vehicle by duly ensuring the proper positioning of the drum and direction of the drum.
- Commence the uncoiling from one end by fixing the end of the conductor rigidly using peg or any anchor arrangement or on OHE mast.
- Gradually maneuver the vehicle in the opposite direction to uncoiling.

9.2 Laying of Conductor:

- Uncoiled conductor from the drum shall be gradually lowered into the groove.
- Extension of the conductor (after completion of drum length) shall be carried out by using straight through connector as per approved drawing.
- Lowering of the conductor shall be carried out in phases (in length of 10 to 15 meters) to avoid twisting or other damages to the conductor.
- Fasteners of the connectors shall be tightened using torque wrench for required torque. Tightness of the fasteners should be as mentioned in the enclosed ITP. In case of extended tightness, then the specified value required during execution should be used.



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10. BACKFILLING AFTER LAYING OF CONDUCTOR:

- After laying of conductor and completion of required interconnections have been done suitably, groove shall be backfilled.
- Excavated material from the excavated groove shall be used for the backfilling.
- Backfilling shall be done properly and adequately compacted. Water may be used during backfilling for achieving better compaction.
- On the slope formation, backfilling shall be carried out manually and compaction shall be carried out using ramming and water sprinkling. Wherever required, Jhunda grass shall be planted over the compacted soil.

11. LAYING OF BEC AT CULVERT / BRIDGE LOCATIONS

Wherever feasibility of laying BEC is not possible due to hindrance / obstructions like culverts, bridges, and the conductor shall be laid as per following method:

- The conductor shall be diverted onto the bridge or culvert from the groove.
- BEC shall be routed on the top of the toe wall with suitable clamping arrangement.
- The conductor shall run through the bridge or culvert, duly covering the entire length of the structure.
- BEC shall be supported using clamping arrangement on the walls of the cable duct/bridge perimeter wall (wherever provisioned).
- After covering the length of the structure, divert the conductor back into the groove on the other end of the bridge.
- Procedure mentioned in the clause 9.2 of this method statement shall be followed for further installation of BEC.
- Alternatively, wherever length of culvert or bridge is lesser than the interconnection distance (as per approved drawing) and feasibility of groove cutting if possible, laying of BEC shall be carried out as per clause 9.2 of this method statement.

12. CONNECTION OF CONDUCTORS WITH OHE MAST AT INTERCONNECTION LOCATIONS:

- Connection of BEC shall be made through a 'Tee' Joint connector and termination with OHE mast shall be as per approved drawing.
- Common bonding Network (CBN) will be provided at every 425 meter interval, from BEC to mast, first rail to second rail then second rail to mast at other side. Finally, the connection shall be terminated at BEC laid at other end.
- Groove of width as smaller as conductor shall be made on the formation for adequate depth.
- Connections between mast to rail and rail to rail shall be done with 16 mm nut bolt as per approved drawing.
- BEC shall be connected to the mast using aluminum lugs as shown in the approved drawings. Lugging of BEC shall be done by crimping tools.
- Fasteners of the connectors shall be tightened using torque wrench for required torque. Tightness of the fasteners should be as mentioned in the enclosed ITP. In case of extended tightness, then the specified value required during execution should be used.

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13. QUALITY ASSURANCE AND QUALITY CONTROL:**13.1 During Installation of conductors:**

- After completion of laying of conductor, groove should be filled properly and compaction should be carried out as per requirement
- Extension of conductor at the end of the drum length shall be verified.

13.2 After completion of installation of conductors:

Backfilling of the groove verified and found in line with requirement.

14. SAFETY, HEALTH & ENVIRONMENT:

Safe work procedure for installation of Buried earth conductor has been provided as appendix 1

15. ANNEXURES:

1. Inspection and Test Plan - Attached in annexure 1
2. Check list - Attached in annexure 2
3. Construction Organogram - Attached in annexure 3



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Annexure - 1**INSPECTION AND TESTING PLAN – INSTALLTION OF BURIED EARTH CONDUCTOR**

1*	Main Activity	Test	Specification and other reference documents	Acceptable criteria	Inspection by.		Frequency	Verifying documents	Remarks
					SLT-16	Eng's			
1	Requirement during Construction activities								
1.1	Verification of groove making	Physical Verification	Approved Drawing for BEC	1.Alignment should be as per site condition 2.Depth of groove as per approved drawing Conductor should be connected through straight through for extension after completion of drum length as per approved drawing and method statement should be as per approved drawing Fasteners should be tightened for required torque as below :- 1. For M-12 : 32.6 N-m (min) 2. For M-16 : 79.9 N-m (min)	W	W/R	Prior to laying of BEC	RFI, Check list	In case of extended tightness then the specified value required during execution the same shall be used .
1.2	Verification of extension of the conductor						After extension of the conductor		
1.3	Verification of connection of BEC with mast						After completion of interconnection / BEC connection to mast		
1.4	Verification of interconnections (Mast to mast through rails)								
1.5	Verification of tightness of the fasteners						Frequently		
2	Requirement after construction activities								
2.1	Verification of backfilling after laying of conductor	Physical Verification	Method statement	Backfilling shall be adequate	W	W/R	After completion of Backfilling	RFI, Check list	



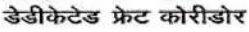

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Annexure – 2



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Format no: WDFC/EMP-16/BEC/01			
			
			
CHECK LIST FOR CABLE TRAY INSTALLATION BURIED EARTH CONDUCTOR (BEC)			
PROJECT	: WDFC PHASE- 2 EMP-16 : JNPT – MAKARPURA (VADODARA)		
EMPLOYER	: DFCCIL		
ENGINEER	: PMC-2R OCG CONSORTIUM		
CONTRACTOR	: SOJITZ - L&T CONSORTIUM		
S.no	Description	Observation YES / NO / NA	Remarks (if any)
A	Requirments During Installation of BEC		
1	Groove making verified and found in line with requirment (as per approved drawing)		
2	Depth of groove making (300 mm)		
3	Extension of condutor carried out using straight through connector wherever drum length completes		
B	Requirment after completion of interconnection of mast		
1	Combined bonding network was made within 425 meter or less connecting both sides of the mast		
2	Connection of BEC with mast carried out using Tee connector		
3	All connection are made as follwoing		
3-A	Mast to nearest rail		
3-B	Inter Rail connection (Rail to Rail)		
3-C	Inter track connection (Rail to rail on the next track)		
3-D	Inter Rail connection (Rail to Rail) (adjacent track)		
3-E	Rail to mast (Adjacent track)		
4	Connection to rail has been made using rail earth clamp		
5	Tightness of fasteners verified and found in line with requirment		
6	Backfilling carried out as per requirment		
Remark:			
SLT		PMC-2R (OCGC)	



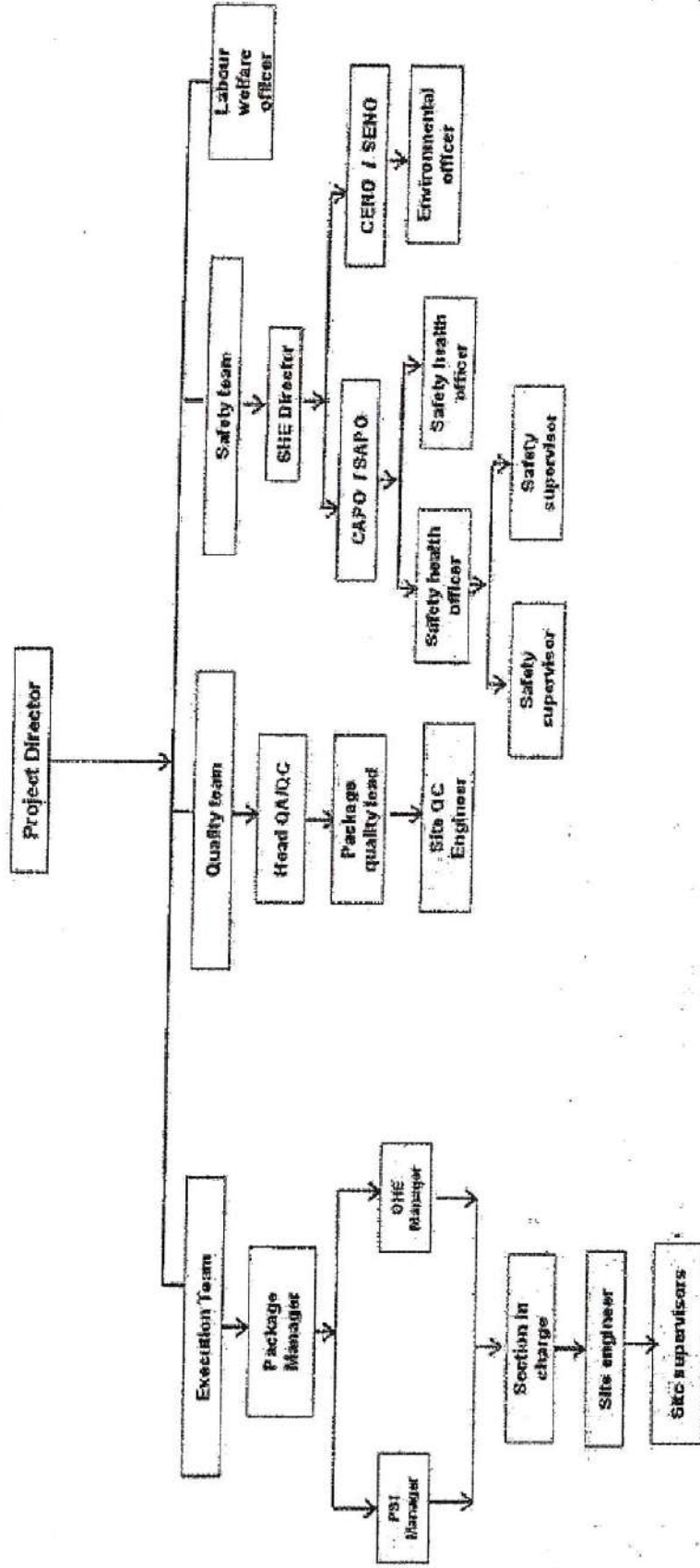
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Typical Construction organogram



Organogram shown here is a typical one
 Actual manpower deployment at as particular site will depend on the type & volume of that specific activity / work.



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Appendix 1



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**SOJITZ-L&T CONSORTIUM
WDFC-PHASE 2-EMP16**

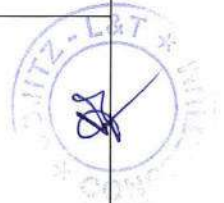
Ref: WDFC/EMP-16/SLT/SHE/33 REV 00

SHE RISK ASSESSMENT

Name of the Project: WDFC, Phase-II, EMP-16 Project
Activity considered: Installation of Buried Earth Conductor (BEC)

Business Unit: RSBU / TFL
Date: 12.3.2020 , Rev 00

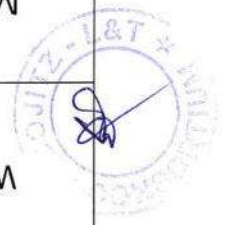
S. No.	Activity	Hazard / Environment Aspect			Existing Control Measures	Probability Rating	Severity Rating	Risk Rating	Additional Control Measures	Residual Risk/Impact	Action By
		Situation /Act	Possible Out come	People at risk							
1	Installation of Buried Earth conductor	New Staff / Supervisor / Workmen without screening / SHE Induction	Minor Injury /LTI	All those involved in work activities.	1. Ensure all Engineers, supervisors; workmen have been given Induction training on Railway Construction Safety. 2. Ensure that all concern Engineers/ Supervisors & deployed agency workers are aware about the site specific risk at the site. 3. Ensure all workmen are	2	2	L	1. Ensure all Engineers, workmen & deployed agency workers are wearing the mandatory PPEs for the purpose. 2. Site engineer / supervisor to Ensure to execute the work as per the Method statement and mitigation of Risk as	L	Site engineer / Admin / SHE Team



					<p>screened & ID cards issued to them.</p>			<p>per the HIRA document. 3. Communicate to workers about the plan of execution and risk involved along with the mitigation.</p>		
<p>2</p>		<p>Working in hot climatic condition.</p>	<p>Minor Injury/Heat stress/cramping</p>	<p>All those involved in work activities.</p>	<ol style="list-style-type: none"> Ensured for sufficient drinking water availability at site for all working group. Ensured dehydration powder readily available at the site. Heat related safety precautions explained to all the working group during toolbox talk. No continuous working in sun for more than 02 hours. Have a break of 30 minutes in between. 	<p>3</p>	<p>3</p>	<ol style="list-style-type: none"> Advise the workmen to drink enough drinking water, if any uneasy felt, report to concerned supervisor. Temporary rest sheds shall be provided to have shed from the sun and avoid resting/ sleeping underneath the vehicle Work shall be carried out with close supervision. 	<p>L</p>	<p>Admin / Site Execution/ SHE Team</p>



3		Working during monsoon / rainy season	Minor / First aid injury/LTI	All those involved in work activities	<ol style="list-style-type: none"> 1. Work activities shall be scheduled for the normal times of the day. 2. Monsoon precautions shall be explained to all the workmen during tool box talk. 3. Access/egress to embankment top shall be made free of slip hazard by using sand etc. 4. Avoid working at the edge of embankment top of the alignment. 	2	2	L	<ol style="list-style-type: none"> 1. Rain coats shall be provided to all workers and supervisors while working in rainy condition. 2. Barricade the worksite with caution tape to avoid the entry of local people. 	L	Admin / Site Execution / SHE Team
4		Working in foggy weather	Minor / First aid injury/LTI	All those involved in work activities	<ol style="list-style-type: none"> 1. Work activities shall be carried out when visibility is at least 1.5 Km. 2. Display warning signages around the site. 3. Working group shall be explained about the risk when weather turns foggy during the work by using yellow blinker lights when weather starts to become foggy. 	3	3	M	<ol style="list-style-type: none"> 1. Ensure that vehicles should be driven at 15 KMPH speed & follow defensive (safe) driving with fog lamp on. 2. Ensured that no person is loitering here and there. 3. All working at site shall use PPE. 	L	Site Execution / SHE Team



5		Under the influence of Alcohol or abused drugs at work site	Major Injury/LTI	All those involved in work activities	No person is allowed entering to the work site under the influence of alcohol or abused drugs.	2	3	M	<p>1. Specific awareness shall be provided to all employees about using alcohol / drugs and coming to site under the influence of same.</p> <p>2. Physically Examine all workers and suspected person shall be tested with breath analyzer for confirming.</p>	L	Site execution & SHE team
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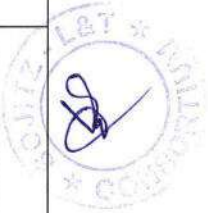
6	Working on DFCC alignment near to operational IR track.	Hit by moving train passing on IR (WR/CR) track	Single or Multiple injury/ Fatality	All those involved in work activities	<p>1. If the work is carried out within 3.5 meter from the centre of IR Track, Take traffic block and Power Block from the IR control room through DFCC officials.</p> <p>2. Hard barricading shall be erected at 3.5 meter from IR track when working between 3.5 meter – 06 meter from the IR Track.</p> <p>3. When working beyond 6 meter from the IR track, A lime marking with 150 mm width shall be marked along the alignment as demarcation line for the workers not to cross the same and soft barricading done.</p>	3	5	H	<p>1. Awareness shall be provided to all working group for Railway safety.</p> <p>2. No person should go near to IR track for any reason without proper permit / supervision.</p> <p>3. Barricading shall be inspected on regular basis.</p> <p>4. Works should be carried out with close supervision.</p> <p>5. No night work shall be done.</p> <p>6. Use hand gloves for marking line with lime.</p>	M	Site execution & SHE team
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7	Hit by Construction Machinery / RRV on DFCC track	Single or Multiple injury/Fatality	All those involved in work activities	<p>1. Work permit to work shall be obtained from the traffic controller of CTP/11, 12 &13 civil contractor (As per the scenario) using track mounted vehicle for the work on DFCC alignment.</p> <p>2. Make Proper possession area with work area and depute flag men at both the end of possession area with Red & green flag and place red banner flags. To warn the working staff for the incoming rail vehicle.</p> <p>3. Distance between work site to possession area boundary shall be 50 meters.</p>	3	5	H	<p>1. Training on Railway safety shall be given to all staff, operators & drivers of track vehicles deployed for the work and Competency card shall be issued.</p> <p>2. Job-specific training shall be imparted to the entire working group.</p> <p>3. Safety precautions related to the work activity should be discussed through TBT on daily basis before start of work activity.</p> <p>4. No supervision no work.</p>	M	Site execution & SHE team
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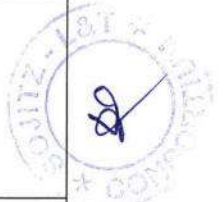
8	Marking for Excavation	Slip / Trip / Fall of person	Minor / First aid injury	Deputed Staff & Workmen	<p>1. Warm the workers deputed for marking line with lime at the edge of formation about the risk of slipping and falling due to loose soil.</p> <p>2. No supervision no work.</p> <p>3. Use plastic hand gloves for touching the lime materials for line marking.</p>	2	3	M	<p>1. Ensure the work path cleared from all obstructions & pits, etc.</p> <p>2. Housekeeping inspection shall be carried out site through checklists.</p> <p>3. Housekeeping shall be supervised by site supervisor.</p>	L	Site execution supervisor & SHE supervisor.
9	Mechanical / Manual near to edge of formation (Both side)	No Safe worthiness certificate available for vehicle/eq uipment.	Major / Lost Time Injury	Operator, Nearby staff and workmen	<p>1. Ensuring testing of the equipment by a competent person and availability of valid Test certificate.</p>	2	3	M	<p>1.Pre inspection of all P&M equipment shall be carried out through checklist before the deployment at the respective site.</p> <p>2. SHE Team to ensure.</p>	L	P&M, Site execution & SHE team
10	300 mm Earth Excavation through	Selection of suitable equipment for excavation	Major / Lost Time Injury	Staff, Operator & Workmen	<p>1. Selection of equipment according to the soil and required excavation depth of 300 mm.</p> <p>2. Work is not carried out until permitted by site SHE and P&M team.</p>	2	3	M	<p>1. Work shall be done under supervision.</p> <p>2. Safety instructions shall be communicated through Tool box talk (TBT) on daily basis.</p>	L	P&M, Site execution & SHE team



11		Tilting / Toppling of Construction Machinery / Vehicles / Equipment	Major Injury / Lost Time Injury/Fatality	Staff, Operator & Workmen	<p>1. Construction Machinery / Vehicles placed on a level & compacted surface.</p> <p>2. All out riggers shall be extended fully and base plate placed on sole plate.</p> <p>3. Work activity shall be carried out with close supervision as per Method statement & Safe work procedures</p>	3	4	M	<p>1. Permit to work system (Excavation) shall be followed before starting of work.</p> <p>2. A competent operator shall be deputed for soil excavation of 300 mm depth along the edge of formation.</p> <p>3. Housekeeping inspection shall be carried through checklists.</p>	L	Site execution & SHE team
12		Incompetent & unfit operator	Major / Lost Time Injury	Staff & Workmen	<p>1. Ensure the selected operator is competent, physically fit.</p> <p>2. No unauthorized person to operate the equipment.</p> <p>3. Ensure driver/ operator for having driving license & competency certificate issued by P&M head.</p>	2	4	M	<p>1. All operating levers shall be in locked in position to prevent unauthorized operation.</p> <p>2. Ensure operating key shall be kept with competent operator only.</p>	L	P&M, Site SHE team



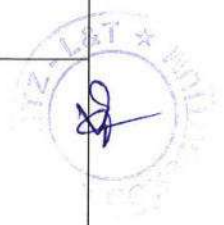
13		Nearby live HT overhead electrical lines	Major Injury/Electrocutions/electric shock/fire	Operator, Nearby staff & Workmen	<p>1. Not allowing operation within 6 m of any overhead lines.</p> <p>2. Electrical work permit with isolation of power supply shall be taken from the utility owner before starting of operation near or under overhead HT line.</p> <p>3. Work to be carried out, as per Method Statement and Safe work procedure under supervision of SHE Electrical engineer.</p>	3	5	H	<p>1. Follow LOTO System to be complied before starting of operation.</p> <p>2. Site Specific OJT training shall be imparted to site personnel & workmen through TBT.</p> <p>3. Safety instructions shall be communicated through TBT.</p> <p>4. Work shall be carried out under close supervision only.</p>	M	Site execution & SHE Electrical engineer
15		Handling of Sharp tools	Minor / First aid injury	Staff, Operator & Workmen	<p>1. Ensuring suitable PPE used by operator/others.</p> <p>2. Power tools and other hand tools being used are in good working condition and safety devices are not by passed / removed.</p> <p>3. Ensured that all rotating / moving parts are guarded adequately.</p>	2	2	L	<p>1. Operator deputed to handle the tools must conversant in use of same.</p> <p>2. Ensure physical inspection of all tools and tackles by P&M staff on daily basis before starting of job.</p> <p>3. P&M staff to Put green tag on it.</p>	L	Site execution supervisor, PM staff & SHE team



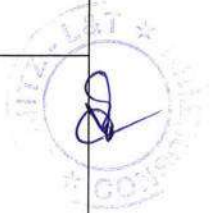
16	Mechanical / Manual Earth Excavation / Back filling	Operating at the edge of embankment formation	Minor Injury/LTI	Staff, Operator & Workmen	<p>1. The soil condition checked before taking the equipment near to the edge of embankment formation for the excavation and soil filling operation.</p> <p>2. Work carried out with close supervision.</p>	3	3	M	<p>1. Ensure that site is barricading at safe distance for equipment operation</p> <p>2. Instructions (TBT) are passed towards the Safety instructions towards the stability of equipment while operating near the edge of formation.</p> <p>3. Ensure no other vehicles are allowed to move at the edge of the embankment formation.</p>	L	Site execution supervisor & SHE team
17	Loading & Unloading of Conductor drums	Non-availability of TPI test certificate of crane	Major / Lost Time Injury	Staff & Workmen	<p>1. Ensuring TPI test certificate of the crane by a competent person and availability of the same with equipment.</p>	1	3	L	<p>Pre and Post inspection of crane should be carried through checklists.</p>	L	Site execution, P&M & Safety team



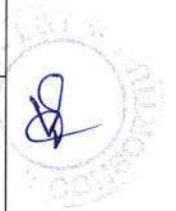
18		Incompetent Crane operator & signalman	Major / Lost Time Injury	Operator, staff & workmen	<p>1. Ensured the selected persons are competent and physically fit to undertake the assigned task.</p> <p>2. Ensured that driver/operator having valid driving license.</p> <p>3. Ensuring banks man / signalman are trained / competent.</p>	3	3	M	<p>1. Operator / Signalman shall have undergone Pre employment Medical check & Screening.</p> <p>2. Ensure issue of ID card to the Operator / Signalman after SHE induction to them.</p> <p>3. Driver shall be briefed for Operational Safety</p> <p>4. No one Other than competent driver shall operate and drive the crane.</p> <p>5. At any case operating key should not be left in crane but shall be with operator.</p> <p>6. After checking on site, PM shall issue authorization Certificate to Operators of the Crane.</p>	L	P&M, Site execution & Safety team
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19		Selection of suitable equipment for lifting activity	Major / Lost Time Injury	Operator, staff & workmen	Operator, staff & workmen	<p>1. Selection of equipment done according to the load to be lifted.</p> <p>2. Work is not carried out until the inspection done by site SHE and P&M team.</p>	3	3	M	<p>1. Work shall be carried out with close supervision.</p> <p>2. Safety instructions shall be conveyed through Tool box talk (TBT) to all.</p> <p>3. Ensure suitable fire extinguisher should be available with crane.</p>	L	P&M, Site execution & Safety team
22		certificates for lifting tools / tackles Not	Major / Lost Time Injury	Operator, staff & workmen	Operator, staff & workmen	Ensuring to have TPI test certificate of the lifting tools & tackles by a competent person.	2	3	M	Pre and post inspection of lifting tools & tackles should be carried through checklists.	L	Site execution & Safety team
21		Tilting / Toppling of Crane	Major / Lost Time Injury	Operator, staff & workmen	Operator, staff & workmen	<p>1. Permit to work system followed before lifting operation at work site.</p> <p>2. Selecting the crane according to the load.</p> <p>3. Crane placed in a leveled ground.</p> <p>4. Work area is cleared of any obstructions.</p>	3	4	M	<p>1. Fully extended the out riggers & place wooden blocks be placed underneath the out riggers base plate.</p> <p>2. Trained operator and rigger shall be deputed for the work..</p> <p>3. Housekeeping inspection shall be done as per checklists.</p>	L	P&M, Site execution & Safety team



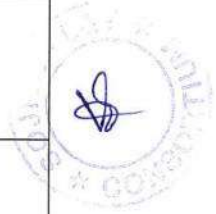
22	Loading & Unloading of Conductor drums	Nearby live overhead electrical lines	Major Injury/ Fatality	Operator, staff & workmen	<p>1. Not allowing operation within 6m radius of any overhead lines.</p> <p>2. Proper Electrical shut down permit taken before starting of work activity near to any live electrical lines.</p> <p>3. Work carried out as per Method Statement and Safe operating procedures.</p>	4	5	H	<p>4. Swinging area shall be barricaded.</p> <p>1. Adequate Safety measures (e.g.: LOTO System) to be complied before starting of operation.</p> <p>2. After taking permit, all overhead lines should be earthed through discharge rods.</p> <p>3. Specific training shall be provided to all site personal and workmen.</p> <p>3. Safety instructions shall be conveyed through TBT.</p>	M	Site execution & Safety team & SHE Electrical engineer
23	Hit by object (Conductor drum)	Major / Lost Time Injury	Staff & workmen	No person allowed near the object (Conductor Drum)	<p>1. Tag line shall be used control the drum movement from a safe distance</p> <p>2. Working areas shall be barricaded adequately.</p>	3	4	M	<p>1. Tag line shall be used control the drum movement from a safe distance</p> <p>2. Working areas shall be barricaded adequately.</p>	L	Site execution & Safety team



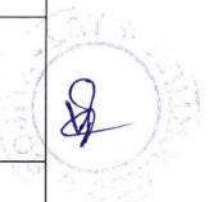
24	Hit by vehicle (Crane)	Major Injury	Staff & workmen	<p>1. No person allowed to work or stand in the path of crane movement.</p> <p>2. Work carried with close supervision.</p>	<p>3</p> <p>4</p>	M	<p>1. Barricading shall be done of crane movement area to prevent any person to come in the pathway.</p> <p>2. Pre and post checking of crane shall be done as per the checklists.</p> <p>3. Ensure reverse horn is working of crane.</p>	L	Site execution & Safety team
25	Fall of object (Conductor drum)	Major Injury	Staff & workmen	<p>1. Damaged slings or wire ropes were not used for lifting.</p> <p>2. No persons shall be allowed to stand or work near the load while lifting operation being carried out.</p> <p>3. Nobody shall stand underneath the suspended load of conductor drum.</p>	<p>3</p> <p>4</p>	M	<p>1. Periodic inspection & maintenance of crane shall be carried out to detect any damage in pendant / hoist rope.</p> <p>2. Working area should be barricaded to prevent access of any person to close to suspended load during lifting work by crane.</p> <p>3. Periodic inspection shall be carried out on Wire ropes and Web</p>	L	Site execution & Safety team



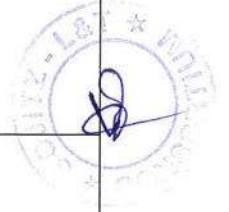
26	Laying of BEC (Manual / Mechanical), Installation of MS flat (bonds) & Fasteners	Selection of suitable gear for conductor rolling (Jack set, drum stand, winch)	Major / Lost Time Injury	Staff & workmen	1. Selection of gear shall be done according to the load, size of the conductor drum and physical site conditions. 2. Work is not carried out until the inspection done by site SHE and P&M team.	3	3	M	slings to detect damage and also ensure Quarterly Color coding of lifting tools and tackles.	
27		Non-availability of TPI test certificates for gears	Major / Lost Time Injury	Staff & workmen	Ensuring TPI test carried out for the gears by a competent person and availability of the certificate at the worksite.	2	3	M	1. Pre and post inspection of lifting tools & tackles shall be carried out through checklists. 2. Quarterly color coding should be followed after the inspection to check if the gears are safe / unsafe for use.	Site execution & Safety team



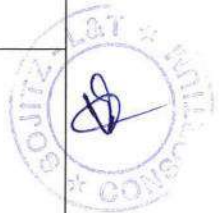
28	Manual pulling of conductor	Minor / First aid injury	Workmen	<p>1. Risk associated for cable pulling shall be explained & Ergonomics issues shall be explained for mitigation through TBT to workers.</p> <p>2. Good manual handling techniques shall be discussed and suggested to the working group.</p> <p>3. Works carried out with close supervision.</p>	2	3	M	<p>1. Ensure break time of 15 minutes after every 01 hours of work to all workers.</p> <p>2. Wherever possible adopt team handling / Mechanical aids for pulling / laying purposes.</p>	L	Site execution & SHE team
29	Slip / Trip / Fall at same level	Minor / First aid injury	Staff & Workmen	<p>1. Ensured tidy housekeeping done daily at all working platforms before starting of works.</p> <p>2. Housekeeping inspection carried out regularly.</p>	2	2	L	<p>1. Safety instructions shall be provided to all through Toolbox Talk.</p> <p>2. Housekeeping of the working area have to be checked time to time</p>	L	Site execution & SHE team
30	Contact with Sharp materials	Minor / First aid injury	Workmen	Ensuring suitable PPEs used by all workmen including hand gloves.	2	2	L	<p>1. Brief all workers for safety for the activities</p> <p>2. Ensure physical inspection of all tools and tackles daily before starting of job.</p>	L	Site execution & SHE team



31	Laying of BEC (Manual / Mechanical), Installation of MS flat (bonds) & Fasteners	Over speeding of RRV	Major / Lost Time Injury	Staff & Workmen	<p>1. Speed of the RRV is limited to 05 kmph.</p> <p>2. Works carried out with close supervision.</p>	2	3	M	<p>1. Ensure trained signal man deployed at site for signaling to RRV during conductor uncoiling / laying.</p> <p>2. Job-specific training should be imparted to the working group.</p> <p>3. Working group shall be trained about the Hazards and control measures</p>	L	P&M, Site execution & SHE team
32		Handling of MS flat	Minor / First aid injury/ LTI	Workmen	<p>1. Good manual handling procedure shall be discussed and suggested to the working group.</p> <p>2. Works carried out with close supervision.</p>	2	3	M	<p>1. Ensure that all workers had rested properly in the past night.</p> <p>2. Wherever possible adopt team handling / Mechanical aids for pulling / laying purposes.</p> <p>3. Cut-resistant hand gloves shall be provided to workers for handling sharp materials.</p>	L	Site execution & SHE team



33	Smoke of Machine /Vehicles	Localized Effect	Operator, Nearby staff and workmen / Surrounding community (Air Pollution)	Valid PUC certificate available.	2	3	L	Ensure periodic maintenance of Engine, air filters for less smoke.	L	P&M, Site SHE team
34	Noise	Minor Effect of tinnitus /headaque	Operator, Nearby staff and workmen / surrounding community (Noise Pollution)	Exhaust Muffler shall be provided in equipment, vehicles and P&M to control noise.	4	3	M	1. Periodic rest shall be provided to workers, who are continuously exposed to noise. 2. P&M shall ensure regular maintenance of equipment for producing less noise.	L	P&M, Site SHE team
35	Dust	Minor Effect	Operator, staff and workmen / Surrounding community (Air Pollution)	1. Water sprinkling system shall be deployed & implemented to the control the dust at worksites. 2. Provide nose mask to workers	4	2	M	1. Periodical sprinkling at site to subside the dust. 2. Proper PPE's ie. Dust mask to be used during excavation works.	L	Site SHE team



36	Fire in Equipment	Major Effect/ LTI	Operator, staff and workmen / Nearby property	<p>1. No flammable materials allowed to keep within 20 feet of construction equipment.</p> <p>2. Ensure that battery terminal lugs are tightened firmly, no loose battery connection.</p> <p>3. Fire extinguisher shall be provided at work site.</p>	2	4	M	L	<p>1. SHE electrical engineer to ensure that battery connection are firm.</p> <p>2. Periodic inspection & monitoring is to be carried out by P&M staff</p> <p>3. Ensure there is no fuel leakage in the equipment.</p>	P&M, Site execution & SHE team/SHE electrical engineer
37	Leakage of Oil / Fuel	Localized Effect	Surrounding community (Land Contamination)	<p>Ensure for no leakages of fuel/oil from the construction equipment on daily basis.</p>	2	3	L	L	<p>1. Periodic maintenance and daily Inspection of equipment, vehicles and P&M shall be ensured by P&M staff.</p> <p>3. Provision of oil spillage kit for avoiding the oil spillage.</p>	P&M, Site SHE team



38	<p>Environmental Aspect / Impact for Construction of Earthing system & Return Current Installations at PSI Locations</p>	<p>Leakage of battery acid</p>	<p>Skin burn</p>	<p>Technician / Workmen</p>	<p>1. Following Safe handling method, while transporting the batteries. 2. Ensure that vent plugs are fully closed and tightened</p>	<p>2 2</p>	<p>2 L</p>	<p>1. Specific training shall be provided to all employees. 2. Periodic maintenance and inspection of the batteries. 3. Baking soda/ Lime and water shall be used for neutralizing the impact of battery's Acid</p>	<p>L</p>	<p>P&M, Site SHE team</p>
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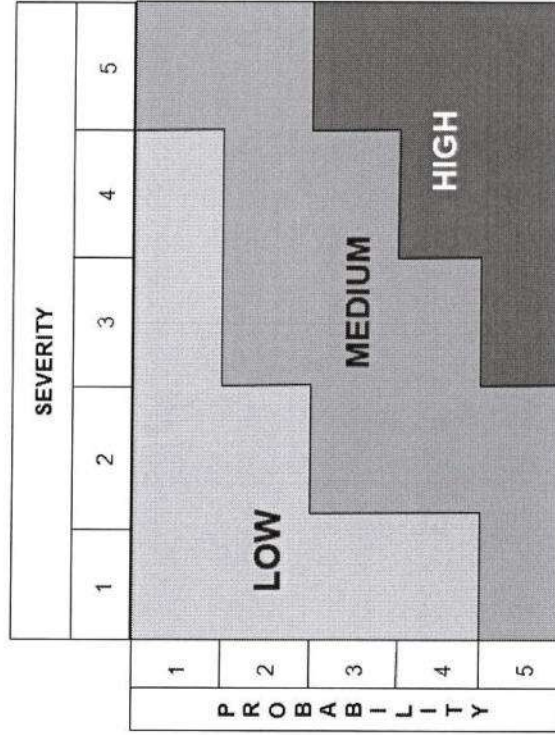


Probability Descriptions (The highest category will always be used)		
VALUE	Status	Description
5	Very much likely	Happens several times per year in a construction site.
4	Most Likely	Happens several times per year in our IC.
3	Likely	Incident occurred in our IC.
2	Unlikely	Known to occur in other ICs & construction industry.
1	Most Unlikely	Never heard of in construction industry.

Severity Descriptions (The highest category shall always be used)			
VALUE	Result of Hazard to Personnel		Severity of the Environmental impact
	Safety	Health	
5	Single or multiple Fatality	Terminal illness	Massive effect
4	Serious Injury requiring hospitalisation	Unemployable due to illness	Major effect
3	Lost Time Injury	Intense health effect	Localized effect
2	Injury requiring Medical Treatment but not Lost Time	Minor health effect	Minor effect
1	First Aid treatment only	Slight health effect	Slight effect



Matrix for Risk Assessment



The End of Document

