	Architectural works.	**IV. False Ceiling, False flooring,** - 10% on issuance of sub-order and submission of equivalent bank guarantee valid till receipt and acceptance of material at site plus 03 Months claim period - 60% on receipt of material at site - 25% on Installation in position and acceptance - 05% on completion of all works in all respects and issuance of completion certificate. **V. Fire Proof Partition/ Aluminum Partition/ Gypsum Partition/ Toughened Glass Partition** - 10% on issuance of sub-order and submission of equivalent bank guarantee valid till receipt and acceptance of material at site plus 03 Months claim period - 60% on receipt and acceptance of material at site - 25% on Installation in position and acceptance - 05% on completion of all works in all respects and issuance of completion certificate. **VI. Cladding/ Facades etc.** - 05 % on submission & approval of design & drawings - 10% on issuance of sub-order & submission of equivalent bank guarantee valid till receipt and acceptance of material at site plus 03 Months claim period - 60% on receipt and acceptance of material at site - 20% on Fixing/ Installation and acceptance - 05% on completion of all works in all respects and issuance of completion certificate **VII. Modular Furniture** - 10 % on approval of furniture drawings at least in Code II - 60% on receipt of material at site - 25% on Fixing/ Installation and acceptance - 05% on completion of all works in all respects and issuance of completion certificate. **VIII. Internal & External Paint of Building.** - 10% on application of putty/ primer /surface preparation etc. - 45 % (##) on Primer& intermediate coats. - 40% on Final coat. - 05% on completion of all works in all respects and issuance of completion certificate. **(##) Further break up of payment schedule, if necessary, shall be recommended/ approved by Engineer-in-charge.**

	Architectural works.	**IX. Waterproofing cum Over Deck Roof Insulation Works.** - 10% on surface preparation and application of primer. - 50% on intermediate coats / layers. - 35% on Final layer, testing etc. - 05% on completion of all works in all respects and issuance of completion certificate **X. Composite items of Partition works made with Glass Partition & Gypsum Partition.** - 5% on approval of Shop Drawings - 35% on receipt and acceptance of material at site - 55% on Installation and acceptance. - 05% on completion of all works in all respects and issuance of completion certificate. **XI. Composite items of Acoustical Wall Paneling with fabric wrapped, Green Wall.** - 5% on approval of Shop Drawings - 35% on receipt and acceptance of material at site - 55% on Installation and acceptance - 05% on completion of all works in all respects and issuance of completion The above payment terms will be applicable for similar items in miscellaneous items. the decision of engineer-in-charge on identification of similar items shall be binding on the contractor.
2.10	**Platform, Ladder**	**I. In case of Contractor supplied material.** a. FABRICATION AT SITE - 50% on receipt and acceptance of material at site. - 30% on fabrication, surface preparation and application of primer. - 15% on erection, aligning and welding. - 05% on completion of all works in all respects and issuance of completion - certificate. b. FABRICATION AT YARD OUTSIDE PROJECT PREMISES / VENDOR'S SHOP. - 50% on receipt and acceptance of material at contractor fabrication yard outside the Project premises against Rolling Bank Guarantee for an equivalent amount of materials at contractor shop with validity till receipt of materials at Project premises plus 03 Months claim period. - 30% on fabrication, surface preparation and application of primer and receipt of fabricated material at site. - 15% on erection, alignment, welding etc. - 05% on completion of all works in all respects and issuance of completion certificate.

		II. At issue rates (Chargeable basis) - 80% on transportation of material from storage yard / stores points to fabrication yard, fabrication, surface preparation and application of primer coat. - 15% on erection, alignment, welding etc. - 05% on completion of all works in all respects and issuance of completion certificate. **III. Free Issue** - 65% on transportation from storage yard / stores points to fabrication yard, fabrication, surface preparation and application of primer coat. - 30% on erection, alignment, welding etc. 05% on completion of all works in all respects and issuance of completion certificate.
2.11	**Hand Railing**	**I. In case of Contractor supplied material.** a. FABRICATION AT SITE - 50% on receipt and acceptance of material at site. - 20% on fabrication, surface preparation and application of primer and galvanizing (if applicable) - 15% on erection, aligning and welding. - 10% after completion of completion of final painting. - 05% on completion of all works in all respects and issuance of completion certificate. **II. At issue rates (Chargeable basis)** - 70% on transportation of material from storage yard / stores points to fabrication yard, fabrication, surface preparation and application of primer coat ,galvanizing and painting (if applicable) - 15% on erection, alignment, welding etc. - 10% after completion of completion of final painting. - 05% on completion of all works in all respects and issuance of completion certificate. **III. Free Issue** - 65% on transportation from storage yard / stores points to fabrication yard, fabrication, surface preparation and application of primer coat galvanizing and painting (if applicable) - 15% on erection, alignment, welding etc. - 15% after completion of completion of final painting. - 05% on completion of all works in all respects and issuance of completion certificate.

	Hand Railing	**IV. Contractor supplied handrail (Handrail Fabricated outside refinery with raw material).** - 10% on issuance of sub-order and submission of equivalent bank guarantee valid till receipt and acceptance of material at site plus 03 Months claim period. - 40% on receipt and acceptance of raw material at contractor fabrication yard outside the Project premises against Rolling Bank Guarantee for an equivalent amount of materials at contractor's shop with a validity till receipt of materials at Project premises plus 03 Months claim period. - 30% on receipt and acceptance of finished handrail at site. - 15% on erection, aligning, welding and completion of final painting or touchup as applicable. - 05% on completion of all works in all respects and issuance of completion certificate. **V. Contractor supplied pre-fabricated handrail (Handrail in final condition ordered on sub-vendor).** - 10% on issuance of sub-order and submission of equivalent bank guarantee valid till receipt and acceptance of material at site plus 03 Months claim period. - 70 % on receipt and acceptance of finished handrail at site. - 15 % on erection, aligning, welding and completion of final painting or touchup as applicable. - 05% on completion of all works in all respects and issuance of completion certificate.
2.12	**Gratings**	**I. Contractor supplied gratings (Grating Fabricated outside refinery with raw material).** - 10% on issuance of sub-order and submission of equivalent bank guarantee valid till receipt and acceptance of material at site plus 03 Months claim period. - 40% on receipt and acceptance of raw material at contractor fabrication yard outside the Project premises against Rolling Bank Guarantee for an equivalent amount of materials at contractor's shop/ yard with validity till receipt of materials at Project premises plus 03 Months claim period. - 30% on receipt and acceptance of finished gratings at site. - 15% on erection, aligning, welding and completion of final painting or touchup as applicable. - 05% on completion of all works in all respects and issuance of completion certificate. **II. Contractor supplied gratings (Grating in final condition ordered on sub-vendor)** - 10% on issuance of sub-order and submission of equivalent bank guarantee valid till receipt and acceptance of material at site plus 03 Months claim period. - 70 %on receipt and acceptance of finished gratings at site.

		- 15 %on erection, aligning, welding and completion of final painting or touchup as applicable. - 05% on completion of all works in all respects and issuance of completion certificate.
2.13	**Other Civil, Structural & Architectural works**	- 95% (##) on completion of work as certified in monthly progress bill. - 05% on completion of all works in all respects and issuance of completion certificate. **(##) Further break up of payment schedule, if necessary, shall be recommended/ approved by Engineer-in-charge.**
3.	MECHANICAL WORKS	
3.1	**Above Ground Piping Works** **(Pipes& *Pipe Components*, Valves, Orifice plates - Free issue)**	a. **Fabrication & Erection of Piping** - 45% after fabrication including NDT, as applicable. - 30% after site erection, field welding, radiographic and other examination. - 10% after providing supports, alignment, providing vents, drains. - 08% after flushing, testing, draining and drying. - 02% after mechanical completion. - 05% on completion of all works in all respects and issuance of completion certificate. b. **Erection of Valves, Orifice Plates** - 85% after transportation and erection. - 08% after flushing and testing. - 02% after mechanical completion - 05% on completion of all works in all respects and issuance of completion certificate.
3.2	**Piping Works-** **Fabrication at site.** **(Pipe & Pipe Components, Valves - Supplied by Contractor)**	a. **Fabrication & Erection of Piping** - 05% on issuance of sub-order and submission of equivalent bank guarantee valid till receipt and acceptance of material at site plus 03 Months claim - 45% after receipt and acceptance of material at site. - 20% on fabrication including NDT, as applicable. - 15% after site erection, field welding, radiographic and other examination. - 05% after providing supports, alignment, providing vents, drains - 03% after flushing, testing, draining and drying. - 02% after mechanical completion - 05% on completion of all works in all respects and issuance of completion certificate. b. **Erection of Valves** - 10% on issuance of sub-order and submission of equivalent bank guarantee valid till receipt and acceptance of material at site plus 03 Months claim period.

		- 60% after receipt and acceptance of material at site. - 15% after erection, welding, radiographic and other examination. - 08% after hydro-testing and final approval. - 02% after mechanical completion. - 05% on completion of all works in all respects and issuance of completion certificate.
3.3	**Piping Works-** **Fabrication at yard outside the Project premises.** **(Pipe & Pipe Components, Valves – Supplied by Contractor)**	**a. Fabrication & Erection of Piping** - 05% on issuance of sub-order and submission of equivalent bank guarantee valid till receipt and acceptance of material at site plus 03 Months claim period. - 45% after receipt and acceptance of material at contractor fabrication yard outside the Project premises against Rolling Bank Guarantee for an equivalent amount of materials at contractor's shop with a validity till receipt of materials at Project premises plus 03 Months claim period. - 20% on fabrication including NDT, as applicable, and receipt of fabricated Piping at site. - 15% after site erection, field welding, radiographic and other examination. - 05% after providing supports, alignment, providing vents, drains - 03% after flushing, testing, draining and drying. - 02% after mechanical completion - 05% on completion of all works in all respects and issuance of completion certificate.
3.4	**Fabrication of respective piping items in Inch Dia.** **(Free issue materials)**	- 85% after welding of joints & its acceptance. - 08% after completion of tests as per respective piping spec. - 02% after mechanical completion - 05% on completion of all works in all respects and issuance of completion certificate.
3.5	**Erection of piping items to be paid in IM basis.** **(Fabricated in Inch. dia. as above)**	- 70% after site erection, field welding, radiographic and other examination. - 15% after providing support, alignment, providing vents, drains etc. - 08% after flushing, testing, draining and drying. - 02% after mechanical completion. - 05% on completion of all works in all respects and issuance of completion certificate.
3.6	**Specials/ MITRES for A/G piping**	- 85% after welding of joints & its acceptance. - 08% after completion of tests as per respective piping spec, application of shop primer etc. - 02% after mechanical completion - 05% on completion of all works in all respects and issuance of completion certificate.
3.7	**NDT (i.e Radiography, UT, MPT/ DPT etc.)**	- 95% on submission of reports and acceptance thereof. - 05% on completion of all works in all respects and issuance of completion certificate.

3.8	**Stress Relieving**	- 95% after successful completion of stress relieving. - 05% on completion of all works in all respects and issuance of completion certificate.
3.9	**Painting** **Insulation Works**	**a. Painting** - 30% on surface preparation and primer painting at shop / fabrication yard. - 65% (##) on completion of final painting. - 05% on completion of all works in all respects and issuance of completion certificate. **(##) Further break up of payment schedule, if necessary, shall be recommended / approved by Engineer-in-charge depending on number of intermediate coats.** **b. Insulation Works** - 50% (##) on supply and acceptance of material at site. - 25% after installation at site. - 20% on inspection after installation, its acceptance and removal of scaffolding, if any. 05% on completion of all works in all respects and issuance of completion certificate. **(##) Payment shall be released on Prorata basis on supply & acceptance of major insulation material.**
3.10	**Equipment**	**a. Column, Vessels, Filters, Ejectors etc.** - 65% **{Note 1}** after transportation from stores / storage points to erection site and erection on foundation. - 25% after alignment and grouting. - 03% after cleaning, box up of manholes, providing all instruments/ auxiliary of fit ups and making ready for startup. 02% after mechanical completion - 05% on completion of all works in all respects and issuance of completion certificate. **{Note 1}:** For Heavy lift equipment's, this milestone payment shall be divided in two milestone payments in case of the item is on lump-sum basis: - 20% on mobilization of required capacity crane at site. - 45% after transportation from stores / storage points to erection site and erection on foundation. **b. Trays and Internals** - 95% after transportation from stores / storage points to erection site, cleaning, placing, bolting/welding, testing within equipment, testing and inspection.

	Equipment	- 05% on completion of all works in all respects and issuance of completion certificate. **c. Heat Exchangers** - 65% after transportation from stores / storage points to erection site and erection. - 20% after alignment and grouting. - 08% after completion of flushing, draining, drying. - 02% after mechanical completion - 05% on completion of all works in all respects and issuance of completion certificate. **d. Testing of Heat exchangers** - 70% after testing. - 23% after completion of flushing, draining, drying by compressed air. - 02% after mechanical completion - 05% after completion of all works in all respects and issuance of completion certificate. **e. Machineries (Compressors, Pumps & Misc.)** - 45% after transportation from stores / storage points to erection site and placing in position. - 30% after initial alignment, leveling and grouting. - 18% after final alignment, shaft alignment after pipe hook-up, dowelling, initial fill of lubricants, mounting of accessories and completion of piping. - 02% after mechanical completion. 05% on completion of all works in all respects and issuance of completion certificate. **f. EOT Crane (In case of Contractor supplied material).** - 05% on finalization of design, engineering and submission of approved drawings. - 50% on receipt and acceptance of material at site. - 30% on installation and completion of EOT crane including Structural, Mechanical, Electrical, instrumentation works. - 02% on receipt of spares at site. - 08 % on completion of testing& acceptance, commissioning. - 05% on completion of all works in all respects and issuance of completion certificate.

3.11	**HVAC, Clean Agent System (CAS), Cathodic Protection (CP), Electrical Heat Tracing System (EHTS)** **Lump Sum**	**HVAC, Clean Agent System (CAS), Cathodic Protection (CP), Electrical Heat Tracing System (EHTS) Lumpsum.** - 05% on finalization of design, engineering and submission of approved drawings. - 50% (##) on receipt and acceptance of material at site. - 30% (##) on installation - 02% on receipt of spares at site. - 08% on completion of testing& acceptance, commissioning. - 05% on completion of all works in all respects and issuance of completion certificate. **(##) Further billing break up, if necessary, shall be recommended/approved by Engineer-in-charge.**
3.12	**ELEVATOR PACKAGE**	ELEVATOR PACKAGE - 5% on issuance of suborder and submission of equivalent bank guarantee valid till receipt and acceptance of material at site plus three months of claim period. - 45% on receipt and acceptance of material at site - 15% after erection in M/c room, alignment of all equipment inside shaft including car body. - 15% on completion of installation including doors and other Electrical and Instrumentation work - 15% after testing and acceptance including load test - 05% on completion of all works in all respect and issuance of completion certificate.
4.	**ELECTRICAL WORK**	
4.1	**For Supply Items**	- 10% on issuance of sub-order and submission of equivalent bank guarantee valid till receipt and acceptance of material at site plus 03 Months claim period - 5% on vendor drawing submission as per DCI and approval - 80% on receipt and acceptance of material at site. - 05% on completion of all works in all respects and issuance of completion certificate.
4.2	**For Erection Items**	- 80% on completion of erection / installation. - 15% on testing and acceptance. - 05% on completion of all works in all respects and issuance of completion certificate.
4.3	**For Items involving both Supply & Erection**	- 05% on issuance of sub-order and submission of equivalent bank guarantee valid till receipt and acceptance of material at site plus 03 Months claim period - 05% on vendor drawing submission & approval - 55% on receipt and acceptance of material at site. - 20% after erection /installation. - 10% after testing and acceptance.

		- 05% on completion of all works in all respects and issuance of completion certificate.
5.	**INSTRUMENTATION**	
5.1	**For Supply Items**	- 10% on issuance of sub-order and submission of equivalent bank guarantee valid till receipt and acceptance of material at site plus 03 Months claim period - 05 % on vendor drawing submission as per DCI and drawing approval - 80 %on receipt and acceptance of material at site - 05% on completion of all works in all respects and issuance of completion certificate.
5.2	**For Erection/ Installation Items**	**a. Items not requiring loop checking.** - 85% on completion of erection./ installation. - 10% on testing - 05% on completion of all works in all respects and issuance of completion certificate. **b. Items requiring loop checking.** - 80% on completion of erection/ installation. - 15% on testing and loop checking. - 05% on completion of all works in all respects and issuance of completion certificate.
5.3	**For Items with supply and erection / installation**	**a. Items not requiring loop checking** - 05% on issuance of sub-order and submission of equivalent bank guarantee valid till receipt and acceptance of material at site plus 03 Months claim period - 60% on receipt and acceptance of materials at site. - 30% on completion of erection / installation and testing. - 05% on completion of all works in all respects and issuance of completion certificate. **b. Items requiring loop checking** - 05% on issuance of sub-order and submission of equivalent bank guarantee valid till receipt and acceptance of material at site plus 03 Months claim period - 55% on receipt and acceptance of materials at site - 25% on completion of erection / installation. - 10% on testing and loop checking - 05% on completion of all works in all respects and issuance of completion certificate.
5.4	**Ducts, Trays and Other Fabricated Materials**	- 10% on issuance of sub-order and submission of equivalent bank guarantee valid till receipt and acceptance of material at site plus 03 Months claim period.

	(Supply in Contractor's scope)	- 55% after receipt and acceptance of fabricated materials (Ducts / Trays) at site. - 25% after erection. - 05% after welding and final painting, if any - 05% on completion of all works in all respects and issuance of completion certificate.
5.5	**Calibrations Main Instruments**	- 80% after calibration. - 15% after completion of recalibration during loop test, if any - 05% on completion of all works in all respects and issuance of completion certificate.
5.6 (a)	**Package works (Design, Supply, Installation, testing & Commissioning like CCTV, fire alarm, access control works)** **Lumpsum**	**a. Package works (Design, Supply, Installation, testing & Commissioning like CCTV, fire alarm, access control works) Lumpsum.** - 05% on finalization of design, engineering and submission of approved drawings. - 60% (##) on supply and acceptance of material at site. - 20% (##) on installation and completion of Civil, Structural, Instrumentation works. - 02% on receipt of spares at site. - 08 % on completion of Testing & Commissioning. - 05% on completion of all works in all respects and issuance of completion certificate. **(##) Further billing break up, if necessary, shall be recommended/ approved by Engineer-in-charge.**
(b)	**Package works (Design, Supply, Installation, testing & Commissioning like IT works, LAN system** **Lumpsum**	**b. Package works (Design, Supply, Installation, testing & Commissioning like IT works, LAN system) Lumpsum.** - 05% on finalization of design, engineering and submission of approved drawings. - 65% (##) on supply and acceptance of all material at site. - 25% (##) on acceptance which includes installation, configuration, checking of technical and functional requirements. - 05% on completion of all works in all respects and issuance of completion certificate including migration (if applicable). **(##) Further billing breakup, if necessary, shall be recommended/ approved by Engineer-in-charge.**

5.7 (a)	**Package works (Supply, Installation, testing & Commissioning like CCTV works) Lumpsum**	**a. Package works (Supply, Installation, testing & Commissioning Like CCTV, fire alarm, access control works) Lumpsum.** - 60% (##) on receipt and acceptance of material at site. - 25% (##) on installation and completion of Civil, Structural, Mechanical, Electrical, instrumentation works. - 02% on receipt of spares at site. - 08% on completion of Testing & Commissioning. - 05% on completion of all works in all respects and issuance of completion certificate. **(##) Further billing breakup, if necessary, shall be recommended/ approved by Engineer-in-charge.**
(b)	**Package works (Supply, Installation, testing & Commissioning like IT works, LAN system** **Lumpsum**	**b. Package works (Supply, Installation, testing & Commissioning Like IT works, LAN system) Lumpsum.** - 65% (##) on supply and acceptance of all materials at site. - 30% (##) on Acceptance which includes installation, configuration, checking of technical and functional requirements. - 05% on completion of all works in all respects and issuance of completion certificate including migration (if applicable). **(##) Further billing breakup, if necessary, shall be recommended/ approved by Engineer-in-charge.**
6.	TANKAGES	**a. Free issue material** i. Design and plate work of floating roof for both, Open tank floating roof and Covered tank floating roof: - 05% on design of floating roof and approval of drawings. - 20% after fabrication. - 25% after erection. - 35% after welding, NDT / radiography and acceptance thereof. - 10% after testing. - 05% on completion of all works in all respects and issuance of completion certificate. ii. Plate work: - 05% on approval of fabrication drawings. - 20% after fabrication. - 25% after erection. - 35% after welding, NDT / radiography and acceptance thereof. - 10% after hydro-testing, disposal of water after hydro testing and cleaning of tank.

- 05% on completion of all works in all respects and issuance of completion certificate.

b. Material supplied by Contractor

i Design and plate work of floating roof for both, Open tank floating roof and Covered tank floating roof

- 05% on design of floating roof and approval of drawings.
- 05% on issuance of sub-order and submission of equivalent bank guarantee valid till receipt and acceptance of material at site plus 03 Months claim period
- 35% on receipt and acceptance of material at site.
- 10% after fabrication.
- 15% after erection.
- 20% after welding, NDT / radiography and acceptance thereof.
- 05% after testing.
- 05% on completion of all works in all respects and issuance of completion certificate.

ii Plate work

- 05% on approval of fabrication drawings.
- 05% on issuance of sub-order and submission of equivalent bank guarantee valid till receipt and acceptance of material at site plus 03 Months claim period
- 35% on receipt and acceptance of material at site.
- 10% after fabrication.
- 15% after erection.
- 20% after welding, NDT / radiography and acceptance thereof.
- 05% after hydro-testing, disposal of water after hydro testing and cleaning of tank.
- 05% on completion of all works in all respects and issuance of completion certificate.

iii Floating roof seals

- 05% on design and approval of drawings.
- 45% on receipt and acceptance of material at site.
- 35% on installation.
- 10% on testing and acceptance.
- 05% on completion of all works in all respects and issuance of completion certificate.

iv Appurtenances, Mixers etc.

- 65% after receipt and acceptance of material at site.

- 20% after installation, providing reinforcement pads.
- 10% after testing and acceptance.
- 05% on completion of all works in all respects and issuance of completio certificate.

v. Calibration

- 95% on submission of duly approved calibration charts.
- 05% on completion of all works in all respects and issuance of completior certificate.

vi. Painting

- 30% on surface preparation and primer application.
- 65% (##) on completion of final painting.
- 05% on completion of all works in all respects and issuance of completion certificate.

(##) Further break up of payment schedule, if necessary, shall be recommended / approved by Engineer-in-charge depending on number of intermediate coats.

vii. Tanks pads (including anti-corrosive layers)

- 65% on construction of tank pad.
- 20% on completion of anti-corrosive layer.
- 10% on repair of anti-corrosive layers (if any)/pitching works and after testing of tanks
- 05% on completion of all works in all respects and issuance of completion certificate.

viii. Cooling Water System / Foam system

- 70% on supply and fabrication.
- 15% on erection, welding and NDT/Radiography including supports.
- 10% on Hydro testing.
- 05% on completion of all works in all respects and issuance of completion certificate.

ix. Insulation Works

- 10% on issuance of sub-order and submission of equivalent bank guarantee valid till receipt and acceptance of material at site plus 03 Months claim period
- 50% on supply and acceptance of material at site.
- 15% after installation of material.
- 20% on inspection after installation, its acceptance and removal of scaffolding, if any.
- 05% on completion of all works in all respects and issuance of completion certificate.

SPHERES (LUMPSUM BASIS)

a. Design & Engineering Cost

- 50% on submission of drawings and engineering details.
- 30% on approval under Code 2.
- 15% on approval under Code 1.
- 05% on completion of all works in all respects and issuance of completion certificate.

b. Supply Cost (Spheres)

Case-I: Shop Fabrication (Fabrication outside Project premises) & site Erection:

- 05% on issuance of sub-order for plates and submission of equivalent bank guarantee valid till completion period plus three months claim period. However, the bank guarantee shall be released after receipt and acceptance of fabricated items at site.
- 40% against receipt of materials on prorate basis at contractor's works on certification by EIL/TPIA and submission of Bank Guarantee for equivalent amount valid till completion period plus three months claim period. However, the bank guarantee shall be released after receipt of fabricated items at site.
- 30% on fabrication of structural steel/ pressing/forming of petals and crown etc on prorate basis against certification by EIL/TPIA and submission of Bank Guarantee for equivalent amount valid till completion period plus three months claim period. However, the bank guarantee shall be released after receipt of fabricated items at site.

10% on receipt and acceptance of fabricated items at site on pro rata basis.

10% on erection, alignment, welding, grouting, NDT on prorate basis

05% on completion of all works in all respects and issuance of completion certificate.

Case-II: Shop Fabrication-Nil, Total Fabrication & Erection at site:

05% on issuance of sub-order for Plate material and submission of equivalent bank guarantee valid till completion period plus three months claim period. However, the bank guarantee shall be released after receipt and acceptance of material at site.

50% on receipt and acceptance of material at site on prorate basis.

30% on fabrication of structural steel/ pressing/forming of petals and crown etc on pro rata basis.

10% on erection, alignment, welding, grouting, NDT on prorate basis.

05% on completion of all works in all respects and issuance of completion certificate.

c. Site works cost (Site Erection):

- 80% on erection, alignment, welding/grouting, NDT on prorate basis.

		- 15% on cleaning, testing etc. - 05% on completion of all works in all respects and issuance of completion certificate. **d. For all other items: Procurement & Supply** - 85% on receipt of materials at Site / fabrication yard within Project premises. - 10% on fabrication and erection/installation, alignment and grouting as required including testing where involved and required. - 05% on completion of all works in all respects and issuance of completion certificate. **Construction:** **Appropriate terms of payment for various items of works (civil, structural, mechanical, electrical, instrumentation etc.) shall be selected from the payment terms specified for item rate tenders.**
8.	**MOUNDED BULLETS** **(LUMPSUM BASIS)**	**a. Design & Engineering cost.** - 50% on submission of drawings and design details. - 30% on approval under Code 2. - 15% on approval under Code 1. - 05% on completion of all works in all respects and issuance of completion certificate. **b. Supply Cost (Mounded Bullets)** **Case-I: Shop Fabrication (Fabrication outside Project premises) & site Erection:** - 05% on issuance of sub-order for plates and submission of equivalent bank guarantee valid till completion pericd plus three months claim period. However, the bank guarantee shall be released after receipt and acceptance of fabricated items at site. - 40% against receipt of materials on pro-rata basis at contractor's works on certification by EIL/TPIA and submission of Bank Guarantee for equivalent amount valid till completion period plus three months claim period. However, the bank guarantee shall be released after receipt of fabricated items at site. - 30% on fabrication of shell / Dished Ends etc. on prorate basis against certification by EIL/TPIA and submission of Bank Guarantee for equivalent amount valid till completion period plus three months claim period. However, the bank guarantee shall be released after receipt of fabricated items at site. - 10% on receipt and acceptance of fabricated items at site on prorate basis. - 10% on erection, alignment, welding, grouting, NDT on prorate basis - 05% on completion of all works in all respects and issuance of completion certificate.

		Case-II: Shop Fabrication-Nil, Total Fabrication & Erection at site: - 05% on issuance of sub-order for Plate material and submission of equivalent bank guarantee valid till completion period plus three months claim period. However, the bank guarantee shall be released after receipt and acceptance of material at site. - 50% on receipt and acceptance of material at site on pro rata basis. - 30% on fabrication of shell / Dished Ends etc. on pro rata basis. - 10% on erection, alignment, welding, grouting, NDT on prorate basis. 05% on completion of all works in all respects and issuance of completion certificate. **c. Site works cost (Site Erection):** - 80% on erection, alignment, welding, NDT on prorate basis. - 15% on cleaning, testing etc. - 05% on completion of all works in all respects and issuance of completion certificate. **d. For all other items: Procurement & Supply** - 85% on receipt of materials at Site / fabrication yard within Project premises. - 10% on fabrication and erection/ installation, alignment and grouting as required including testing where involved and required. - 05% on completion of all works in all respects and issuance of completion certificate. **Construction:** **Appropriate terms of payment for various items of works (civil, structural, mechanical, electrical, instrumentation etc.) shall be selected from the payment terms specified for item rate tenders.**
9.	**DWST (Double Wall Storage Tank)** **(LUMPSUM BASIS)**	**DWST (Double Wall Storage Tank) (LUMPSUM BASIS)** **a. Design & Engineering Cost** - 50% on submission of drawings and engineering details. - 30% on approval under Code 2. - 15% on approval under Code 1. - 05% on completion of all works in all respects and issuance of completion certificate. **b. Supply Cost (Double wall storage tank)** **Case-I: Shop Fabrication (Fabrication outside Project premises) & site Erection:** - 05% on issuance of sub-order for plates and submission of equivalent bank guarantee valid till completion period plus three months claim period.

However, the bank guarantee shall be released after receipt and acceptance of fabricated items at site.

- 40% against receipt of materials on prorate basis at contractor's works on certification by EIL/TPIA and submission of Bank Guarantee for equivalent amount valid till completion period plus three months claim period. However, the bank guarantee shall be released after receipt of fabricated items at site.
- 30% on fabrication of structural steel, shell, roof and bottom plate etc on prorate basis against certification by EIL/TPIA and submission of Bank Guarantee for equivalent amount valid till completion period plus three months claim period. However, the bank guarantee shall be released after receipt of fabricated items at site.
- 10% on receipt and acceptance of fabricated items at site on pro rata basis.
- 10% on erection, alignment, welding, grouting, NDT on prorate basis
- 05% on completion of all works in all respects and issuance of completion certificate.

Case-II: Shop Fabrication-Nil, Total Fabrication & Erection at site:

- 05% on issuance of sub-order for Plate material and submission of equivalent bank guarantee valid till completion period plus three months claim period. However, the bank guarantee shall be released after receipt and acceptance of material at site.
- 50% on receipt and acceptance of material at site on prorate basis.
- 30% on fabrication of structural steel, shell, roof and bottom plate etc. on pro rata basis.
- 10% on erection, alignment, welding, grouting, NDT on prorate basis.
- 05% on completion of all works in all respects and issuance of completion certificate.

c. Site works cost (Site Erection):

- 80% on erection, alignment, welding/grouting, NDT on prorate basis.
- 15% on cleaning, testing etc.
- 05% on completion of all works in all respects and issuance of completion certificate.

d. For all other items: Procurement & Supply

- 85% on receipt of materials at Site / fabrication yard within Project premises.
- 10% on fabrication and erection/ installation, alignment and grouting as required including testing where involved and required.
- 05% on completion of all works in all respects and issuance of completion certificate.

Construction:

Appropriate terms of payment for various items of works (civil, structural, mechanical, electrical, instrumentation etc.) shall be selected from the payment terms specified for item rate tenders.

9.	HEATERS	
9.1	**Steel Works**	**a. In case of Contractor's supplied materials:** i. FABRICATION AT SITE - 05% on finalization of quantities, plan and submission of approved fabrication drawings. - 05% on issuance of sub-order and submission of equivalent bank guarantee valid till completion period plus three months claim period. However, the bank guarantee shall be released after receipt and acceptance of material at site. - 35% on receipt and acceptance of material at site. - 20% on fabrication, surface preparation and application of primer coat. - 25% on erection, alignment, welding, grouting etc. - 05% on completion of Final painting. - 05% on completion of all works in all respects and issuance of completion certificate. ii. FABRICATION AT YARD OUTSIDE PROJECT PREMISES - 05% on finalization of quantities, plan and submission of approved fabrication drawings. - 05% on issuance of sub-order and submission of equivalent bank guarantee valid till completion period plus three months claim period. However, the bank guarantee shall be released after receipt and acceptance of fabricated items at site. - 35% on receipt and acceptance of material at contractor fabrication yard outside the Project premises against Rolling Bank Guarantee for an equivalent amount of materials at contractor's shop with a validity till receipt of materials at Project premises plus 03 Months claim period. - 20% on fabrication, surface preparation and application of primer and receipt of fabricated items at site. - 25% on erection, alignment, welding & grouting etc. - 05% on completion of Final painting. - 05% on completion of all works in all respects and issuance of completion certificate. **b. At issue rates (chargeable basis):** - 05% on finalization of quantity, plan and submission of fabrication drawings. - 70% on transportation of material to site, fabrication, surface preparation and application of shop primer. - 15% on erection, alignment, welding/grouting etc. - 05% on completion of Final painting.

		- 05% on completion of all works in all respects and issuance of completion certificate. **c. Free Issue:** - 05% on finalization of quantity, plan and submission of fabrication drawings. - 45% on transportation of material to site, fabrication, surface preparation and application of shop primer. - 35% on erection, alignment, welding/grouting etc. - 10% on completion of Final painting. - 05% on completion of all works in all respects and issuance of completion certificate.
9.2	**Coils**	**a. In case of Contractor supplied materials:** - 05% on issuance of sub-order and submission of equivalent bank guarantee valid till completion period plus three months claim period. However, the bank guarantee shall be released after receipt and acceptance of material at site. - 45% after receipt and acceptance of material at site. - 25% after fabrication, welding & NDT /radiography. - 05% after erection. - 10% after field welding is completed (including NDT/radiography and PWHT). - 05% after hydro-testing. - 05% on completion of all works in all respects and issuance of completion certificate. **b. i. In case of Owner supplied free issue material** - 60% after fabrication, welding, NDT / radiography. - 10% after erection. - 15% after field welding is completed (including NDT/radiography and PWHT) - 10% after hydro-testing. - 05% on completion of all works in all respects and issuance of completion certificate. **ii. Fabrication at Yard outside Project Premises.** - 05% on finalization of quantities, plan and submission of approved fabrication drawings. - 05% on issuance of sub-order and submission of equivalent bank guarantee valid till completion period plus three months claim period. However, the bank guarantee shall be released after receipt and acceptance of fabricated items at site. - 35%on receipt and acceptance of material at contractor fabrication yard outside the Project premises against Rolling Bank Guarantee for an equivalent amount of materials at contractor's shop with a validity till receipt of materials at Project premises plus 03 Months claim period.

		- 20% on fabrication, surface preparation and application of primer and receipt of fabricated items at site. - 20% on erection, alignment, welding & grouting etc. - 05% on completion of Final painting. - 05% after Hydrotesting. - 05% on completion of all works in all respects and issuance of completion certificate.
9.3	**Burners**	**a. In case of Contractor supplied material** - 05% on issuance of sub-order and submission of equivalent bank guarantee valid till completion period plus three months claim period. However, the bank guarantee shall be released after receipt and acceptance of material at site. - 65% after receipt and acceptance of material at site. - 25% after erection & alignment in position at site. - 05% on completion of all works in all respects and issuance of completion certificate. **b. In case of Owner supplied free issue material** - 95% after erection & alignment in position at site. - 05% on completion of all works in all respects and issuance of completion certificate.
9.4	**Air pre-heaters**	**a. In case of Owner supplied material as free issue** - 50% after erection. - 45% after alignment, testing etc. - 05% on completion of all works in all respects and issuance of completion certificate. **b. In case of Contractor supplied material** - 05% on issuance of sub-order and submission of equivalent bank guarantee valid till completion period plus three months claim period. However, the bank guarantee shall be released after receipt and acceptance of material at site. - 65 % after receipt and acceptance of material at site. - 15 % after erection. - 10% after alignment, testing etc. 05% on completion of all works in all respects and issuance of completion certificate.
9.5	**ID/FD Fans**	**a. In case of Owner supplied material as free issue** - 45% after transportation from stores / storage points to erection site and placing in position. - 30% after initial alignment, leveling and grouting. - 20% after final alignment and mounting of accessories etc. - 05% on completion of all works in all respects and issuance of completion certificate.

		b. In case of Contractor's supplied material - 05% on issuance of sub-order and submission of equivalent bank guarantee valid till completion period plus three months claim period. However, the bank guarantee shall be released after receipt and acceptance of material at site. - 45% after receipt and acceptance of material at site. - 20% after transportation from stores / storage points to erection site and placing in position. - 15% after initial alignment, leveling and grouting. - 10% after final alignment and mounting of accessories etc. - 05% on completion of all works in all respects and issuance of completion certificate.
9.6	**Insulation Works**	- 10% on issuance of sub-order and submission of equivalent bank guarantee valid till receipt and acceptance of material at site plus 03 Months claim period - 50% on supply and acceptance of material at site. - 15% after installation of material. - 20% on inspection after installation, its acceptance and removal of scaffolding, if any. - 05% on completion of all works in all respects and issuance of completion certificate.
9.7	**Refractory Works**	- 10% on issuance of sub-order and submission of equivalent bank guarantee valid till completion period plus three months claim period. However, the bank guarantee shall be released after receipt and acceptance of material at site. - 40% on receipt and acceptance of materials at site. - 30% on installation. - 15% on initial dry out and acceptance. - 05% on completion of all works in all respects and issuance of completion certificate
9.8	**Painting Works**	- 30% on surface preparation and primer application. - 65% (##) on final painting. - 05% on completion of all works in all respects and issuance of completion certificate. **(##) Further break up of payment schedule, if necessary, shall be recommended/ approved by Engineer-in-charge depending on number of intermediate coats.**
9.9	**Miscellaneous Works**	- 95% (##) on completion of work on pro-rata basis as certified in monthly progress bill. - 05% on completion of all works in all respects and issuance of completion certificate. **(##) Further break up of payment schedule, if necessary, shall be recommended/ approved by Engineer-in-charge.**

10.	Laying of Pipeline and Associated Works (On Shore)	
10.1	**Laying of Pipeline and Associated Works (On Shore)**	**a. PIPELINE LAYING:** **Free issue:** - 5% on completion of site development, stacking, clearing and grading of ROU etc. - 10% on completion of trenching by excavation/ blasting. - 5% on completion of stringing. - 15% on completion of Fabrication, Alignment, Field Welding. - 5% on completion of Radiography, NDT. - 5% on completion of Joint Coating. - 10% on completion of Lowering, laying of HDPE duct - 05% on completion of Tie-ins - 10% on completion of Backfilling. - 10% on completion of hydrotesting - 05% on dewatering, swabbing, magnetic cleaning plus electronic geometry pigging. - 10% on completion of restoration and marker installation etc. - 05% on completion of all works in all respects and issuance of completion certificate. The above payments shall be made subject to the following: i. For the purpose of payments of 10% on account of lowering and laying of HDPE duct, 05% on account of tie- ins and 10% on account of back filling, a minimum continuous stretch of 10 KMs or 5% of spread length whichever is lower, will be considered except for discontinuities on account of listed crossings. ii (i) is not applicable in case of city areas and where continuous ROU stretch is not released. iii. For discontinuity on account of major crossings specified in SOR (being paid separately as SOR item) crossing length shall not be taken into account for (i) and (ii) above for payment purposes. iv. All crossings, i.e, Creek, Railway, Road, Horizontal Directional Drilling and River crossings which are not separately listed in SOR items shall be paid on the basis of linear pipeline length laid. **b. OPTICAL FIBRE CABLE / HDPE (Supply)** - 10% on issuance of sub-order against submission of equivalent bank guarantee valid till receipt and acceptance of material at site plus 03 Months claim period. - 75 % on receipt and acceptance of material at Project site / yard. - 10 % on Testing after laying as per specification. - 05% on completion of all works in all respects and issuance of completion certificate.

c. Installation of OFC

- 55 % on completion of laying / blowing of OFC through HDPE duct laid in the same Pipeline Trench.
- 20 % on Supply & Erection of Jointing Pit, Jointing of OFC as per Specification.
- 20% on OFC Testing as per specification.
- 05% on completion of all works in all respects and issuance of completion certificate.

d. HDD WORKS

- 10 % on carrying out Geotechnical Survey and design Approval.
- 25% on string preparation, NDT clearance, pre testing and Joint coating.
- 10% on pilot hole drilling.
- 35 % on reaming and Pulling of string.
- 10% on Post testing, Tie in and backfilling.
- 05% on Restoration including bentonite disposal and obtaining NOC
- 05% on completion of all works in all respects and issuance of completion certificate.

e. MICROTUNELLING WORKS

Micro-tunneling and Pipeline installation along with associated works

- 05% on submission and approval of drawings
- 05% on all type of pre-construction survey required for Design & calculation.
- 15% on construction of launching and receiving shaft.
- 10% on Mobilization and placement of Micro-tunneling equipment along with all the accessories and consumables at site.
- 35% on Supply and Installation of Jacking Pipe at site location.
- 05% on Carrier Pipe pre-installation hydro testing / repair.
- 08 % on Installation of carrier pipeline & HDPE ducts, MMO wire anode carrying ducts for CP, including provision of supports inside jacking pipe.
- 07% on Blowing of OFC, gauging of pipeline, NDT, Post installation hydro-testing, dewatering and swabbing.
- 05% on capping of jacking pipe, backfilling, final Clean-up & restoration (complete in all respect), disposal of drilling fluid and waste etc. and acceptance of the system by Owner.
- 05% on completion of all works in all respects and issuance of completion certificate.

f. STATION WORKS (Receipt / Dispatch terminals):

Appropriate terms of payment for various items of works (civil, structural, mechanical, electrical, instrumentation etc.) shall be selected from the payment terms specified for item rate tenders.

		g. TEMPORARY CATHODIC PROTECTION/ PERMANENT CATHODIC PROTECTION WORKS The payment for Temporary Cathodic Protection System shall be made based on the actual measurement of Pipeline in KM protected. The lump sum price for Temporary & Permanent Cathodic Protection system shall be considered and payable on prorate basis as per the following break-up - 05% on approval of design Document. - 05% on issuance of sub-order against submission of equivalent bank guarantee valid till receipt and acceptance of material at site plus 03 Months claim period. - 40% on receipt and acceptance of material at sites. - 20 % on installation of the system progressively. - 25 % on testing and commissioning of CP system. - 05% on completion of all works in all respects and issuance of completion certificate. Note: Payment against testing and commissioning in case of Permanent Cathodic Protection shall include Post commissioning survey (DCVG/ CAT/ CIPL – as applicable) and interference mitigation.
10.2	**SUBMARINE PIPE LINE LAYING WORK** **(FREE ISSUE MATERIAL)**	Payment terms for pipeline laying are basic guidelines for payment of pipeline laying work. The payment terms need to be suitably modified, if required, depending on work and quantum of work in consultation with Project Manager and GM (C&P): **a. Submarine Pipeline laying on pro-rata basis.** - 05% on completion of pre-construction survey. - 20% on mobilization of Lay-barge and other equipment. - 10% on Receiving, Taking over & Transportation of Coated Line Pipes to Installation site. - 50% on completion of repairs, welding, radiography, NDT, Installation including Trenching, Dredging and backfilling etc. - 05% on completion of hydro testing. - 05% on submission of As Built drawings & all other drawings/ documents. - 05% on completion of all works in all respects and issuance of completion certificate **b. Installation of SPM & PLEM System** - 05% on completion of pre-construction survey. - 20% on mobilization of Lay-barge and other equipments. - 10% on Receiving, Taking over SPM & PLEM etc. - 55% on completion of Installation and Testing. - 05% on submission of As Built drawings & all other drawings/ documents. - 05% on completion of all works in all respects and issuance of completion certificate **c. Pre-Commissioning & Commissioning Assistance.** - 50 % on Flood, Clean, Gauge & Hydro Test of Pipeline.

		- 30% on after completion of Pre-Commissioning, Integration and acceptance of the SPM system in all respects - 15% on completion of commissioning Assistance. - 05% on completion of all works in all respects and issuance of completion certificate.
10.3	**COATING AND TRANSPORTATION OF COATED PIPES**	- 10% after bare pipes are lifted by coating agency from pipe supplier yard. - 65 % prorate payment along with taxes & duties after coating and acceptance - 20% on receipt of coated pipes at dumpsite including repair charges and transportation charges for coated pipes. - 05% on completion of all works in all respects and issuance of completion certificate.
10.4	**DUMPSITE DEVELPMENT**	- 10% on production of land lease agreement copy - 85% payment after development of dumpsite for receipt of pipes as per specifications. - 05% on completion of all works in all respects and issuance of completion certificate.
10.5	**DUMPSITE MANAGEMENT**	- 85% on completion of work on pro-rata basis as certified in monthly progress bill. - 10% on restoration and obtaining NOC from land owner. - 05% on completion of all works in all respects and issuance of completion certificate.
11.	**MATERIAL HANDLING**	a. As soon as any consignment against a Bill of Lading /AWB is delivered at Project site in full, contractor shall submit his bills in triplicate as per Schedule of Price to Officer-in-Charge. b. If any of the consignments are required to be stored in contractor's godown by EIL / Owner, contractor may raise part bills for the services completed. Note: Further break-up of Lumpsum Prices, if deemed necessary for any progressive payment of individual item may be mutually arrived at between Engineer-in-Charge and the Contractor.
12.	**Miscellaneous Works**	- 95% (##) on completion of work as certified in monthly progress bill. - 05% on completion of all works in all respects and issuance of completion certificate. **(##) Further break up of payment schedule, if necessary, shall be recommended/ approved by Engineer-in-charge.**
13.	**For Lumpsum Rate Item (Not covered above)**	- 95% on completion of total work in all respects. (For all lumpsum item included in Schedule of Rate, Contractor shall furnish price breakup for quoted lumpsum prices for the approval of Engineer-in-Charge. Progressive payment for such items shall be made accordingly. In this regard decision of Engineer-in- Charge shall be final and binding to the Contractor). - 05% on completion of all works in all respects and issuance of completion certificate.
14. .		**PEB Buildings (Without Civil Foundation)** - 05% on approval of design, detailed engineering and preparation of drawings & documents and submission of equivalent bank guarantee valid till receipt

	PEB Buildings (Without Civil Foundation)	and acceptance of material at site plus 3 months claim period. - 65% (##) on receipt and acceptance of pre-fabricated & pre-engineered structures / members with application of primer & painting at project premises. - 25% (##) on erection, alignment, welding, bolting, grouting etc. - 05% on completion of works in all respect and issuance of completion certificate. **(##) Further billing break up if necessary, shall be recommended/ approved by Engineer-in-charge.**
15.	**PEB Buildings (With Civil Foundation)**	**PEB Buildings (With Civil Foundation).** - 05% on approval of design, detailed engineering and preparation of drawings & documents and submission of equivalent bank guarantee valid till receipt and acceptance of material at site plus 3 months claim period. - 45% (##) on receipt and acceptance of pre-fabricated & pre-engineered structures / members with application of primer & painting at project premises. - 45% (##) on Civil Works erection, alignment, welding, bolting, grouting etc. - 05% on completion of works in all respect and issuance of completion certificate. **(##) Further billing breakup if necessary, shall be recommended/ approved by Engineer-in-charge.**
16.	**Marine Cum Erection All Risk Insurance:**	**Marine Cum Erection All Risk Insurance:** Progressive payments shall be released to contractor against running account bills duly certified by Engineer in-charge after affecting the necessary deductions/ recovery, if any . The basis for payment against various items shall be as follows: **a. Premium for Marine Insurance :** 100% upfront premium of premium against Marine insurance coverage after award of work and within a week of receiving the Proforma Premium invoice. The contractor shall submit the tax invoice and proof of payment of GST at the earliest but not later than 3 months of realization of payment. **b. Premium against Erection All Risk (EAR) Cover :** • Premiums are to be released in installment on quarterly basis. • First premium shall be 5 % of the total Premium plus (95% of total premium /No of installments) within a week of receiving of invoice • Subsequent premium shall be of 95% of total Premium /No of installments and payable within due date of payment as specified in the policy. • The last premium shall be released at least six months before expiry of the policy. No of Installment= [1+{Period in months-6} /3] The contractor shall submit the tax invoice and proof of payment of GST at the earliest but not later than 3 months of realization of payment.

17.	**Third Party Inspection services :**	**Third Party Inspection services:** Progressive payments shall be released to contractor against running account bills duly certified by Engineer in-charge after affecting the necessary deductions/recovery, if any a. **Third Party Inspection services for inspection of equipment and materials including package items (Wherein flat percentage rate have been specified):** • Inspection services for the PO item: 90% shall be paid along with IRN of the respective PO item in complete status on prorate basis • 10% shall be paid along with issue of completeness certificate for final documentation as per VDR and on receipt and acceptance of all materials at site. b. **Third Party Inspection services for inspection of equipment and materials including package items based on man-day rate:** • 90% against submission of monthly bills and time sheet certified by the engineer in-charge • 10% shall be paid along with issue of completeness certificate for final documentation as per VDR and on receipt and acceptance of all materials at site. c. **For other services like attending monthly review meetings based on Man day rate 100% against submission of monthly bills and time sheet certified by the engineer in-charge.**

NOTE:

1. The above payment terms commensurate with the work executed.

2. The above progress payments are subject to deductions towards income tax and other deductions as applicable as per terms of the Contract.

3. Withholding Tax at the prevailing rate shall be deducted as per the Indian Income Tax Act. TDS certificate shall be issued by the Owner.

4. Completion certificate is the certificate issued after attending the defects prior to taking over as specified in the General Conditions of Contract. In case separate nomenclature is provided for Completion certificate in GCC for various clients, the same shall be replaced by that certificate accordingly.

5. Part completion certificate whenever essential (in case of job in multi units, offloading case etc.) shall be issued with due concurrence from competent authorities to facilitate release of Final payment.

6. Where ever milestone payment is linked with sub ordering, Engineer-in-charge shall ensure that the total quantity against which the payment is released towards supply shall not exceed the final installed quantity of the item.

7. Wherever milestone payment has been recommended on receipt and acceptance of material, the same shall be released against "Incoming Material Inspection Report" issued by EIL. Engineer-in-Charge shall release the progressive payment towards supply in such a way ensuring that the total quantity against which the payment is released towards supply shall not exceed the final installed quantity of the item.

FORMAT FOR ADVANCE BANK GUARANTEE

PROFORMA OF BANK GUARANTEE
ADVANCE (INDIGENOUS)
(On non-judicial stamp paper of appropriate value)

To
Engineers India Limited
1 Bhikaiji Cama Place
New Delhi – 110 066
Attn.: Head (LSTK-Finance)
Project _____
RFQ No. _____
Dear Sirs,

Engineers India Limited, 1, Bhikaiji Cama Place, New Delhi-110066 (hereinafter called – "the Purchaser" which expression shall include its successors and assigns) has awarded M/s _____ (hereinafter called "The Supplier" which expression shall include its successors and assigns) the work of designing, manufacturing, fabricating and supply of _____ in terms of a contract as constituted by Purchase Order No. _____ dated _____ issued by the Purchaser to the Supplier (hereinafter called "The Contract" which expression include all the amendments and/or modifications of the Purchase Oder).

AND WHEREAS the Purchaser has agreed to advance the Supplier a sum of Rs._____ (Rupees _____) hereinafter called "The Advance" as financial assistance to the Supplier under the Contract on the condition, inter alia, that the advance shall be secured by a Bank Guarantee as hereinafter appearing:

We _____ Bank _____ a Bank incorporated/ constituted under the laws of _____ and having it registered/principal office at _____ (hereinafter called "The Bank" which expression shall include our successors and assigns) in consideration of the aforesaid promises and at the request of the Supplier DO HEREBY bind ourselves and our successors and assigns, and irrevocable undertake to pay the Purchaser on first demand in writing without protest or demur or proof or condition and without reference to the Supplier any and all amounts at any time and from time to time claimed by you, as due to you under or in respect of the said advance, and demanded by you from us, with reference to this undertaking for an aggregate limit of Rs. _____ (Rupees _____).

AND, we, the Bank DO HEREBY further agree as follows:

(i) The Purchaser shall have the fullest liberty without reference to the Bank and without affecting in any way the liability of the Bank under this Guarantee/Undertaking, at any time and/or from time to time to anywise vary the Contract and/or any of terms and conditions thereof or of or relative to the advance and to extend time for the performance of the Contract and/or repayment

of the advance or to postpone for any time or from time to time the obligations of the Supplier and to waive or postpone exercise of any of the rights available to the Purchaser against the Supplier or to forebear from enforcing any of the terms or conditions of the Contract and/or the advance or any security(ies) available to the Purchaser, AND the liability of the Bank shall remain in full force and effect notwithstanding any exercise by the Purchaser of the liberty with reference to any or all the matters aforesaid or by reason of time being given to the Supplier or any forbearance, waiver, act or omission on the part of the Purchaser or any indulgence by the Purchaser to the Supplier or any other act, matter or thing whatsoever which under the law relating to sureties would have the effect of releasing the Bank from its liability hereunder or any part thereof, AND the BANK DOTH HEREBY waive all rights at any time inconsistent with the terms of this Guarantee/Undertaking.

(ii) It shall not be necessary for the Purchaser to proceed against the Supplier before proceeding against the Bank and this guarantee/undertaking shall be enforceable against the Bank as principal debtor notwithstanding the existence of any other security for any indebtedness of the Supplier to the Purchaser (including relative to the advance) and notwithstanding that any such security shall at the time when claim is made against the Bank or proceedings taken against the Bank be outstanding or unrealized.

(iii) As between the Bank and the Purchaser for the purpose of this guarantee/undertaking the amount claimed by the Purchaser from the Bank with reference to this guarantee/ undertaking shall be final and binding upon the bank as to the amount payable by the Bank to the Purchaser hereunder.

(iv) The liability of the Bank to the Purchaser under this guarantee/undertaking shall remain in full force and effect notwithstanding the existence of any difference or dispute between the Supplier and the Purchaser, the Supplier and the Bank and/or the Bank and the Purchaser, or otherwise howsoever touching or affecting these presents or the liability of the Supplier to the Purchaser, and notwithstanding the existence of any instructions or purported instructions of the Supplier or any other person(s) to the Bank not to pay or for any cause withhold or defer payment to the Purchaser under these presents with the intent that notwithstanding the existence of such difference, dispute or instruction, the Bank shall be and remain liable to make payment to the Purchaser.

(v) This guarantee/undertaking shall not be affected by any change in the constitution of the Bank or that of the Supplier or the Purchaser, or any irregularity in the exercise of borrowing powers by or on behalf of the Supplier.

(vi) This guarantee/undertaking shall be valid for all claims/demands made by the Purchaser to or upon us upto _____ provided always that if for any reasons, the Supplier is unable to complete supplies under the Contract, the Bank shall at the request of the Purchaser and without recourse to the Supplier extend the validity of this guarantee/undertaking for a further period of six months. For the purpose of this clause, the Purchaser's statement that the Supplier is unable to complete supplies under the contract shall be conclusive and final binding on us.

(vii) Notwithstanding anything contained herein:

(a) The Bank's liability under this Guarantee/Undertaking shall not exceed Rs. _____ (Rupees _____only).

(b) This Guarantee/Undertaking shall remain in force upto _____ and any extension(s) thereof; and

(c) The Bank shall be released and discharged from all liability under this Guarantee/ Undertaking unless a written claim or demand is issued to the Bank on or before _____ plus 3 months claim period, or the date of expiry of any extension(s) thereof if this guarantee/undertaking has been extended.

(viii) The Bank DOTH HEREBY declare that Mr. _____ (name of the person signing on behalf of the Bank) who is _____ (his designation), is authorized to sign this guarantee/undertaking on behalf of the Bank and to bind the Bank thereby.

Dated this _____ day of _____

Yours faithfully,

For _____

Signature _____

Name & Designation _____

Name of the Branch _____

NOTE

1. This Guarantee is required to be stamped as an agreement according to the Stamp Duty Act.

2. The Performance Bank Guarantee shall be strictly as per above proforma and shall be through Indian or Foreign Branches of Indian Scheduled Banks (other than Cooperative Bank)/Nationalized Bank or Indian Branches of Foreign Banks.

3. The bank shall provide details viz contact person, telephone number, fax number, e-mail address and address of the Controlling/Regional Office of issuing bank for verification of authenticity of Bank Guarantee.

4. This Guarantee is required to be sent by Seller's Bankers directly to the Head (LSTK-Finance), Engineers India Limited, EI Bhawan, 3rd Floor, 1, Bhikaiji Cama Place, New Delhi-110066.

MEASUREMENT OF WORK

[ANNEXURE - III TO SPECIAL CONDITIONS OF CONTRACT]

MEASUREMENT
OF
WORK
(ANNEXURE – III TO SCC)

1. GENERAL

The mode of measurement shall be as per the details mentioned in this Annexure.

1.1 In case of discrepancy between measurement of work specified in this Annexure, Standard Specification/ Job Specification, Schedule of Price/Rates etc., precedence shall be given in following order :

1.2 Measurement of works as per this Annexure of SCC.

1.3 Measurement of works as mentioned in Standard Specification/Job Specification.

1.4 Measurement of works in accordance with item description of relevant item mentioned in Schedule of Rates.

1.5 In case the clarity is not in the above documents, then it shall be as per BIS and if it does not exist in BIS also, then Measurement of works shall be as decided by Engineer-in-Charge.

1.6 Payment will be made on the basis of joint measurements taken by Sub-contractor and certified by Engineer-in-Charge. Measurement shall be based on "Approved for Construction" drawings, to the extent that the work conforms to the drawings and details are adequate.

1.7 Wherever work is executed based on instructions of Engineer-in-Charge or details are not adequate in the drawings, Sub-contractor shall take physical measurements in the presence of Engineer-in-Charge.

1.8 Measurements will be made on the basis of following units indicated in unit column of schedule of rates.

Weights	MT or Kg
Length	M (Metre)/ CM (Centimetre)/ MM (Millimetre)
Number	No.
Volume	Cu.M
Area	Sq.M

1.9 Welds, bolts, nuts, washers etc. shall not be measured. No payment for temporary works connected with this Contract or for items such as weld, shims, packing plates etc. shall be made by Owner. Cost of above items shall be included in the unit rates quoted.

1.10 Wherever the unit of items has been indicated as lumpsum, the payment shall be made on lumpsum basis on completion & no mode of measurement shall be applicable.

2. GENERAL CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS

The measurement of works as mentioned in the relevant Technical/Standard Specification shall be followed.

3. PIPING AND RELATED WORK

3.1 PIPING

a) Payment will be made based on linear measurement as per execution drawings.

b) All lines shall be measured along the centre lines of pipes, curvilinear centre lines of bends and elbows, centre line of flanges and all other fittings such as tees, reducers, expansion joints etc. all in line instruments, line mounted fittings, ejectors, eductors, mixers, sight glasses, trays, inline filters, desuperheaters etc. Length of all types of valves (except socket weld and screwed valves upto 1.5" size) shall be excluded in this measurement. However, no separate payment for socket weld valves upto 1-1/2" size shall be made and the quoted rates for piping shall be deemed to include the same.

c) The socket weld fittings shall be supplied to the sub-contractor as per the requirements of the drawings. All other hot/cold bends, reducers etc. for size 1-1/2" and below shall be fabricated and erected as per requirements by the sub-contractor at no additional cost and his rates for piping of size 1-1/2" and below shall be inclusive of this work.

d) The forged tees shall be supplied to the sub-contractor as per the requirement of the drawings. All other branch connections including reinforcement pads shall be accomplished by pipe to pipe connections. The rates quoted for piping shall be inclusive of making branch connections. The reinforcement pads shall be measured separately.

e) Vents and drains shall be measured from O.D. of pipe lines and shall be paid for at the corresponding unit rates for similar sizes of pipe. Other piping attachment such as couplings, earthing lugs etc. shall be supplied & erected by the sub-contractor within his quoted rates for piping. However, vents and drains required temporarily for flushing and testing shall be provided by the sub-contractor at their cost.

f) Fabrication of spool pieces for temporary use to aid Sub-contractor's work such as fabrication, erection, flushing and testing of piping etc. shall be done by Sub-contractor at his cost as part of piping work and no separate payment shall be made for the same.

g) In case of branch piping, the measurement shall be made from outer surface of the main line except in case of equal size branches, in which case measurement shall be made from centre line of the branching header.

h) As regards safety valves, size of valves will be identified by inlet pipe size.

i) Reducers will be paid alongwith piping of larger dia- meter except in the case of funnels where they are welded only to the smaller diameter pipe, for which payment will be made alongwith piping of such smaller dia.

j) All piping attachments such as couplings, orifice plates, steam traps, strainers, earthing lugs etc. shall be provided by the Sub-contractor as part of piping erection work and no separate payment will be made for the same.

3.2 Piping Works

Measurement of above ground and underground piping shall be done in the following manner:

3.2.1 Fabrication of Piping

Measurement for fabrication of pipe shall be done on the basis of Inch. dia (the nominal diameter of pipe in 'Inches' multiplied by number of weld joints). All pre-fabrication work (including transportation of materials to site, fit up, shop weld, fabrication of spool pieces for erection) as well as all piping welding in situ are covered in Inch. dia. of fabrication. This shall include all types of SW/BUTT-welding e.g. GTAW, SMAW.

Payment shall be made based on the unit rate against following diameter range of pipes and type of welds, under the headings of pipe metallurgy (CS/AS/SS etc., separately for IBR/NIBR and thickness upto 10 MM/10-20 MM/20-30 MM/30-40MM etc.).

Butt Welds
Upto 1-1/2" NB
2" to 6" NB
8" to 14" NB
16" to 24" NB
26" to 36" NB
38" to 48" NB
50" to 60" NB
Above 60" NB

Fillet Welds
Upto 1-1/2" NB
2" to 6" NB
8"to14"NB
16" to 24" NB
26" to 36" NB
38" to 48" NB
50" to 60" NB
Above 60" NB

Total welding for slip on flanges shall be accounted as one single joint per flange.
Seal welds, wherever required shall not be counted under weld joints.

No separate payment shall be made for welding involved in pipe supports.

Branch welds shall be considered under butt welds

3.2.2 Erection of Piping

Measurement will be done based on Inch. Meter (the nominal diameter of pipe in 'Inches' multiplied by the installed length of piping in 'Meters') as per execution drawing. Inch. Meter shall include all work pertaining to Erection of Fabricated spools/straight lengths, providing vent, drains, instrument tapings, alignment, hydro-testing and all other activities required as per item description, but not covered in scope under Inch. dia.

Payment shall be made based on the unit rate against following diameter range of pipes:

Upto 1-1/2" NB
2" to 6" NB
8" to 14" NB

16" to 24" NB
26" to 36" NB
38" to 48" NB
50" to 60" NB
Above 60" NB

All lines shall be measured along the centre lines of pipes, curvilinear centre lines of bends and elbows, centre line of flanges and all other fittings such as tees, reducers, expansion joints etc. all in line instruments, line mounted fittings, ejectors, eductors, mixers, sight glasses, trays, filters, desuperheaters etc. Length of all types of valves except socket weld valves upto 1-1/2" shall be excluded in this measurement. However, no separate payment for socket weld valves upto 1-1/2" size shall be made and the quoted rates for piping shall be deemed to include the same.

3.2.3 REMARKS:

Measurement of following flanged/ screwed items shall be in linear Running meter basis/Lumpsum basis, as applicable:

i) Clad steel piping

ii) Cement lined piping

iii) Rubber lined piping

iv) Teflon lined piping

v) Plastic piping (HDPE etc.)

vi) Galvanised piping

vii) Jacketed piping

viii) Steam Tracers

ix) Tubing

Measurement of following items shall be on number basis:

- Piping Specials like Mitres & Fabricated Reducers
- Reinforcement pads

3.3 Fabrication of Specials

For fabrication of mitre bends and reducers (concentric & eccentric) from the pipes/ Steel plates/ fabricated pipes to be supplied by Owner free of cost, payment will be made on numbers of such specials at the rates given separately in Schedule of Rates. The unit rate shall be inclusive of tests such as DP/ MP as mentioned in item description of an item. However, the erection of mitre bends and reducers shall be part of piping erection work and the rates for piping will be inclusive of this work.

3.4 Valves

All types of valves such as gate/ globe / check / plug / needle/ ball/ control/ safety valves/ Gate Valves/ Butterfly valves etc. will be measured and paid on number basis at the rates given in the Schedule of Rates. Dismantling and re-erection of the valves required for the purpose of testing, calibration etc. shall not be considered for measurement as same are to be carried out by the sub-contractor within his quoted rates. The length of such valves along with companion flanges shall be excluded from piping length.

3.5 Fabrication of Supports

Measurement and payment of fabrication of pipe supports shall be on weight basis.

Bolts, nuts and washers including U-bolt will be supplied by sub-contractor. Weight of bolts, nuts and U-bolts etc. shall not be added to the weight of pipe support for payment purpose. Spring supports, if any, shall be supplied by Owner as Free Issue.

Erection of all types of supports, including grouting of supports, if required, shall be carried out by the Sub-contractor as part of piping work and no separate measurement & payment will be made for it. However, for erection of pre-issued support assemblies like spring, strut, snubber etc., payment shall be done separately.

3.6 Post Weld Heat Treatment (Stress Relieving)

Measurement and payment for post weld heat treatment shall be on the basis of per circumferential joint for different diameters of pipes as per the rates quoted. Repeat post weld heat treatment for repaired joints or otherwise due to Sub-contractor's fault will be carried out at Sub-contractor's cost. In case of attachment welding (of support to piping) undergoing PWHT, the weld length shall be considered for payment on the basis of equivalent circumferential weld joint.

3.7 Radiography/ Dye-Penetrate (DP) Test / Magnetic Particle (MP) Test

Measurement and payment for radiography shall be made on the basis of circumferential joints for different pipe diameter. Repeat radiography due to defective films or on repaired joint due to Sub-contractor's fault or for additional radiography necessitated due to poor performance of Sub-contractor's welder will be done at Sub-contractor's cost.

Measurement and payment for magnetic particle and dye penetrate test will be on the basis of weld length tested/ circumferential weld joints as mentioned in schedule of rates.

The cost of DP/MP test included in item description of piping items such as Fabrication of Specials, Reinforcement Pads etc. shall be included in the quoted unit rate and no additional payment for such DP/MP test for such items shall be made. Payment for DP/MP test shall be made only for such items where DP/MP test is not included in item description.

The cost for performing Positive Materials Identification (PMI) using alloy analysers including hiring of such equipment and mobilisation of the same to site shall be included in the unit rate for all such items of piping where PMI is specified in the item description.

4. PAINTING ON EQUIPMENTS/ PIPING/ STRUCTURAL STEEL ETC.

4.1 Painting on Equipments

For columns, vessels, reactors, Exchangers, furnaces, ejectors etc., measurement shall be on square meter basis taken over the painted surface.

For equipment numbering, name, lettering and stencilling (only for Pressure Vessels) separate payment for letter shall be made as per the rates mentioned in Schedule of Rates.

For pumps, motors and compressors measurement shall be made on number basis.

4.2 Painting on Piping, Specials and Fittings

Payment will be made on linear measurement in 'Meters' corrected to the nearest centimetre.

Piping shall be measured along the centre line through all types of fittings and flanges.

Rates for painting of pipes shall be inclusive of painting of all types of pipe supports, flanges, guides, shoes, saddles, clamps, etc. and also all types of fittings except valves which shall be paid separately on number basis.

There will be no separate measurements of the colour bands/ identification signs (line numbering), flow direction etc. on uninsulated and insulated piping, the rates of painting of linear length of piping shall be inclusive of cost of such works.

4.3 Painting on Steel Structure

Payment for steel structures shall be made on the basis of admissible weight of structure painted.

Welds, bolts, nuts, washers etc. shall not be measured and paid as rates for painting of structure are inclusive of painting of such items.

5. THERMAL INSULATION WORKS

The mode of measurement shall be as per the details mentioned in this Annexure.

In case of discrepancy between measurement of work, specified in this Annexure. Standard Specification/Job Specification, Schedule of Price/Rates etc., precedence shall be given in following order :

- Measurement of works as per this Annexure of SCC.
- Measurement of works as mentioned in Standard Specifications/Job Specification.
- Measurement of works in accordance with item description of relevant item mentioned in Schedule of Rates.

In case the clarity is not in the above documents, then it shall be as per BIS and if it does not exist in BIS also, then Measurement of works shall be as decided by Engineer-in-Charge.

Payment will be made on the basis of joint measurements taken by Contractor and certified by Engineer-in-Change. Measurement shall be based on "Approved for Construction" drawings, to the extent that the work conforms to the drawings and details are adequate.

Wherever work is executed based on instructions of Engineers-in-Charge or details are not adequate in the drawings, Contractor shall take physical measurements in the presence of Engineer-in-Charge.

Welds, bolts, nuts, washers etc, shall not be measured. No payment for temporary works connected with this Contract or for items such as weld, shims, packing plates etc, shall be made by OWNER. Cost of above items shall be included in the unit rates quoted.

Wherever the unit of items has been indicated as lumpsum, the payment shall be made on lumpsum basis on completion & no mode of measurement shall be applicable.

Piping

Measurement of piping shall be taken/considered along Curvilinear centre lines of pipe insulated and through all fittings which are insulated but excluding valves, instruments and fittings which are insulated measurements shall be considered as under :

a) For all types of valves, including control valves on which removable box has been provided: payment shall be made per number. This shall be including mating flanges on both side and proper body of valves/control valves.

b) For all type of flange assembly including orifice plate, payment shall be made on number basis.

c) For bends, additional measurement equivalent to single length of curvilinear centre lines of bends shall be added to the respective size of piping.

d) Reducers will be considered with larger diameter.

e) No extra payment shall be made for tees, branch connections and inspection plugs and the rates quoted shall be inclusive of all these items. Branch connections shall be measured from the outer surface of the header.

f) No extra payment shall be made for vents, drains and instrument connections having nozzles length upto 12". However, if the length of such connections exceeds 300mm the same will be paid as per piping measurement in respective sizes.

g) For all fittings measurement along curvature centre line shall be considered.

h) Steam/Refrigerant traced lines and untraced pipelines shall be normally specified and measure separately Steam/Refrigerant traced lines shall also be normally specified and measured separately, according to the number of tracers.

i) For steam/Refrigerant traced pipelines, which are specified and are measured separately, only the diameter of the main pipelines (s) shall be reckoned for measurement of insulation. No. separate measurement shall be made for the insulation of the steam tracer line(s) which shall be deemed to have been covered under the insulation of the main pipeline.

j) For all fittings measurement along curvature centre line shall be considered.

NOTE :

All other mode of measurement not covered in above clauses shall be measured in accordance with relevant BIS codes/Schedule of Rates/Specifications etc. and/or as decided by Engineers-in-Charge. The above measurement of works shall not be applicable for lumpsum items of SOR.

ANNEXURE-IV

TO

SCC

KEY CONSTRUCTION MANPOWER TO BE DEPLOYED BY THE CONTRACTOR DURING EXECUTION FOR BALANCE WORK FOR CONSTRUCTION OF BOUNDARY WALL AROUND THE SHRI RAM MANDIR COMPLEX IN AYODHYA

S. NO.	DESCRIPTION	NOS.
1.	RCM	1
2.	LEAD DISCIPLINE ENGINEER - CIVIL & STRUCTURAL	 1
3.	LEAD QA/QC ENGINEER	1
4.	SAFETY OFFICER & OTHER SAFETY PERSONNEL	AS PER HSE SPEC (6-82-0001)
5.	DISCIPLINE ENGINEERS+ SUPERVISORS - CIVIL - ELECTRICAL - QUANTITY SURVEYOR -LICENCED ELECTRICIAN - SURVEYOR - LAB TECHNICIAN	 1+2 1 1 1 1 1

NOTES

1) Above key construction manpower is required to be deployed by the contractor to complete the work within schedule. Contractor is required to augment the above list with additional numbers/categories of personnel as required and directed by Engineer-In charge to complete the work within the completion time schedule and quoted price.

2) The Key Construction Personnel identified above shall be well qualified & having adequate relevant experience, as specified in document No. 7-82-0003 enclosed elsewhere in the bidding document. The other manpower shall also be qualified and experienced with their assigned work.

3) Key Construction personnel identified above shall be deployed by contractor as and when relevant activities are required to be carried out for completing the job within completion time schedule and as per direction of Engineer In-charge.

4) CVs of key persons proposed to be deployed shall be submitted to Owner/Engineer-In-charge prior to their mobilization at site. The mobilization of key personnel shall be done at site subject to prior approval of their CVs by Owner/Engineer-In-charge.

(STAMP & SIGNATURE OF BIDDER)

ANNEXURE-V

TO

SCC

प्रमुख निर्माण कार्मिकों के लिए अपेक्षित योग्यता एवं अनुभव और तैनाती न करने पर जुर्माना

QUALIFICATION & EXPERIENCE REQUIREMENT OF KEY CONSTRUCTION PERSONNEL AND PENALTY FOR THEIR NON-MOBILIZATION

Rev. No	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
1	01.07.2020	Revised & Updated	DG	RK	AKK	SKS
0	12.06.2015	Doc. No. 9-1940-0001 Rev 1 has been revised and issued as Standard	DJ	RK	MD	SC

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Abbreviations:

CV	:	Curriculum Vitae
EPC	:	Engineering, Procurement & Construction
EPCC	:	Engineering, Procurement, Construction & Commissioning
ISO	:	International Organization for Standardization
NDT	:	Non Destructive Testing
QA/QC	:	Quality Assurance /Quality Control
RT	:	Radiography Testing
UT	:	Ultrasonic Testing

Construction Standards Committee

Convenor: Sh. A K Kundu, ED (Construction)

Members:
Sh. Janak Kishore, ED (Projects)
Sh. Biswajit Mandal, Sr. GM (SCM)
Sh. Udayan Chakravarty, Sr. GM (Piping)
Sh. Ravindra Kumar, GM (Construction)
Sh. Debasish Ghosal, GM (Construction)
Sh. Pankaj Kumar Rai, AGM (Construction)

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Qualification & Experience (Post Qualification)

CATEGORY	QUALIFICATION & EXPERIENCE (POST QUALIFICATION) REQUIRED			
Resident Construction Manager/ Resident Engineer/Site-In-Charge	Degree or Diploma in Engineering with minimum following relevant experience in construction:			
	Awarded value (Rs) →	< 10 Cr. Works	10 - 50 Cr. Works	> 50 Cr. Works
	Degree holders	5 yrs	10 yrs	15 yrs
	Diploma holders	8 yrs	13 yrs	20 yrs
Lead Discipline Engineer (Mechanical, Civil, Electrical, Instrumentation)	Degree or Diploma in relevant Engineering discipline with following minimum experience in Construction:			
	Awarded value (Rs) →	≤ 10 Cr. Works	10-50 Cr. Works	> 50 Cr. Works
	Degree holders	3 yrs	5 yrs	10 yrs
	Diploma holders	5 yrs	8 yrs	13 yrs
Lead Welding / NDT Engineer	Degree or Diploma in Mechanical Engineering/ Metallurgy with the minimum following experience in Welding & NDT (Non Destructive Testing) and possessing valid Level-II certificate in the relevant NDT methodology (RT/UT)			
	Awarded value (Rs) →	≤ 10 Cr. Works	10-50 Cr. Works	> 50 Cr. Works
	Degree holders	3 yrs	5 yrs	10 yrs
	Diploma holders	5 yrs	8 yrs	13 yrs
Lead QA/QC Engineer	Degree or Diploma in Engineering with following experience (refer Note 1 also) :			
	Awarded value (Rs) →	≤ 10 Cr. Works	10-50 Cr. Works	> 50 Cr. Works
	Degree holders	3 yrs of construction experience of which minimum 1 years in QA/QC	5 yrs of construction experience of which minimum 2 years in QA/QC	10 yrs of construction experience of which minimum 3 years in QA/QC
	Diploma holders	5 yrs of construction experience of which minimum 3 years in QA/QC	8 yrs of construction experience of which minimum 5 years in QA/QC	13 yrs of construction experience of which minimum 6 years in QA/QC
Lead Planning Engineer	Degree or Diploma in Engineering with following experience in Planning & Scheduling			
	Awarded value (Rs) →	≤ 10 Cr. Works	10-50 Cr. Works	> 50 Cr. Works
	Degree holders	3 yrs	5 yrs	8 yrs
	Diploma holders	5 yrs	8 yrs	13 yrs
Safety Officer / Supervisor	As per HSE Specification enclosed elsewhere in the bidding document.			

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Warehouse- In- Charge/ Materials Manager	Diploma in Engineering or Diploma in Materials Management or Graduate in any stream with min. following experience in Warehousing/ Stores Management:			
	Awarded value (Rs) →	≤ 10 Cr. Works	10-50 Cr. Works	> 50 Cr. Works
	Experience	3 years	5 yrs.	10 yrs.
Quantity Surveyor	Degree or Diploma in Engineering with minimum following experience in quantity estimation, field measurement, bill preparation etc. in Construction field:			
	Awarded value (Rs) →	≤ 10 Cr. Works	10-50 Cr. Works	> 50 Cr. Works
	Degree holders	2 yrs	3 yrs	5 yrs
	Diploma holders	4 yrs	6 yrs	8 yrs
Discipline Engineer	Degree in relevant Engineering Discipline with minimum 2 years of relevant experience in construction or Diploma in relevant Engineering Discipline with minimum 4 years of relevant experience in Construction. Welding / NDT engineer shall possess valid Level-II certificate in the relevant NDT methodology (RT/UT).			

NOTES : (For Table)

1. For Mechanical, Composite, EPC or EPCC Contracts of value more than Rupees 50 crores, the Lead QA/QC Engineer shall be a qualified internal auditor for ISO 9001.
2. CVs of key construction personnel proposed to be deployed shall be submitted to Owner/Engineer-in-Charge prior to their mobilization at site. The mobilization of key personnel shall be done at site subject to prior approval of their CVs by Owner/Engineer-in-Charge.

PENALTY FOR NON - MOBILIZATION OF KEY CONSTRUCTION PERSONNEL

Penalty for non-mobilization per day per person after the contractual mobilization period / mobilization schedule agreed during Kick off meeting / jointly agreed between contractor and PMC / Owner based on front availability etc.

- Rs. 7000/- for Resident Construction Manager/ Resident Engineer/ Site-in-Charge.
- Rs. 4000/- for Lead QA/QC Engineer, Lead Planning Engineer, Warehouse In-charge, Lead Discipline Engineers, Lead Welding / NDT Engineer and the Quantity surveyor.
- Safety Officer (As per HSE Specification).

NOTES : (For Penalty Clauses)

a) All intervening off days (Sundays etc.) and holidays will be counted for levy of penalty.

b) Mobilized personnel shall not be demobilized till contractual completion or based on consent of Engineer-in-Charge, else penalties as above shall be applied.

c) Total of above penalties shall not exceed 2% of the awarded contract value.

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Job Number: C098

SPECIFICATION
FOR
QUALITY MANAGEMENTSYSTEM

[ANNEXURE - VI TO SPECIAL CONDITIONS OF CONTRACT]

बोलीकर्ता से गुणवत्ता प्रबंधन प्रणाली अपेक्षाओं हेतु विनिर्देश

SPECIFICATION FOR QUALITY MANAGEMENT SYSTEM REQUIREMENTS FROM BIDDERS

Rev. No	Date	Purpose	Prepared by	Checked by	Standards Committee Convener	Standards Bureau Chairman
					Approved by	
2	12.06.20	General Revision	QMS Standards Committee	QMS Standards Committee	SKB	SKS
1	12.03.15	General Revision	QMS Standards Committee	QMS Standards Committee	MPJ	SC
0	04.06.09	Issued as Standard Specification	QMS Standards Committee	QMS Standards Committee	SCT	ND

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Abbreviations:

ISO	-	International Organization for Standardization
MR	-	Material Requisition
PO	-	Purchase Order
PR	-	Purchase Requisition
QMS	-	Quality Management System

QMS Standards Committee

Convener: Mr. S.K. Badlani

Members: Mr. Sanjay Mazumdar (Engg.)
Mr. R.K. Singh (SCM)
Mr. B. Biswas (SCM)
Mr. Ravindra Kumar (Const.)
Mr. Vinod Kumar (CQA)
Mr. Swapnil Vaishnav (Projects)

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1.0 SCOPE

This specification establishes the Quality Management System requirements to be met by BIDDER for following purpose:

- QMS requirements to be met by suppliers / contractors after award of work / during contract execution.

2.0 DEFINITIONS

2.1 Bidder

For the purpose of this specification, the word "BIDDER" means the person(s), firm, company or organization who is under the process of being contracted by EIL / Owner for delivery of some products (including service). The word is considered synonymous to supplier, contractor or vendor.

2.2 Project Quality Plan

Document tailored from Standard Quality Management System Manual of BIDDER, specifying how the quality requirements of the project will be met.

2.3 Owner

Owner means the owner of the project for which services / products are being purchased and includes their representatives, successors and assignees.

3.0 REFERENCE DOCUMENTS

6-78-0002	Specification for Documentation Requirements from Contractors
6-78-0003	Specification for Documentation Requirements from Suppliers

4.0 QUALITY MANAGEMENT SYSTEM – GENERAL

Unless otherwise agreed with EIL / Owner, the BIDDER proposed quality system shall fully satisfy all relevant requirements of ISO 9001 "Quality Management Systems – Requirements." Evidence of compliance shall be current certificate of quality system registration to ISO 9001 or a recent compliance audit recommending registration from a certification agency. The quality system shall provide the planned and systematic control of all quality related activities for execution of contract. Implementation of the system shall be in accordance with BIDDER'S Quality Manual and PROJECT specific Quality Plan.

5.0 QUALITY SYSTEM REQUIREMENTS

5.1 BIDDER shall prepare and submit for review / record, Project Quality Plan / Quality Assurance Plan for contracted scope / job. The BIDDER'S Quality Plan shall address all of the applicable elements of ISO 9001, identify responsible parties within BIDDER'S organization, for the implementation / control of each area, reference the applicable procedures used to control / assure each area, and verify the documents produced for each area. The Project Quality Plan shall necessarily define control or make reference to the relevant procedures, for design and engineering, purchase, documentation, record control, bid evaluation, inspection, production / manufacturing, preservation, packaging and storage, quality control at construction site, pre-commissioning, commissioning and handing over (as applicable) in line with contract requirement and scope of work.

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5.2 BIDDER shall identify all specified or implied statutory and regulatory requirements and communicate the same to all concerned in his organization and his sub contractor's organization for compliance.

5.3 BIDDER shall deploy competent and trained personnel for various activities for fulfillment of PO / contract. BIDDER shall arrange adequate infrastructure and work environment to ensure that the specification and quality of the deliverable are maintained.

5.4 BIDDER shall do the quality planning for all activities involved in delivery of order. The quality planning shall cover as minimum the following:

- Resources
- Product / deliverable characteristics to be controlled.
- Process characteristics to ensure the identified product characteristics are realized
- Identification of any measurement requirements, acceptance criteria
- Records to be generated
- Need for any documented procedure

The quality planning shall result into the quality assurance plan, inspection and test plans (ITPs) and job procedures for the project activities in the scope of bidder. These documents shall be submitted to EIL / Owner for review / approval, before commencement of work.

5.5 Requirements for sub-ordering of outsourced items / sub-contracting / purchasing of services specified in MR / contract / tender shall be adhered to. In general all outsourced items will be from approved vendors of EIL. Wherever requirements are not specified, or approved sub vendors do not exist, the sub-contractor shall establish and maintain a system for purchasing / sub-contracting to ensure that purchased product / service conforms to specified requirements in concurrence with EIL / Owner. Criteria for selection of sub-contractor, evaluation, re-evaluation, maintenance of purchasing data and verification of purchased product (sub-contractor services), constitute important components of this requirement.

5.6 BIDDER shall plan and carry production and service provision under controlled conditions. Controlled conditions shall include, as applicable

a) the availability of information that describes the characteristics of the product
b) the availability of work instructions
c) the use of suitable equipment
d) the availability and use of monitoring and measuring devices
e) the implementation of monitoring and measurement
f) the implementation of release, delivery and post-delivery activities

5.7 BIDDER shall validate any processes for production and service provision where resulting output cannot be verified by subsequent monitoring and measurement. This includes any process where deficiencies become apparent only after the product is in use or service has been delivered.

5.8 BIDDER shall establish a system for identification and traceability of product / deliverable throughout product realization. Product status with respect to inspection and testing requirements shall be identified.

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5.9 BIDDER shall identify, verify, protect and safeguard EIL / Owner property (material / document) provided for use or incorporation into the product. If any Owner / EIL property is lost, damaged or otherwise found to be unsuitable for use, this shall be reported to the EIL / Owner.

5.10 BIDDER shall ensure the conformity of product / deliverable during internal processing and delivery to the intended destination. Requirements mentioned in the MR/ tender shall be adhered to.

5.11 BIDDER shall establish system to ensure that inspection and testing activities are carried out in line with requirements. Where necessary, measuring equipment shall be calibrated at specified frequency, against national or international measurement standards; where no such standard exists, the basis used for calibration shall be recorded. The measuring equipment shall be protected from damage during handling, maintenance and storage.

5.12 BIDDER shall ensure effective monitoring, using suitable methods, of the processes involved in production and other related processes for delivery of the scope of contract.

5.13 BIDDER shall monitor and measure the characteristics of the product / deliverable to verify that product requirement has been met. The inspection (stage as well as final) by BIDDER and EIL / Owner personnel shall be carried out strictly as per the approved ITPs or ITPs forming part of the contract. Product release or service delivery shall not proceed until the planned arrangements have been satisfactorily completed, unless otherwise approved by relevant authority and where applicable by Owner / EIL.

5.14 BIDDER shall establish and maintain a documented procedure to ensure that the product which does not conform to requirements is identified and controlled to prevent its unintended use or delivery

5.15 All non-conformities (NCs) / deficiencies found by the BIDDER'S inspection / surveillance staff shall be duly recorded, including their disposal action shall be recorded and resolved suitably. Effective corrective actions shall be implemented by the BIDDER so that similar NCs including deficiencies do not recur. The BIDDER shall take appropriate actions to address the Risks and Opportunities in the project.

5.16 All deficiencies noticed and reported by EIL / Owner shall be analyzed by the BIDDER and appropriate corrective actions shall be implemented. BIDDER shall intimate EIL / Owner of all such corrective action implemented by him.

5.17 BIDDER should follow the standards, specifications and approved drawings. Concessions / Deviations shall be allowed only in case of unavoidable circumstances. In such situations Concession / deviation request must be made by the BIDDER through online system of EIL eDMS. URL of EIL eDMS is http://edocx.eil.co.in/vportal.

5.18 BIDDER shall have documented procedure for control of documents.

5.19 All project records shall be carefully kept, maintained and protected for any damage or loss until the project completion, then handed over to EIL / Owner as per contract requirement (Refer Specification Nos. 6-78-0002 - Specification for Documentation Requirements from Contractors and 6-78-0003 - Specification for Documentation Requirements from Suppliers), or disposed as per relevant project procedure.

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6.0 AUDITS

BIDDER shall plan and carry out the QMS audit for the job. Quality audit programme shall cover design, procurement, construction management and commissioning as applicable including activities carried out by sub-vendors and sub-contractors. This shall be additional to the certification body surveillance audits carried out under BIDDER'S own ISO 9001 certification scheme.

The audit programmes and audit reports shall be available with bidder for scrutiny by EIL / Owner. EIL or Owner's representative reserves the right to attend, as a witness, any audit conducted during the execution of the WORKS.

In addition to above, EIL, Owner and third party appointed by EIL / Owner may also perform Quality and Technical compliance audits. BIDDER shall provide assistance and access to their systems and sub-contractor / vendor systems as required for this purpose. Any deficiencies noted shall be immediately rectified by BIDDER.

7.0 DOCUMENTATION REQUIREMENTS

BIDDER shall submit following QMS documents immediately after award of work (Within one week) for record / review by EIL / Owner/ TPIA, as applicable.

- Organization chart (for complete organization structure and for the project)
- Project Quality Plan / Quality Assurance Plan
- Job specific Inspection Test Plans, if not attached with PR
- Job Procedures
- Inspection / Test Formats

In addition to above QMS documents, following documentation shall be maintained by the BIDDER for submission to EIL / Owner on demand at any point of time during execution of the project.

- Quality Manual
- Certificate of approval for compliance to ISO: 9001 standard
- Procedure for Control of Non-conforming Product
- Procedure for Control of Documents
- Sample audit report of the QMS internal and external audits conducted during last one year
- Customer satisfaction reports from at least 2 customers,
- Project QMS audit report
- Technical audit reports for the project
- Corrective action report on the audits

Documents as specified above are minimum requirements. BIDDER shall submit any other document / data required for completion of the job as per EIL / Owner instructions.

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ANNEXURE-VII

TO

SCC

KEY CONSTRUCTION EQUIPMENTS TO BE MOBILIZED BY THE CONTRACTOR DURING EXECUTION OF BALANCE WORK FOR BOUNDARY WALL AROUND THE SHRI RAM MANDIR COMPLEX IN AYODHYA

SL. NO.	EQUIPMENT DESCRIPTION	CAPACITY	REQUIREMENT DURING CONSTN
1.	HYDRAILIC EXCAVATOR WITH REVERSE HORN AND REAR LIGHT/MIRROR WITH ROCK & CONCRETE BREAKING/CHISELLING ATTACHMENT	0.7-1.2 M3	AS REQUIRED
2.	HYDRAULIC EXCAVATOR WITH REVERSE HORN AND REAR LIGHT/MIRROR WITH ROCK & CONCRETE BREAKING/CHISELLING ATTACHMENT	0.3 M3	AS REQUIRED
3.	HYDRAULIC CRANE (MODEL NO: TRX Series- K10,F15 TRX 1651, TRXS 2319, MAC 1214, FX 120, FX150, 15XWE, 15XWF Rhino110 FC, etc.) WITH AUDIO-VISUAL SIGNALLING DEVICES AND LIMIT SWITHES	10-18 MT	AS REQUIRED
4.	HYDRAULIC/ PNEUMATIC RIG & RELEVANT ACCESSORIES FOR BORED CAST-IN-SITU RCC STRAIGHT SHAFTED PILES ALONG WITH CRANE FOR ASSEMBLY OF RIG.		AS REQUIRED
5.	CONVENTIONAL PILING RIG & RELEVANT ACCESSORIES FOR BORED CAST-IN-SITU RCC STRAIGHT SHAFTED PILES		3
6.	EQUIPMENTS & ACCESSORIES FOR PILE LOAD TESTING (VERTICAL, PULLOUT AND LATERAL) AS PER SOR		AS REQUIRED
7.	CRANE	40-50 MT	AS REQUIRED
8.	HYDRAULIC/PNEUMATIC PILE HEAD BREAKER		AS REQUIRED
9.	DUMPER		AS REQUIRED
10.	TRACTOR TRAILER WITH HYDRAULIC UNLOADING FACILITY		AS REQUIRED
11.	TRAILER		AS REQUIRED
12.	BOOM LIFT		AS REQUIRED
13.	BOOM PLACER/ CONCRETE PUMP		AS REQUIRED
14.	VIBRO / ROAD ROLLER	8-10 TON	AS REQUIRED
15.	READY MIXED CONCRETE (RMC) PLANT/ SUPPLIER	30 M3/HR	AS REQUIRED
16.	TRANSIT MIXER (IF NOT PROVIDED BY THE RMC SUPPLIER)	6 M3	AS REQUIRED
17.	MIXER MACHINE WITH WEIGH BATCHER		1
18.	PLATE COMPACTOR		1
19.	NEEDLE VIBRATORS		2
20.	BAR CUTTING AND BENDING MACHINE		2
21.	WATER TANKERS		AS REQUIRED
22.	TOTAL STATION		1
23.	AUTO LEVEL		2
24.	WELDING MACHINE		2
25.	GRINDING MACHINE		2
26.	GAS CUTTING SET		AS REQUIRED
27.	AIR COMPRESSOR		AS REQUIRED
28.	BLAST CLEANING EQPT.		AS REQUIRED
29.	DG SET	25-65 KVA	AS REQUIRED
30.	TOOLS AND TACKLES REQUIRED FOR PAINTING AS PER SOR		AS REQUIRED
31.	ELCO METER		AS REQUIRED
32.	HYDROTESTING / LEAK TESTING MACHINE SETUP		AS REQUIRED
33.	JACKHAMMER		AS REQUIRED
34.	WATER FILLING PUMP (SUITABLE CAPACITY)		AS REQUIRED
35.	DEWATERING PUMP (SUITABLE CAPACITY)		AS REQUIRED

36.	TOOLS AND TACKLES REQUIRED FOR FIXING MECHANICAL ANCHOR FASTNER / CHEMICAL ANCHOR FASTNER AS PER SOR		AS REQUIRED
37.	TOOLS AND TACKLES REQUIRED FOR CHEMICAL REBARING WORKS AS PER SOR		AS REQUIRED
38.	TOOLS AND TACKLES REQUIRED FOR SHORING AND STRUTTING AS PER SOR		AS REQUIRED
39.	TOOLS AND TACKLES REQUIRED FOR CENETRING & SHUTTERING WORKS AS PER SOR		AS REQUIRED
40.	TOOLS AND TACKLES REQUIRED FOR CARPENTRY WORKS AS PER SOR		AS REQUIRED
41.	TOOLS AND TACKLES REQUIRED FOR PLUMBING WORKS AS PER SOR		AS REQUIRED
42.	TOOLS AND TACKLES REQUIRED FOR JOINTING OF UPVC/CPVC PIPE AS PER SOR		AS REQUIRED
43.	TOOLS AND TACKLES REQUIRED FOR ALUMINIUM WORKS AS PER SOR		AS REQUIRED
44.	TOOLS AND TACKLES REQUIRED FOR TOOLS AND TACKLES FOR RCC CUTTING /CHIPPING WORKS/ DISMANTLING/ MAKING OF POCKETS & HOLES AS PER SOR		AS REQUIRED
45.	TOOLS AND TACKLES REQUIRED FOR STAINLESS STEEL WORKS AS PER SOR		AS REQUIRED
46.	TOOLS AND TACKLES REQUIRED FOR STONE/ TILE WORKS AS PER SOR		AS REQUIRED
47.	TOOLS AND TACKLES REQUIRED FOR WATERPROOFING WORKS AS PER SOR		AS REQUIRED
48.	TOOLS AND TACKLES FOR GI PIPING		AS REQUIRED
49.	3 TERMINAL EARTH TESTER		AS REQUIRED
50.	DIGITAL MULTIMETER		AS REQUIRED
51.	TONG TESTER	0-300 AMP	AS REQUIRED
52.	EARTH DISCHARGE ROD		AS REQUIRED
53.	LUX METER		AS REQUIRED
54.	PANEL SHIFTING TROLLEY		AS REQUIRED
55.	LIVE CABLE DETECTOR		AS REQUIRED
56.	MANUAL/HYDRAULIC CRIMPING TOOL		1 SET EACH
57.	LEAKAGE CURRENT DETECTOR		AS REQUIRED
58.	LIFTING JACK, SHAFT SUITABLE FOR CABLE DRUM LIFTING		AS REQUIRED
59.	ELECTRICIAN TOOL KIT		AS REQUIRED
60.	INSTRUMENTATION TOOL KIT		AS REQUIRED
61.	PORTABLE DRILL M/C & HOLE CUTTER		AS REQUIRED
62.	INSULATION RESISTANCE MEGGER		AS REQUIRED
63.	LABORATORY EQPTS		AS REQUIRED

NOTES :

1. The details of key construction equipments in good working condition, required to be mobilized by the Contractor, to complete the work within the schedule. The actual deployment schedule of Construction Equipments shall be approved by Engineer-in-charge. Contractor shall augment the above list with additional numbers/categories/ capacities of equipments, tools & tackles, as required and directed by Engineer-In charge to complete the work within the completion time schedule and quoted price.

2. Contractor to confirm that the above equipments are available with him in good working condition and shall be timely mobilized on this project site. Contractor has the option to hire some of these equipments form equipment-hiring agencies also.

3. Owner/EIL reserves the right to physically check & verify the availability of these equipments prior to award of work.

4. Contractor shall replace any defective/damaged equipments promptly to complete the work without any time & cost implication to the Owner/EIL.

5. Construction equipment identified above shall be mobilised by contractor as and when relevant activities are required to be carried out for completing the job within completion time schedule and as per direction of Engineer In-charge.

6. Instruments (as applicable) to be made available with valid calibration certificate, issued by NABL accredited laboratory.

(STAMP & SIGNATURE OF BIDDER)

CALIBRATION REQUIREMENTS OF MONITORING AND MEASURING DEVICES AT CONSTRUCTION SITES

[ANNEXURE - VIII TO SPECIAL CONDITIONS OF CONTRACT]

निर्माण स्थलों पर निगरानी और मापने के उपकरणों की आंशांकन आवश्यकताएँ

CALIBRATION REQUIREMENTS OF MONITORING AND MEASURING DEVICES AT CONSTRUCTION SITES

Rev. No	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
1	02.07.2020	Revised & Updated	DG	RK	AKK	SKS
0	28.04.2015	Doc. No. 9-1940-0030 Rev 0 has been issued as Standard	DJ	SNB	MD	SC

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Abbreviations:

BIS	:	Bureau of Indian Standard
NABL	:	National Accreditation Board for Testing and Calibration Laboratories
CEIL	:	Certification Engineers International Ltd.
LRS	:	Llyod's Register Group Limited
BV	:	Bureau Veritas
ABS	:	ABS Consultancy
DNV	:	Det Norske Veritas
IRS	:	Indian Registrar for Shipping
PMI	:	Positive Material Identification

Construction Standards Committee

Convenor: Sh. A K Kundu, ED (Construction)

Members:
Sh. Janak Kishore, ED (Projects)
Sh. Biswajit Mandal, Sr. GM (SCM)
Sh. Udayan Chakravarty, Sr. GM (Piping)
Sh. Ravindra Kumar, GM (Construction)
Sh. Debasish Ghosal, GM (Construction)
Sh. Pankaj Kumar Rai, AGM (Construction)

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Requirement for control of monitoring and measuring devices.

Sl. No.	Description	Calibration requirements	Frequency	Remarks
A.	**Civil-Survey**			
A.1.	Theodolite	To check for permanent adjustments by traversing and observing the closing error. (Refer Note).	Once in a year or project duration whichever is earlier.	Record to be maintained
A.2.	Level Instruments (Auto Level / Dumply Level)	To check by backsight / foresight readings, the temporary adjustments of level. (Refer Note).	Every use.	Record to be maintained
A.3.	Steel measurement tapes	----	----	a. "Freemans" make or BIS approved make shall be used. b. Mutilated, or broken tapes shall not be used. c. Marking on the tape shall be legible
A.4.	Cross staff	---	---	Same as 3b & 3c above.
A.5.	Distomat	Actual Physical Verification at Site.	Before using first time at site.	Records to be maintained.
A.6.	Total Station	To check for permanent adjustments by traversing and observing the closing error, etc. (Refer Note).	Once in a year or project duration whichever is earlier.	Record to be maintained
B.	**Civil Laboratory**			
B.1.	All balances - Mechanical	Check for zero error	Whenever used.	---
B.2.	Weigh Batcher / Batching Plant	Calibration of scales	Once in three Months.	Records to be maintained.
B.3.	Cube testing machine	Calibration certificate from manufacturers or from calibrating laboratories / agency. (Refer Note).	As per manufacturer specification or once a year whichever is earlier	Records to be maintained.
B.4.	Moisture Meter	Calibration of scales .	6 months.	Records to be maintained.
B.5	Vicat Appratus	Calibration certificate from manufacturers or from calibrating laboratories / agency. (Refer Note).	As per manufacturer specification or once a year whichever is earlier.	Records to be maintained.

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Sl. No.	Description	Calibration requirements	Frequency	Remarks
C.	**Mechanical/ Electrical/Welding**			
C.1	Pressure gauges	Calibration certificate from calibrating laboratories / agencies or calibrate by dead weight testers with standard weights or with master Gauge. (Refer Note)	Once in 6 months	Records to be maintained.
C.2	Dial gauges	Check for Zero error.	Whenever used	---
C.3	Dead weight tester	Calibration from manufacturer or calibrating laboratories / agency. Calibration certificate shall not be older than one month from the date of mobilization. (Refer Note).	As per manufacturer's recommendation or once in a six month whichever is earlier.	Records (Calibration certificate) to be maintained.
C.4	Vernier caliper / screw gauge	Check for Zero error.	Whenever used.	---
C.5	Holiday tester	Calibration from manufacturer or calibrating laboratories / agency or calibration by zeep meter. (Refer Note).	Once in 6 months.	Records to be maintained.
C.6	Elcometer	Check with standard test films supplied by the manufactures.	Before use .	Records to be maintained.
C.7	Universal Testing machine	Calibration Certificate from various third party inspection agency. Viz. CEIL, LRS, BV, ABS, DNV or IRS etc.	As per manufacturer's recommendation or once a year whichever is earlier.	Records to be maintained.
C.8	Charpy V-notch Impact testing machine.	Calibration Certificate from various third party inspection agency. Viz. CEIL, LRS, BV, ABS, DNV or IRS etc.	As per manufacturer's recommendation or once in a year whichever is earlier.	Records to be maintained.
C.9	Hardness Testing machine.	Check with the standard test block supplied with the machine as per manufacturer's Recommendation.	Before use.	Records to be maintained.
C.10	Chemical Analysis, ex : PMI etc.	Check with the standard samples.	Before use.	Records to be maintained.
C.11	Various Digital and Analog meters.	Calibration Certificate from calibrating laboratories / agencies or the Manufacturer (Refer Note).	Once in Six Months or as per manufacturer's recommendation whichever is earlier.	Records to be maintained.

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Sl. No.	Description	Calibration requirements	Frequency	Remarks
C.12	HIPOT Kit, Multimeter / Clampmeter, Ohmicron Kit, CT Analyser, CRM Kit, BDV Kit, Tachometer etc.	Calibration Certificate from calibrating laboratories / agencies (Refer Note).	Once in Six months.	Records to be maintained.
C.13	Temperature / Pressure recorders	Calibration from manufacturer or any calibrating laboratories / agency (Refer Note).	Once in Six months.	Records to be maintained
C.14	Temperature gauges	Calibration Certificate from calibrating laboratories / agencies (Refer Note).	Once in Six months.	To be discarded in case of damage or malfunctioning.
C.15	Thermocouples	Manufacturer's Certificate or Chemical Check	---	---
C.16	Vibration probes	Calibration from calibrating laboratories / agencies (Refer Note).	Once in a year.	To be discarded in case of damage or Malfunctioning.
C.17	Decibel-Meter	Calibration from calibrating laboratories / agencies (Refer Note).	Once in a year.	To be discarded in case of damage or Malfunctioning.
C.18	Manual Torque Wrench / Electric Torque Machine	Calibration from manufacturer or any calibrating laboratories / agency (Refer Note).	As per manufacturer's recommendation or once in a year whichever is earlier.	Records to be maintained
C.19	Mother Oven	Calibration from manufacturer or any calibrating laboratories / agency (Refer Note).	As per manufacturer's recommendation or once in a year whichever is earlier.	Records to be maintained.

Note: If Error is found, it has to be sent to manufacturers or their agents (Calibrating laboratories / agency) or to any other lab / agency for recalibration / rectification and certification. The calibrating laboratory / agency shall be NABL accredited or any other lab accredited as per ISO/IEC:17025 by any of the National/International accreditation body for relevant testing.

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Job Number: C098

SPECIFICATION

FOR

DOCUMENTATION REQUIREMENTS

FROM

CONTRACTORS

[ANNEXURE - IX TO SPECIAL CONDITIONS OF CONTRACT]

ठेकेदारों से प्रलेखन अपेक्षाओं हेतु विनिर्देश

SPECIFICATION FOR DOCUMENTATION REQUIREMENTS FROM CONTRACTORS

Rev. No	Date	Purpose	Prepared by	Checked by	Standards Committee Convener	Standards Bureau Chairman
					Approved by	
2	12.06..20	General Revision	QMS Standards Committee	QMS Standards Committee	SKB	SKS
1	12.03.15	General Revision	QMS Standards Committee	QMS Standards Committee	MPJ	SC
0	04.06.09	Issued as Standard Specification	QMS Standards Committee	QMS Standards Committee	SCT	ND

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Abbreviations:

DCI	-	Document Control Index
FOA	-	Fax of Acceptance
IC	-	Inspection Certificate
IRN	-	Inspection Release Note
ITP	-	Inspection and Test Plan
LOA	-	Letter of Acceptance
QMS	-	Quality Management System
URL	-	Universal Resource Locator
V Portal	-	Vendor Portal

QMS Standards Committee

Convener: Mr. S.K. Badlani

Members:
Mr. Sanjay Mazumdar (Engg.)
Mr. R.K. Singh (SCM)
Mr. B. Biswas (SCM)
Mr. Ravindra Kumar (Const.)
Mr. Vinod Kumar (CQA)
Mr. Swapnil Vaishnav (Projects)

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4.0 DOCUMENTATION AND DATA REQUIREMENTS 4

Attachments

Format for completeness of Final Documentation : Format No. 3-78-0004

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1.0 SCOPE

This specification establishes the Documentation Requirements from Contractors

All documents / data against the Tender / Contract shall be developed and submitted to EIL / Owner by the contractor for review / records, in line with this specification.

2.0 DEFINITIONS

2.1 Contractor

For the purpose of this specification, the word "CONTRACTOR" means the person(s), firm, company or organization who has entered into a contract with EIL / Owner for delivery of some products and services. The word is considered synonymous to bidder, supplier or vendor.

2.2 Owner

Owner means the owner of the project for which services / products are being purchased and includes their representatives, successors and assignees.

3.0 REFERENCE DOCUMENTS

6-78-0001	Specification for Quality Management System Requirements from Bidders

4.0 DOCUMENTATION AND DATA REQUIREMENTS

4.1 Order Acknowledgement and Assigning Project Manager

After placement of order, Contractor shall acknowledge order through V-Portal within 7 days of receipt of FOA / PO. Contractor shall assign a Project Manager for that order though online portal and provide requisite details. Project Manager details shall include e-mail address, mailing address, mobile / telephone nos., fax nos. and name of Project Manager. All the system generated emails pertaining to that order shall be sent to the assigned Project Manager.

4.2 Documents / Data to be submitted by the Contractor

4.2.1 The contractor shall submit the documents and data against the Tender / Contract as per the list specified in respective Tender / Contract.

4.2.2 Review of the contractor drawings / Documents by EIL would be only to review the compatibility with basic designs and concepts and in no way absolve the contractor of his responsibility / contractual obligation to comply with Tender / Contract requirements, applicable codes, specifications and statutory rules / regulations. Any error / deficiency noticed during any stage of manufacturing / execution / inspection / installation shall be promptly corrected by the contractor without any extra cost or time, whether or not comments on the same were received from EIL during the drawing review / inspection stage.

4.2.3 Unless otherwise specified, submission of documents for Review / Records shall commence as follows from the date of Fax of Intent / Letter of Intent/ Fax of Acceptance (FOA) / Letter of Acceptance (LOA):

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QMS	- 1 week
Document Control Index	- 2 weeks
Other Documents/Drawings	- As per approved Document Control Index

4.2.4 Documents as specified in Tender / Contract are minimum requirements. Contractor shall submit any other document / data required for completion of the job as per EIL / Owner instructions.

4.3 Style and Formatting

4.3.1 All Documents shall be in ENGLISH language and in M.K.S System of units.

4.3.2 Before submitting the drawings and documents, contractor shall ensure that the following information are properly entered in each drawing:

Tender Number
Name of Equipment / Package
Equipment / Package Tag No.
Name of Project
Owner
Main Contractor (if work is sub-contracted)
Drawing / Document Title
Drawing / Document No.
Drawing / Document Revision No. and Date

4.4 Review and Approval of Documents by Contractor

4.4.1 The Drawing / Documents shall be reviewed, checked, approved and duly signed / stamped by contractor before submission. Revision number shall be changed during submission of the revised contractor documents and all revisions shall be highlighted by clouds. Whenever the contractor require any sub- contractor drawings to be reviewed by EIL, the same shall be submitted by the contractor duly reviewed, approved and stamped by the contractor. Direct submission of sub- contractor's drawings without contractor's approval shall not be entertained.

4.5 Document Category

4.5.1 **Review Category**

Following review codes shall be used for review of contractor Drawings / Documents:

Review Code 1	-	No comments. Proceed with Manufacture / Fabrication / Construction as per the document.
Review Code 2	-	Proceed with Manufacture / Fabrication / Construction as per commented document. Revised document required.
Review Code 3	-	Document does not conform to basic requirements as marked. Resubmit for review.
R	-	Document is retained for Records. Proceed with Manufacturing / fabrication as per Tender/ Contract Requirement.
V	-	Void

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4.6 Methodology for Submission of Documents to EIL / Owner

4.6.1 Document Control Index (DCI)

Contractor shall create and submit Document Control Index (DCI) for review based on PO / PR / MR along with schedule date of submission of each drawing / document on EIL Vendor Portal. The DCI shall be specific with regard to drawing / document no. and the exact title. Proper sequencing of the drawings / documents should be ensured in schedule date of submission.

4.6.2 Submission of Drawings / Documents / Data

Drawings / documents, data and DCI shall be uploaded on the EIL Vendor Portal. The detail guidelines for uploading documents on EIL Vendor Portal are available on following URL

http://edocx.eil.co.in/vportal

4.6.3 Statutory Approvals

Wherever approval by any statutory body is required to be taken by Contractor, the Contractor shall submit copy of approval by the authority to EIL.

4.6.4 Schedule and Progress Reporting

Contractor shall submit monthly progress report (MPR) and updated procurement, engineering and manufacturing status (schedule vs. actual) and highlight constraints, if any, along with action plan for mitigation, to the EIL / Owner by 1st week of every month. One month Look-ahead schedule including the mobilization plan shall be submitted within 2 weeks from FOA / LOA. In case of exigencies, EIL / Owner can ask for report submission as required on weekly / fortnightly / adhoc basis depending upon supply status and contractor shall furnish such reports promptly without any price implication. Format for progress report shall be submitted by the contractor during kick off meeting or within one week of receiving FOA / LOA, whichever is earlier.

4.6.5 Quality Assurance Plan / Inspection and Test Plan

Inspection and test plans attached if any, to the tender are generic and indicative only. Immediately after receipt of the order, contractor shall submit within one week of receiving FOA / LOA, job specific ITPs based on the indicative ITPs. Further, contractor shall also submit Quality Assurance Plan for project activities in the scope of contract, starting from manufacturing to handing over / commissioning, these plans shall cover / identify the activities, relevant procedure, if any, code of conformance, resources for performance and checking / monitoring, approval requirements and authority, records to be generated and audit scope by EIL/Owner.

For EPCC / LSTK / Package contracts, the contractor shall prepare a list of items / equipment and their inspection categorization plans for all items included in the scope of supply immediately after receipt of order and obtain approval for the same from EIL. The items shall be categorized into different categories depending upon their criticality for the scope of inspection of TPIA and / or EIL.

4.6.6 Inspection Release Note (IRN)/ Inspection Certificate (IC)

Contractor shall ensure that all documents viz. documents reviewed, manufacture's test certificate etc., mentioned in Inspection Release Note (IRN), issued by EIL / third party against the materials supplied by contractor, are sent to EIL along with the IRN.

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IRN / IC shall be issued by EIL Inspector / third party inspection agency only after all the drawings/documents as per DCI are submitted and are accepted under review code-1 & code R. Material / Equipment dispatch from contractor's / sub vendor's works shall not commence till above condition is met.

Note 1: Non fulfilling above requirement shall result into appropriate penalty or with- holding of payment as per conditions of Tender / Contract.

Note 2: For items where IRN/IC is issued by TPIA, supplier to ensure that following as a minimum must be mentioned by TPIA in IRN/IC

a) Tender document number
b) List of drawings / documents with EIL approval code
c) Tests witnessed, documents reviewed
d) Compliance statement by TPIA that product meets the requirement as specified in EIL standard specifications, Inspection Test Plan / QAP and approved documents.

4.6.7 **Pre Commissioning & Commissioning Activities Management System (PCAMS)**

Pre Commissioning & Commissioning activities management system software shall be followed for Mechanical completion, check listing of loops, punch points, hydro test and issue of Formats during the Pre Commissioning and Commissioning activities and the same can be accessed on following URL

https://pcams.eil.co.in/

4.7 Final Documentation

4.7.1 As built Drawings

Minor Shop / Site changes made by contractor after approval of drawings under 'Code 1' by EIL and deviations granted through online system , if any, shall be marked in hard copies of drawings which shall then be stamped 'As-built' by the contractor. These 'As-built' drawings shall be reviewed and stamped by EIL Inspector / Site engineer / TPIA also, as the case may be. Format for completeness of final documents (Format No. 3-78-0004) is attached with this specification. Contractor shall prepare scanned images files of all marked – up 'As – built' drawings. Simultaneously contractor shall incorporate the shop / site changes in the native soft files of the drawings also.

4.7.2 As built Final Documents

As built final documents shall be submitted as listed in Tender / Contract

4.7.3 Packing / Presentation of Final Documents

Final Documents shall be legible photocopies in A4, A3 size only. Drawings will be inserted in plastic pockets (both sides transparent, sheet thickness minimum 0.1 mm) with an extra strip of 12 mm wide for punching so that drawings are well placed.

Final Documentation shall be bound in hard board plastic folder(s) of size 265 mm x 315 mm ($10^1/_2$ inch x $12^1/_2$ inch) and shall not be more that 75 mm thick. It may be of several volumes and each volume shall have a volume number, index of volumes and index of contents of that particular volume. Where numbers of volumes are more, 90mm thickness can be used. Each volume shall have top PVC sheet of minimum 0.15 mm thick duly fixed and pressed on folder cover and will have 2 lever clips. In case of imported items documents, 4 lever clip shall also be accepted. All four corners of folders shall be properly metal clamped. Indexing of contents with page numbering must be incorporated by contractor. Spiral / Spico bound documents shall not be acceptable. As mentioned above, books should be in hard board plastic folders with sheets punched and having 2/4 lever clips arrangement.

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Each volume shall contain on cover a title block indicating Tender No., name of project, name of customer, package equipment tag no. & name (if applicable). Each volume will have hard front cover and a reinforced spine to fit thickness of book. These spines will also have the title printed on them. Title shall include also volume number (say 11 of 15) etc.

4.7.4 Submission of Soft copies

Contractor shall submit to EIL, the scanned images files as well as the native files of drawings / documents, along with proper index.

In addition to hard copies, contractor shall submit soft copies of all the final drawings and documents in pen drive or any other specified medium with proper identification tag, all text documents prepared on computer, scanned images of all important documents (not available as soft files), all relevant catalogues, manuals available as soft files (editable copies of drawings / text documents, while for catalogues / manuals / proprietary information and data PDF files can be furnished).

All the above documents shall also be uploaded on the EIL Vendor Portal and if applicable on Client Server also.

4.7.5 Completeness of Final Documentation

Contractor shall get the completeness of final documentation verified by EIL / TPIA and attach the Format for Completeness of Final Documentation (Format No. 3-78-0004) duly signed by EIL or TPIA as applicable to the final document folder.

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COMPLETENESS OF FINAL DOCUMENTATION

Name of Supplier/Contractor	:	
Customer	:	
Project	:	
EIL's Job No.	:	
Purchase Order No./ Contract No.	:	
Purchase Requisition No./ Tender No.	:	Rev. No. :
Name of the Work/ Equipment	:	
Tag. No.	:	
Supplier's / Contractor's Works Order No.	:	

Certified that the Engineering Documents / Manufacturing & Test Certificates submitted by the supplier (as per Index sheet mentioned in Annexure-1) are complete in accordance with the Vendor Data Requirements of Purchase Requisition / Tender.

Signature	: …….	Signature	: …….
Date	: …….	Date	: …….
Name	: ……..	Name	: ……..
Designation	: ……	Designation	: ……
Department	: ……	Department	: ……
	Supplier / Contractor		EIL / TPIA

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Annexure-1

Final Documentation Index Sheet			
PR/PO/Tender No.		Rev. No.	
Serial No.	Document Title	Page/ Folder No.	No. of Pages

Signature	: …….	Signature	: …….
Date	: …….	Date	: …….
Name	: ……..	Name	: ……..
Designation	: ……	Designation	: ……
Department	: ……	Department	: ……

Supplier / Contractor

EIL / TPIA

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ANNEXURE-X

TO

SCC

CONTRACT CLAUSE FOR ACCEPTANCE OF STRUCTURAL STEEL AND TMT BAR MANUFACTURERS

1. Steel manufacturers having valid BIS certificate and listed in the BIS website as on date of procurement of steel shall be allowed for supply of steel (Structural and TMT bars) and contractor shall procure from them with prior intimation to Engineer-in-Charge.

2. Tests after receipt of structural steel at site:

   In addition to availability of valid BIS license and MTC, testing at site shall be conducted by the contractor as per the following requirement:

   - For each category/size of structural steel procured, one sample for every 50 MT or part thereof shall be drawn and tested in approved laboratory
   - The charges for such testing shall be borne by the contractor

3. Tests after receipt of TMT bars at site:

   In addition to availability of valid BIS license and MTC, testing at site in approved laboratory shall be conducted by the contractor as per the following requirement:

   - Under 10 mm bars one sample (diameter wise) for each 25 MT (or part thereof) for consignment below 100 MT and one sample (diameter wise) each 40 MT for consignment above 100 MT shall be tested.
   - For 10 mm to 16 mm bars, one sample(diameter wise) for each 35 MT (or part thereof) for consignment below 100 MT and one sample(diameter wise) each 45 MT (or part thereof) for consignment above 100 MT shall be tested.
   - Over 16 mm bars one sample (diameter wise) for each 45 MT (or part thereof) for consignment below 100 MT and one sample (diameter wise) each 50 MT (or part thereof) for consignment above 100 MT shall be tested.
   - The charges for such testing shall be borne by the contractor.

CONTRACT CLAUSE FOR ACCEPTANCE OF CEMENT MANUFACTURERS.

1. Cement manufacturers having valid BIS certificate and listed in the BIS website as on date of procurement of cement shall be allowed for supply of cement and contractor shall procure cement from them with prior intimation to Engineer-in-charge.

2. Tests after receipt of cement at site: Each batch of cement (week wise as mentioned on cement bags) supplied by the contractor after delivery at site shall be subjected to the tests and analysis required by the relevant Indian Standard Codes. The contractor shall carry out and bear the cost of all tests and analysis to ensure quality of cement before using in actual works.

ANNEXURE-XI TO SCC

APPROVAL OF CONSTRUCTION SUB-CONTRACTOR

APPROVAL OF CONSTRUCTION SUB-CONTRACTOR

1.	NAME OF CONTRACTOR	:	
2.	NAME OF WORK, LOCATION	:	
3.	NAME OF PROPOSED SUB-CONTRACTOR	:	
4.	SCOPE OF WORK PROPOSED TO BE SUB-CONTRACTED (BRIEF)	:	
5.	ESTIMATED VALUE OF THE PROPOSED WORK TO BE SUB-CONTRACTED (INR):	:	
6.	QUALIFYING CRITERIA FOR SUB-CONTRACTOR:	:	
6.1	Similar Work experience :	:	
i)	1 (One) Contract of 50% or 2 (two) contracts of 40 % each or 3 (Three) contracts of 30% each of estimated value of proposed work to be sub-contracted :	:	
ii)	Average Annual Turnover of Immediate three preceding financial year: Not less than 30% of estimated value of proposed work to be sub-contracted	:	
iii)	Positive Networth as per latest annual balance sheet/ Profit & loss account:	:	
iv)	Working Capital (WC): Not less than 10% of estimated value of proposed work to be sub-contracted in the immediate preceding financial year		
7.	EXPERIENCE AND FINANCIAL DETAILS OF PROPOSED SUB-CONTRACTOR	:	
i)	Contract Value of similar work executed (as evidenced by work Order & Completion Certificate) during the last 7 years	:	
ii)	Average Annual Turnover during last 3(three) years (as evidenced by Audited Financial statements)	:	
iii)	Networth as per latest Audited Financial statement	:	
iv)	Working Capital as per latest Audited Financial statement		
8	CRITERIA FOR QUALIFICATION OF SUB-CONTRACTOR	:	
i)	Sl.No. 7(i) > 6 (i)	:	YES / NO
ii)	Sl.No. 7 (ii) > 6 (ii)	:	YES / NO
iii)	Sl.No. 7 (iii) ⇒ Positive	:	YES / NO

iii)	Sl.No. 7 (iv) > 6 (iv)	:	YES / NO
9	Based on above information, we M/s_____ (Name of Contractor) propose M/s._____ (Name of proposed sub-contractor) as our sub-contractor for the above mentioned works. We understand that notwithstanding above approval, we shall remain fully responsible for the performance of the said sub-contractor and any failure of the sub-contractor shall not absolve/relieve us of our responsibility to complete the works as per the terms and conditions of the Contract.		

NOTE: Contractor to fill all the details in the above proforma. Further Contractor shall also fill-in the details at Sl.No.5 above based on the estimated value of the proposed work to be subcontracted.

(STAMP & SIGNATURE OF CONTRACTOR)

HSE MANAGEMENT& OTHER SAFETY REQUIREMENTS

[ANNEXURE - XII TO SPECIAL CONDITIONS OF CONTRACT]

निर्माण स्थल पर स्वास्थ्य, सुरक्षा एवं पर्यावरण प्रबंधन हेतु मानक विनिर्देश

STANDARD SPECIFICATION FOR HEALTH, SAFETY & ENVIRONMENTAL MANAGEMENT AT CONSTRUCTION SITES

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
2	18/04/2023	REVISED & UPDATED	BT	RK	JPV	SM
1	07/06/2022	REVISED & UPDATED	BT	RK	JPV	SM
0	23/12/2020	REVISED & UPDATED	BT	RK	AKK	S Mazumdar

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Abbreviations:

AERB	:	Atomic Energy Regulatory Board
ANSI	:	American National Standards Institute
BARC	:	Bhabha Atomic Research Centre
BS	:	British Standard
BOCW	:	Building and other construction workers
BOO/BOOT	:	Build, Own, Operate/Build, Own, Operate, Transfer
EIL	:	Engineers India Limited
EIC	:	Engineer In charge
ELCB	:	Earth Leakage Circuit Breaker
EPC	:	Engineering, Procurement and Construction
EPCC	:	Engineering, Procurement, Construction and Commissioning
ESI	:	Employee State Insurance
GCC	:	General Conditions of Contract
GM	:	General Manager
GTAW	:	Gas Tungsten Arc Welding
HOD	:	Head of Department
HSE	:	Health, Safety & Environment
HIRAC	:	Hazard, Identification Risk Assessment & Control
HMV	:	Heavy Motor Vehicle
HV	:	High Voltage
IS	:	Indian Standard
ISO	:	International Organization for Standardization
IE	:	Indian Electricity
LTI	:	Lost Time Injuries
LMV	:	Light Motor Vehicle
LOTO	:	Lock Out & Tag Out
LPG	:	Liquefied Petroleum Gas
LSTK	:	Lump Sum Turn Key
MV	:	Medium Voltage
OH&S	:	Occupational Health and Safety
OISD	:	Oil Industry Safety Directorate
PPE	:	Personal Protective Equipment
PUC	:	Pollution Under Control
RC	:	Registration Certificate
RCCB	:	Residual Current Circuit Breaker
RCM	:	Resident Construction Manager or Site-in-Charge, as applicable
SCC	:	Special Conditions of Contract
SLI	:	Safe Load Indicator
SWL	:	Safe Working Load
TPI	:	Third Party Inspection
TBT	:	Tool Box Talks

Construction Standards Committee

Convenor: Sh John Paul V, ED(Construction)

Members:
Sh.Janak Kishore, ED (Projects)
Sh.Biswajit Mandal, CGM (SCM)
Sh. Udayan Chakravarty, Sr.GM (Piping)
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1.0 SCOPE

This specification establishes the Health, Safety and Environment (HSE) management requirement to be complied by Contractors/Vendors including their sub-contractors/sub vendors during construction.

This specification is not intended to replace the necessary professional judgment needed to design & implement an effective HSE system for construction activities and the contractor is expected to fulfill HSE requirements in this specification as a minimum. It is expected that contractor shall implement best HSE practices beyond whatever are mentioned in this specification.

Requirements stipulated in this specification shall supplement the requirements of HSE Management given in relevant Act(s)/ Legislations, General Conditions of Contract (GCC), Special Conditions of Contract (SCC) and Job (Technical) Specifications. Where different documents stipulate different requirements, the most stringent shall apply.

2.0 REFERENCES

The document should be read in conjunction with following:

- General Conditions of Contract (GCC)
- Special Conditions of Contract (SCC)
- Building and other construction workers Act, (Refer Appendix-D)
- Indian Factories Act,(Refer Appendix-D)
- Job (Technical) specifications
- Relevant International/ National Codes (refer Appendix-A for standards/codes on HSE)
- Relevant State & National Statutory requirements.
- Operating Manuals Recommendation of Manufacturer of various construction Machineries
- Occupation Health and Safety Management System (OHSAS 18001:2007/ISO 45001) and Environmental Management System (ISO 14001:2015)

3.0 REQUIREMENTS OF HEALTH, SAFETY & ENVIRONMENTAL (HSE) MANAGEMENT SYSTEM TO BE COMPLIED BY BIDDERS

3.1 Management Responsibility

3.1.1 HSE Policy & Objectives

The Contractor should have a documented and duly approved HSE policy &objectives to demonstrate commitment of their organization to ensure health, safety and environmental aspects in their line of operations.

The Contractor's senior management shall provide strong visible leadership and continuously demonstrate commitment to develop, operate and maintain, review and continually improve a HSE culture at site which empowers individuals to take responsibility for their safety and embrace and accept nothing but responsible HSE behaviour.

Contractor shall refer in clause No. 3.3.23 for Key Performance Indicator (KPI).

3.1.2 Management System

The HSE management system of the Contractor shall cover the HSE requirements & commitments to fulfill them, including but not limited to what have been specified under clauses 1.0 and 2.0 above. The Contractor shall obtain the approval of its site specific HSE Plan from EIL/ Owner prior to commencement of any site works. Corporate as well as Site management of the Contractor shall ensure compliance of their HSE Plan at work sites in its entirety in true spirit.

3.1.3 Indemnification

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Contractor shall indemnify & hold harmless, Owner/EIL & their representatives, free from any and all liabilities arising out of non-fulfillment of HSE requirements or its consequences.

3.1.4 Deployment &Qualifications of Safety Personnel

The Contractor shall designate/deploy various categories of HSE personnel at site as indicated below insufficient number. In no case, deployment of safety Supervisor / Safety Steward shall substitute deployment of Safety Officer / Safety Engineer what is indicated in relevant statute of BOCW Act i.e. deployment of safety officer/Safety Engineer is compulsory at project site. The Safety supervisors, Safety stewards/Observer etc. would facilitate the HSE tasks at grass root level for construction sites and shall assist Safety Officer /Engineers.

Contractor shall appoint safety personnel as given below for every work shift:

(i) Safety Observer/Steward: Contractor shall depute one Safety Observer/Steward for every 100 workers or part thereof

(ii) Safety Supervisor: In addition to above(i), contractor shall depute one Safety Supervisor for every 250 workers or part thereof

(iii) Safety Engineer: In addition to above (i&ii), one safety engineer/ officer for every 1000 workers or part thereof.

Contractor shall intimate/obtain prior permission from EIC before demobilizing any safety personnel. The Contractor shall mobilize suitable safety personnel as replacement.

a) Safety Steward/Observer

As a minimum, he shall possess class XII pass certificate and trained in fire-fighting as well as in safety/occupational health related subjects, with minimum two year of practical experience in construction work environment and should have adequate knowledge of the local language spoken by majority of the workers at the construction site.

b) Safety Supervisor

As a minimum, he shall possess a recognized graduation Degree in Science (with Physics & Chemistry) or a Diploma in Engg. Or Tech. with minimum Two years of practical experience in construction work environment and should possess requisite skills to deal with construction safety & fire related day-to-day issues.

c) Safety Officer / Safety Engineer

Safety Officer/Engineer should possess following qualification & experience:

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(i) Recognized degree in any branch of Engg. or Tech. or Architecture with practical experience of working in a building or other construction work in supervisory capacity for a period of not less than two years, **or** possessing recognized diploma in any branch of Engg. or Tech with practical experience of working in a building or other construction work in supervisory capacity for a period of not less than five years.

(ii) Recognized degree or one year diploma in Industrial safety(from any Indian Institutes recognized by AICTE or State Council of Tech. Education of any Indian State/Union territory) with at least one paper in construction safety (as an elective subject).

(iii) Preferably have adequate knowledge of the language spoken by majority of the workers at the construction site.

Alternately

(i) Person possessing Graduation Degree in Science with Physics **or** Chemistry and degree or one year diploma in Industrial Safety (from any Indian institutes recognized by AICTE or State Council of Tech. Education of any Indian State/ Union Territory) with practical experience of working in a building, plant or other construction works (as Safety Officer, in line with Indian Factories Act, 1948) for a period of not less than five years, may be considered as Safety Officer.

d) HSE In-Charge

In case there is more than one Safety Officer at any project construction site, one of them, who is senior most by experience (in HSE discipline), may be designated as HSE In-Charge. Duties & responsibilities of such person shall be commensurate with that of relevant statute and primarily to coordinate with top management of EIL/Client and contractors.

In case the statutory requirements i.e. State or Central Acts and / or Rules as applicable like the Building and Other Construction Workers' Regulation of Employment and Conditions of Service- Act,1996 or State Rules (wherever notified), the Factories Act, 1948 or Rules (wherever notified), etc. are more stringent than above clarifications, the same shall be followed.

Contractors shall ensure physical availability of safety personnel at the place of specific work location, where Hot Work Permit is required/granted. No work shall be started at any of the project sites until above safety personnel & concerned Site Engineer of Contractor are physically deployed at site. The Contractor shall submit a HSE Organogram clearly indicating the lines of responsibility and reporting system and elaborate the responsibilities of safety personnel in their HSE Plan.

Upon fulfilling the basic requirement of qualification and relevant experiences, the performance of contractor HSE personnel's is to be monitored.

The good performing contractor's HSE personnel at site shall be rewarded upon assessment of performance by EIL/Owner. The non-performing HSE personnel shall be counselled by EIL/Owner & suitable action may be taken for suspension from site for 3-6 days. Contractor shall arrange training for non performing HSE personnel.

HSE In –Charge of the contractor shall be given the status at par with the other heads of department and shall report to Head of Project.

The Contractor shall verify & authenticate credentials of such safety personnel and furnish Bio-Data/Resume/Curriculum Vitae of the safety personnel as above for EIL/Owner's approval, at least 1 month before the mobilization. The Contractor, whenever required, shall arrange submission of original testimonials/certificates of their Safety personnel, to EIL/Owner (for verification/scrutiny, etc.)

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Imposition/ Realization of penalty shall not absolve the Contractor from his/her responsibility of deploying competent safety officer at site.

Adequate planning and deployment of safety personnel shall be ensured by the Contractor so that field activities do not get affected because of non-deployment of competent & qualified safety personnel in appropriate numbers.

3.1.5 **Implementation, Inspection/Monitoring**

a) The Contractor shall be fully responsible for planning, reporting, implementing and monitoring all HSE requirements and compliance of all laws & statutory requirements.

b) The Contractor shall also ensure that the HSE requirements are clearly understood & implemented conscientiously by their site personnel at all levels at site.

c) The Contractor shall ensure physical presence of their field engineers / supervisors, during the continuation of their contract works / site activities including all material transportation activities. Physical absence of experienced field engineers / supervisors of Contractor at critical work spot during the course of work may invite halting / stoppage of work.

d) The Contractor shall regularly review inspection report internally and implement all practical steps / actions for improving the status continuously.

e) Contractor skilled workmen like riggers, scaffold erectors, welders, crane operators etc. should have sufficient past experience and skill on the relevant job.

f) The Contractor shall ensure important safety checks right from beginning of works at every work site locations and to this effect format No. HSE-10 "Daily Safety Check List" shall be prepared by field engineer & duly checked by safety personnel for conformance.

g) The Contractor shall carry out inspection to identify various unsafe conditions of work sites/machinery/equipment's as well as unsafe acts on the part of workmen/supervisor/engineer while carrying out different project related works.

h) Adequate records for all inspections shall be maintained by the Contractor and the same shall be furnished to EIL/Owner, whenever sought.

i) To demonstrate involvement/commitment of site management of Contractor, at least one Monthly Safety Walk through in a month shall be carried out by Contractor's head of site (along with his area manager/field engineers)and a report shall be furnished to EIL/Owner as per format No: HSE-1" Safety walk through report" followed by compliance for unsatisfactory remarks.

j) As a general practice lifting tools/tackles, machinery, accessories etc. shall be inspected, tested and examined by competent person(approved by concerned State authorities) before being used at site and also at periodical interval (e.g. during replacement, extension, modification, elongation/reduction of machine/parts, etc.) as per relevant statutes. Hydraulic Mobile Crane, cranes, lifting machinery, mobile equipment's/ machinery/ vehicles, etc. shall be inspected regularly by only competent / experienced personnel at site and requisite records for such inspections shall be maintained by contractor. Contractor shall also maintain records of maintenance of all other site machinery (e.g. generators, rectifiers, compressors, cutters, etc.) & portable tools/equipment's being used at project related works (e.g. drills, abrasive wheels, punches, chisels, spanners, etc.).The Contractor shall not make use of arbitrarily fabricated 'derricks' at project site for lifting/ lowering of construction materials.

k) Site facilities /temporary. installations, e.g. batching plant, cement godown, DG-room, temporary electrical panels/distribution boards, shot-blasting booth, fabrication yards, etc. and site welfare facilities, like labour colonies, canteen/pantry, rest-shelters, motor cycle/bicycle-shed, First-aid centers, urinals/toilets, etc. should be periodically inspected by Contractor (preferably utilizing HR/Admin. personnel to inspect site welfare facilities) and records to be maintained.

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3.1.6 **Behaviour Based Safety**

a) The contractor shall develop a system to implement Behavior-Based Safety (BBS) through which work groups can identify, measure and change the behaviors of employees and workers towards construction safety aspects.

b) The BBS process shall include the following:
- Identify the behaviors critical to achieve required safety performance.
- Communicate the behaviors and how they are performed correctly byall
- Observe the work force and record safe/at risk behaviors. Intervene with workers to give positive reinforcement when unsafe behaviors are observed. Provide coaching/correction when at risk behaviors are observed
- Collect and record observation data
- Summarize and analyze observation data
- Communicate observation data and analysis results to all employees
- Provide recognition or celebrate when safe behavior improvements occur
- Change behaviors to be observed or change activators or change consequences as appropriate.
- Communicate any changes to workforce

c) Contractor through its own HSE committee shall implement the above process.

d) The necessary procedures and Monthly reporting formats shall be developed by the contractor for approval by EIL/Owner.

e) The HSE committee of contractor shall observe individual's behavior for safe practices adapted for utilization/execution of work for followings a minimum:-
- PPE
- Tools & equipment's
- Hazard Identification & control
- House keeping
- Confined space entry
- Hot works
- Excavation
- Loading & unloading
- Work at height
- Stacking & storage
- Ergonomics

f) EIL/Owner and Contractor's site staff at all levels shall monitor the behavior of contractor employees that create and/or contribute to the unsafe situations at work place.

g) Contractor shall arrange Behavior Based safety (BBS) training of their employees at site on yearly basis.

3.1.7 **Awareness and Motivation**

a) The Contractor shall promote and develop awareness on Health, Safety and Environmental protection among all personnel working for the Contractor.

b) The contractor shall display safety statistics board at all prominent location .Also shall provide dedicated notice board for displaying of safety alerts or any other safety related notices for awareness site workforces.

c) Regular awareness programs and fabrication shop/work site meetings at least on monthly basis shall be arranged on HSE activities to cover hazards/risks involved in various operations during construction.

d) Contractor's workmen & supervisory staff shall participate in common Tool Box Meeting as & when organized/required at site to avoid any incident/accident or occupational disease arising out of multidisciplinary jobs/activities being performed by various contracting agencies in the same location at different elevation.

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e) Contractor to motivate & encourage the workmen & supervisory staff by issuing/ awarding them with tokens/ gifts/ mementos/ monetary incentives/ certificates etc. The motivational program shall be organized on regular basis.

f) Contractor shall assess & recognize the behavioral change of its site engineers / supervisors periodically and constantly motivate / encourage them to implement HSE practices at project works

g) Life Saving Rules (refer Appendix-I for details) are to be displayed at prominent location of site.

3.1.8 **Fire Prevention & First-Aid**

The Contractor shall deploy First aider & suitable First-aid measures such as First Aid Box (Refer Appendix-B for details), stand-by Emergency Vehicle. Additionally separate ambulance with trained personnel/male or female nurse to administer First Aid shall be provided by the Contractor beyond deployment of 500 workmen during day/night working hours.

a) The Contractor shall arrange installation of fire protection measures such as adequate number of steel buckets with sand & water and adequate number of appropriate portable fire extinguishers (Refer Appendix-C for details) to the satisfaction of EIL/Owner.

b) The Contractor shall arrange EMERGENCY MOCK DRILL like fire, bomb threat, gas leakage, earth quake, etc. at each site at least once in three months, involving site workmen and site supervisory personnel & engineers. The Contractor shall maintain record of such mock drills at project site.

c) The contractor shall require to tie-up with the hospitals located in the neighborhood for attending medical emergency.

3.1.9 **Documentation**

The Contractor shall evolve a comprehensive, planned and documented system covering the following as a minimum for implementation and monitoring of the HSE requirements and the same shall be submitted for approval by owner/EIL.

- HSE Organogram
- Site specific HSE Plan
- Safety Procedures, forms and Checklist. Indicative list of HSE procedures is attached as Appendix :H
- Inspections and Test Plan
- Risk Assessment & HIRAC for critical works.
- HIRAC Register as per Format no: HSE-19 to identify, assess, analyze & mitigate the construction hazards& incorporate relevant control measures before actually executing site works.
- Environmental Aspect Impact Register as per Format no: HSE-18 (identify, assess, analyze & mitigate the environmental impact & incorporate relevant control measures).
- Legal Register to identify and comply to all applicable HSE related legal requirements.

The monitoring for implementation shall be done by regular inspections and compliance of the observations thereof. The Contractor shall get similar HSE requirements implemented at his sub-contractor(s) work site/office, if applicable. However, compliance of HSE requirements shall be the responsibility of the Contractor. Any review/approval by EIL/Owner shall not absolve contractor of his responsibility/liability in relation to fulfilling all HSE requirements.

3.1.10 **Audit**

Safety Audit shall be conducted at initial stage by EIL/Owner to understand the readiness to start the job after mobilization of contractor's RCM at site& Suitable action shall be taken by contractor to comply the audit observation(s).

The Contractor shall submit an Audit Plan to EIL/Owner indicating the type of audits covering following as minimum:

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a) Internal HSE audits regularly on six monthly basis by engaging internal qualified auditors (viz. safety officers/Construction personnel having 5years experience in construction safety and Lead Auditor Course: OHSAS 18001/ISO 45001 certification).However, minimum two internal HSE audit will have to be conducted irrespective of time period of the contract.

b) External HSE audits regularly on yearly basis by engaging authorized auditing agencies (viz. National Safety Council etc.)or qualified external auditors (viz safety officers/Construction personnel having 10years experience in construction safety and Lead Auditor Course: OHSAS 18001/ISO 45001certification). However, minimum one external HSE audit will have to be conducted irrespective of time period of the contract.

c) EIL/Owner may participate in Opening and closing meeting of external audits and provide inputs to the external auditor. Outcome of external audit shall be discussed during HSE Meeting with EIL/Owner.

All HSE shortfalls/ non-conformances on HSE matters brought out during review/audit, shall be resolved forthwith(generally within a week) by Contractor& compliance report shall be submitted to EIL/Owner.

In addition to above audits by contractor, the contractor's work shall be subjected to HSE audit by EIL/Owner at any point of time during the pendency of contract. The Contractor shall take all actions required to comply with the findings of the Audit Report and issue regular Compliance Reports for the same to OWNER/ EIL till all the findings of the Audit Report are fully complied.

Failure to carry-out HSE Audits& its compliance (internal & external) by Contractor, shall invite penalization.

3.1.11 **Meetings**

i. The Contractor shall ensure participation of his top most executive at site (viz. Resident Construction Manager / Resident Engineer/ Project Manager / Site-in-Charge) along with safety officer in Safety Committee/HSE Committee meetings arranged by EIL/Owner usually on monthly basis or as and when called for. In case Contractor's top most executive at site is not in a position to attend such meeting, he shall inform EIL/Owner in writing before the commencement of such meeting indicating reasons of his absence and nominate his representative – failure to do so may invite very stringent penalization against the specific Contractor, as deemed fit as per Contract. The obligation of compliance of any observations during the meeting shall be always time bound. The Contractor shall always assist EIL/Owner to achieve the targets set by them on HSE management during the project implementation.

ii. In addition, the Contractor shall also arrange internal HSE meetings chaired by his top most executive at site on fortnightly basis and maintain records. Such internal HSE meetings shall essentially be attended by field engineers / supervisors including safety personnel of the Contractor and its associates. Records of such internal HSE meetings shall be maintained by the Contractor for review by EIL/Owner or for any HSE Audits.

iii. Agenda of internal HSE meeting should broadly cover: -

a) Confirmation of record notes /minutes of previous meeting
b) Discussion on outstanding subjects of previous points / subjects, if any
c) Incidents / Accidents (of all types) at project site, if any
d) Current topics related to site activities / subjects of discussion
e) House keeping
f) Behavioral Safety
g) Information / views / deliberations of members / site sub-contractors
h) Report from Owner / Client
i) Status of Safety awareness, Induction programs & Training programs

The time frame for such HSE meeting shall be religiously maintained by one and all.

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3.1.12 Intoxicating drinks & drugs and smoking

a) The Contractor shall ensure that his staff members & workers (permanent as well casual) shall not be in a state of intoxication during working hours and shall abide by any law relating to consumption & possession of intoxicating drinks or drugs in force.

b) The Contractor shall not allow any workman to commence any work at any locations of project activity who is/are influenced / effected with the intake of alcohol, drugs or any other intoxicating items being consumed prior to start of work or working day.

c) Awareness about local laws on this issue shall form part of the Induction Training and compulsory work-site discipline.

d) The Contractor shall ensure that all personnel working for him comply with "No-Smoking" requirements of the Owner as notified from time to time. Cigarettes, lighters, auto ignition tools or appliances as well as intoxicating drugs, dry tobacco powder, etc. shall not be allowed inside the project / plant complex.

e) Smoking shall be permitted only inside smoking booths, if any, exclusively designated & authorized by the Owner/EIL.

3.1.13 Penalty

The Contractor shall adhere consistently to all provisions of HSE requirements. In case of non-compliances and also for repeated failure in implementation of any of the HSE provisions, EIL/Owner may impose stoppage of work without any cost & time implication to the Owner and/or impose a suitable penalty.

The amount of penalty to be levied against defaulted Contractor shall be up to a cumulative limit of

2.0% (Two percent) of the contract value for Item Rate or Composite contracts with an overall ceiling of 1,00,00,000(Rupees One Crore).

0.5% (Zero decimal five percent) of the contract value for LSTK, OBE, EPC,BOO/BOOT, EPCC or Package contracts with an overall ceiling of 10,00,00,000(Rupees Ten Crores.)

This penalty shall be in addition to all other penalties specified elsewhere in the contract. The decision of imposing stop-work-instruction and imposition of penalty shall rest with EIL/Owner. The same shall be binding on the Contractor. Imposition of penalty does not make the Contractor eligible to continue the work in unsafe manner.
The amount of penalty applicable for the Contractor on different types of HSE violations is specified below:

Sl. No.	Violation of HSE Norms	Penalty Amount
1.	For not using personal protective equipment like Helmet, Safety Shoes, and other safety gadgets as applicable as per nature of work.	Rs.500/- per day/Item / Person
2.	Working without Work Permit/Clearance	Rs.20,000/- per occasion
3	Execution of work without deployment of requisite field engineer / supervisor at work spot	Rs.5,000/- per violation per day
4.	Unsafe electrical practices (not installing ELCB, using poor joints of cables, using naked wire without top plug into socket, laying wire/cables on the roads, electrical jobs by incompetent person, etc.)	Rs.10,000/- per item per day

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Sl. No.	Violation of HSE Norms	Penalty Amount
5.	Working at height without full body harness, using non-standard/ rejected scaffolding and not arranging fall protection arrangement as required, like hand-rails, life-lines, Safety Nets etc.	Rs.10,000/- per case per day
6.	Unsafe handling of compressed gas cylinders (No trolley, jubilee clips double gauge regulator, and not keeping cylinders vertical during storage/handling, not using safety cap of cylinder).	Rs.1,000/- per item per day
7.	Use of domestic LPG for cutting purpose / not using flash back arresters on both the hoses/tubes on both ends.	Rs.5,000/-per occasion
8.	No fencing/barricading of excavated areas / trenches.	Rs.5,000/- per occasion
9.	Not providing shoring/strutting/proper slope and not keeping the excavated earth at least 1.5M away from excavated area.	Rs.5,000/-per occasion
10.	Non display of scaffold tags, caution boards on erected scaffolds.	Rs.1,000/- per occasion per day
11.	Traffic rules violations like over speeding of vehicles, rash driving, talking on mobile phones during vehicle driving, wrong parking, not using seat belts, vehicles not fitted with reverse horn / warning alarms / flicker lamps during foggy weather.	Rs.3,000/-per occasion per day
12.	Absence of Contractor's RCM/SIC or his nominated representative (prior approval must be taken for each meeting for nomination) from site HSE meetings whenever called by EIL/Owner& failure to nominate his immediate deputy for such HSE meetings.	Rs.10,000/- per meeting
13.	Failure to maintain HSE records by Contractor Safety personnel, in line with approved HSE Plan/Procedures/Contract specifications.	Rs.10,000/- per month
14.	Failure to conduct daily site safety inspection (by Contractor's Site Engineer &safety officer), internal HSE meeting, internal HSE Awareness/Motivation Program and Site HSE Training at predefined frequencies (as approved in HSE Plan).	Rs.10,000/- per occasion
15.	Failure to fill online/submit the monthly HSE report by 5th of subsequent month to Engineer-in-Charge/ Owner	Rs10,000/-per occasion and Rs.1,000/-per day of further delay
16.	Poor House Keeping	Rs.5,000 /- per occasion per subject
17.	Failure to report &follow-up accident (including Near Miss) reporting system within specific time-frame.	Rs.20,000/- per occasion
18.	Degradation of environment (not confining toxic spills, spilling oil/lubricants onto ground)	Rs.10,000/- per occasion

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Sl. No.	Violation of HSE Norms	Penalty Amount
19.	Not medically examining the workers before allowing them to work at height / to work in confined space / to work in shot-blasting / to work for painting / to work in bitumen or asphalt works, not providing ear muffs while allowing them to work in noise polluted areas, made them to work in air polluted areas without respiratory protective devices, etc.	Rs.5,000/- per occasion per worker
20.	Violation of any other safety condition as per job HSE plan / work permit and HSE conditions of contract (e.g.using crowbar on cable trenches, improper welding booth, not keeping fire extinguisher ready at hot work site, unsafe rigging practices, non-availability of First-Aid box at site, not providing dead man handle switch for blasting, whiplash arrestor for the compressor line, not using hood with respiratory devices by blaster for shot//grit blasting, etc.)	Rs.5,000/- per occasion
21.	Penalty for non-deployment of ambulance in case of man-power more than 500 or not providing dedicated emergency vehicle in case of man-power less than 500.	Rs.3,000 per day
22.	Failure to carry-out Safety audit in time (internal & external),close-out of identified shortfalls of Observations of Safety Aspects(OSA),etc.	Rs.20,000/- per occasion (for internal audit &OSA). Rs.30,000/-per occasion for external audit
23.	Carrying out sand blasting instead of grit/shot blasting	Rs.50,000/- per day
24.	Failure to deploy adequately qualified and competent Safety Officer	Rs.10,000/- per day per Officer
25.	Utilization of Hydraulic Mobile Crane /back-hoe loader for material shifting or any other unauthorized /unsafe lifting works	Rs.25,000/- per occasion
26.	Any Fatal Accident	Rs.10,00,000/-per fatality
27.	Any violation not covered above	To be decided by EIL/Owner.

Note: Penalty amount deducted from the contractor shall be utilized by owner/EIC for the promotion of the safety during the currency of the project.

The Contractor shall make his field engineers/supervisors fully aware of the fact that they keep track with the site workmen for their behavior and compliance of various HSE requirements. Safety lapses / defects of project construction site shall be attributable to the concerned job supervisor / engineer of the Contractor, (who remains directly responsible for safely executing field works). For repeated HSE violations, concerned job supervisor / engineer shall be reprimanded or appropriate action, as deemed fit, shall be initiated (with information to EIL & Owner) by the concerned Contractor.

Contractor shall initiate verbal warning shall be given to the worker/employee during his first HSE violation. A written warning shall be issued on second violation and specific training shall be arranged / provided by the Contractor to enhance HSE awareness/skill including feedback on the mistakes/ flaws. Any further violation of HSE stipulations by the erring individuals shall call

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for his forthright debar from the specific construction site. A record of warnings for each worker/employee shall be maintained by the Contractor, like by punching their cards / Gate passes or by displaying their names at the Project entry gate. Warnings, penalizations, appreciations etc. shall be discussed in HSE Committee meetings by site Head of the Contractor.

3.1.14 **Accident/ Incident investigation**

All accidents/incidents shall be informed to EIL/Owner at least telephonically by Contractor immediately and in writing within 24 hours on Format No. HSE-2 as applicable, by Contractor. Thereafter, a Supplementary Accident/Incident investigation Report on Format No. HSE-3 shall be submitted to EIL/Owner within 72 hours. Near Miss incident(s), Dangerous accidents/incident shall also be reported on Format No. HSE-4 within24 hours. The accident/ incident shall be investigated by a team of Contractor's senior Site personnel (involving Site-in-Charge or at least by his deputy) for establishing root-cause and recommending corrective & preventive actions. Findings shall be documented and suitable actions taken to avoid recurrences shall be communicated to EIL/Owner. Owner/EIL shall have the liberty to independently investigate such occurrences and the Contractor shall extend all necessary help and cooperation in this regard. EIL/Owner shall have the right to share the content of this report with the outside world.

3.2 House Keeping

The Contractor shall ensure that a high degree of housekeeping is maintained and shall ensure inter-alia; the followings:

a) All surplus earth and debris are removed/disposed-off from the working areas to designated location(s).

b) Unused/surplus cables, steel items and steel scrap lying scattered at different places within the working areas are removed to identify location(s).

c) All wooden scrap, empty wooden cable drums and other combustible packing materials, shall be removed from work place to identified location(s).

d) Roads shall be kept clear and materials like pipes, steel, sand, boulders, concrete, chips and bricks etc. shall not be allowed on the roads to obstruct free movement of men & machineries.

e) Fabricated steel structural, pipes & piping materials shall be stacked properly.

f) Water logging on roads shall not be allowed.

g) No parking of trucks/trolleys, cranes and trailers etc. shall be allowed on roads, which may obstruct the traffic movement.

h) Utmost care shall be taken to ensure over all cleanliness and proper upkeep of the working areas.

i) Protective measures to be ensured with projected rebar by suitable means.

j) Trucks carrying sand, earth and pulverized materials etc. shall be covered while moving within the plant area/ or these materials shall be transported with top surface wet.

k) The contractor shall ensure that the atmosphere in plant area and on roads is free from particulate matter like dust, sand, etc. by keeping the top surface wet for ease in breathing.

l) At least two exits for any unit area shall be assured at all times – same arrangement is preferable for digging pits/ trench excavation/ elevated work platforms/ confined spaces etc.

m) Welding cables and the power cable must be segregated and properly stored and used. The same shall be laid away from the area of movement and shall be free from obstruction.

n) Upkeep/cleaning of site to be carried out on regular basis by the contractor. Contractor shall earmark the area for waste/scrap disposal and ensure that all waste/scrap arising out of the day's work is properly disposed to the earmarked area.

o) Hazardous waste shall be segregated and shall be kept separately at designated place.

p) Contractor shall present the status of housekeeping in HSE meeting.

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The Contractor shall carry-out regular checks (minimum one per fortnight) as per format No. HSE-11 for maintaining high standard of housekeeping and maintain records for the same. The Contractor shall provide supervisor for housekeeping exclusively for management of day-to-day housekeeping activities.

3.3 HSE Measures

3.3.1 Construction Hazards

The Contractor shall ensure identification of all Occupational Health, Safety & Environmental hazards in the type of work he is going to undertake and enlist mitigation measures. Contractor shall carry out HIRAC specifically for high risk jobs/critical jobs like

a) Working at height (+2.0 Mts height) for cold (incl. colour washing, painting, insulation etc.) & hot works.
b) Work in confined space,
c) Deep excavations &trench cutting (depth > 2.0 mts.)
d) Operation & Maintenance of Batching Plant.
e) Shuttering / concreting (in single or multiple pour) for columns, parapets & roofs.
f) Erection & maintenance of Tower Crane.
g) Erection of structural steel members / roof-trusses / pipes at height more than 2.0 Mts. with or without crane.
h) Erection of pipes (full length or fabricated) at height more than 2.0 Mts. height with Crane of 100T capacity.
i) All lifts using 100T Crane plus mechanical pulling.
j) All lifts using two cranes in unison (Tandem Lifting).
k) Any lift exceeding 80% capacity of the lifting equipment's (Hydraulic Mobile Crane, crane etc.).
l) Laying of pipes (isolated or fabricated) in deep narrow trenches – manually or mechanically.
m) Maintenance of crane / extension or reduction of crane-boom on roads or in yards.
n) Erection of any item at >2.0 Mts. height using 100T crane or of higher capacity
o) Hydrostatic test of pipes, vessels & columns and water-flushing.
p) Radiography jobs (in-plant & open field)
q) Work in Live Electrical installations / circuits
r) Handling of explosives &Blasting operations
s) Demolishing/ dismantling activities
t) Welding/ gas cutting jobs at height (+2.0 Mts.)
u) Lifting/placing roof-girders at height(+2.0 Mts.)
v) Lifting & laying of metallic / non-metallic sheet over roof/structures.
w) Lifting of pipes, gratings, equipment's/vessels at heights (+2.0 Mts.) with & without using cranes
x) Calibration of equipment, instruments and functional tests at yards / work-sites.
y) Operability test of Pump, Motors (after coupling) & Compressors.
z) Cold or Hot works inside Confined Space.
aa) Transportation & shifting of ODC consignments into project areas.
bb) Working in "Charged/Live" elect. Panels
cc) Stress Relieving works (Electrically or by Gas-burners).
dd) Pneumatic Tests
ee) Card board blasting
ff) Grit Blasting activity
gg) Catalyst loading/unloading
hh) Erection/dismantling of scaffolding
ii) Chemical cleaning

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The necessary HSE measures devised shall be put in place, prior to start of an activity &also shall be maintained during the course of works, by the Contractor. Copies of such HIRAC shall be kept available at work sites by the Contractor to enable all concerned carrying out checks / verification.

A list of typical construction hazards along with their effects & preventive measures is given in **Appendix-E.**

3.3.2 Accessibility

h) The Contractor shall provide safe means of access(in sufficient numbers)& efficient exit to any working place including provisions of suitable and sufficient scaffolding at various stages during all operations of the work for the safety of his workmen and EIL/Owner.

i) The Contractor shall implement use of all measures including use of "life line", "fall-arresters", "retractable fall arresters", "safety nets" etc. during the course of using all safe accesses& exits, so that in no case any individual remains at risk of slip & fall during their travel.

j) A ladder or step- ladder must have a level and firm footing, in case of use of fixed ladders, sufficient foot hold and hand hold to be provided.

k) The access to operating plant / project complex shall be strictly regulated. Any person or vehicle entering such complex shall undergo identification check, as per the procedures in force / requirement of EIL/Owner.

l) Accessibility to 'confined space' shall be governed by specific system / regulation, as established at project site.

3.3.3 Personal Protective Equipment (PPEs)

a) The Contractor workmen shall be permitted entry inside the project premises only with proper PPEs.

b) The Contractor shall ensure that all their staff, workers and visitors including their sub-contractor(s) have been issued (records to be kept) & wear appropriate PPEs like nape strap type safety helmets preferably with head &sweat band with ¾" cotton chin strap (made of industrial HDPE), High ankle safety shoes with steel toe cap and antiskid sole, Coverall, full body harness (CE marked and conforming to EN361), protective goggles, gloves, ear muffs, respiratory protective devices, etc. All these gadgets shall conform to applicable IS Specifications/CE or other applicable international standards. The Contractor shall implement a regular regime of inspecting physical conditions of the PPEs being issued / used by the workmen of their own & also its sub-agencies and the damaged / unserviceable PPEs shall be replaced forthwith.

c) Owner/EIL may issue a comprehensive color scheme for helmets to be used by various agencies. The Contractor shall follow the scheme issued by the owner/EIL and shall choose colour other than white (for Owner) or blue (for EIL). All HSE personnel shall preferably wear dark green band on their helmet or green color safety helmet so that workmen can approach them for guidance during emergencies.HSE personnel shall preferably wear such dresses with fluorescent stripes, which are noticeable during night, when light falls on them.

d) Florescent jackets with respective company logo to be worn by the contractor workmen with different color coding for categories like supervisor and workmen.

e) Workers required using or handling alkalies, acid or other similar corrosive substance at site shall be provided with appropriate protective equipment, in accordance with MSDS.

f) For shot blasting, the usage of protective face shield and helmets, gauntlet and protective clothing is mandatory. Such protective clothing should conform relevant IS Specification.

g) For off-shore jobs/contracts, contractor shall provide PPEs (new) of all types to EIL & Owner's personnel, at his (contractor's) cost. All personnel shall wear life jacket at all time.

h) An indicative list of HSE standards/codes is given under **Appendix-A**.

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i) Contractor shall ensure procurement & usage of following safety equipment's/ accessories (conforming to applicable IS mark / CE standard) by their staff, workmen & visitors including their subcontractors all through the span of project construction / pre-commissioning/ Commissioning:-

i. PPEs (Helmet with company name/logo, Safety Goggles, Coverall, Ear-muff, Face Shield, Hand Gloves, High Ankle Safety Shoes, Gum Boot etc.)
ii. Barricading tape / warning signs
iii. Rechargeable Safety torch (flame-proof)
iv. Safety nets (with tie-chords)
v. Fall arresters
vi. Emergency Man-basket/rescue kit for height works
vii. Portable ladders (varying lengths)
viii. Life-lines (steel wire-rope, dia. not less than 8.0 mm)
ix. Full body double lanyard Safety harness with Rebar/ladder hook or scaffolding hook.
x. Lanyard
xi. Karabiner
xii. Retractable fall arresters (various length)
xiii. Portable fire extinguishers (DCP type) – 5 kg&10 kg capacity
xiv. Portable Multi Gas detector
xv. Sound level meter
xvi. Digital lux meter
xvii. Fire hoses & flow nozzles
xviii. Fire blankets/ Fire retardant cloth (with eyelets)
xix. Flame retardant/Flame resistant coverall-based on hazard identification & risk assessment, if required.

3.3.4 **Working at height**

a) The Contractor shall issue permit for working (PFW) at height after verifying and certifying the checkpoints as specified in the attached permit (Format No. HSE-6). He shall also undertake to ensure compliance to the conditions of the permit during the currency of the permit including adherence of personal protective equipment's. Contractor's Safety Officer shall verify compliance status of the items of permit document after implementation of action is completed by Contractor's execution / field engineers at work site. HIRAC for specific works at height duly commented by EIL/Owner, shall be kept attached with particular Permit for Work (PFW) at site for ready reference & follow-up.

b) Such PFW shall be initially issued for one single shift or expected duration of normal work and extended further for balance duration, if required. EIL/Owner can devise block-permit system at any specific area, in consultation with project specific HSE Committee to specify the time-period of validity of such PFW or its renewal. This permit shall be applicable in areas where specific clearance from Owner's operation Deptt./Safety Deptt. is not required. EIL / Owner's field Engineers/Safety Officers/Area Coordinators may verify and counter sign this permit (as an evidence of verification) during the execution of the job.

c) All personnel shall be medically examined & certified by registered doctor, confirming their 'medical fitness(Vertigo or epilepsy must be covered under test report)for working at height. Contractor shall develop the model for conducting vertigo test. The fitness examination shall be done once in six months. Sticker for "PASS FOR HEIGHT WORK" shall be pasted on the safety helmet of the site personnel.

d) In case work is undertaken without taking sufficient precautions as given in the permit, EIL/Owner Engineers may exercise their authority to cancel such permit and stop the work till satisfactory compliance/rectification is arranged made. Contractors are expected to maintain a register for issuance of permit and extensions thereof including preserving the

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used permits for verification during audits etc.

e) The Contractor shall arrange (at his cost) and ensure use of Fall Arrester Systems by his workers. Fall arresters are to be used while climbing/descending tall structures or vessels / columns etc. These arresters should lock automatically against the anchorage line, restricting free fall of the user. The device is to be provided with a double security opening system to ensure safe attachment or release of the user at any point of rope. In order to avoid shock, the system should be capable of keeping the person in vertical position in case of a fall. All the fall arrest systems should be cleaned after use and stored in a clean &dry area. Defective Safety Harness, lanyards & life line must be discarded from workplace and record to be maintained.

f) The Contractor shall ensure that Full body harnesses with double lanyards conforming EN361 and having authorized CE marking is used by all personnel while working at height. The lanyards and life lines should have enough tensile strength to take the load of the worker in case of a fall. One end of the lanyard shall be firmly tied with the harnesses and the other end with life line. The harness should be capable of keeping the workman vertical in case of a fall, enabling him to rescue himself.

g) The Contractor shall provide Roof Top Walk Ladders for carrying out activities on sloping roofs in order to reduce the chances of slippages and falls.

h) The Contractor shall ensure that a proper Safety Net System is used wherever the hazard of fall from height is present. The safety net, preferably a knotted one with mesh ropes conforming to IS 5175/ ISO 1140 shall have a border rope & tie cord of minimum 12mm dia. The Safety Net shall be located not more than 6.0 meters below the working surface extending on either side upto. sufficient margin to arrest fall of persons working at different heights.

i) In case of accidental fall of person on such Safety Net, the bottom most portion of Safety Net should not touch any structure, object or ground.

j) Grade separators shall be provided in Pipe-rack/Tech-structures to arrest falling objects like welding spatters, welding rods, nuts, bolts, tools etc. and to facilitate U/G and A/G works simultaneously.

k) Beam Clamps may be used for construction of localized temporary working platforms sheds for welding booths etc. at height in all types of steel structure due to faster installation and requirement of less scaffolding materials.

l) Hanging Platform, manufactured by Standard HSE equipment vendors must be encouraged for painting of Buildings etc.

m) All the tools used at height (like spanner, screw driver etc.) shall be provided with securing arrangement like back-pack/waist pouch to prevent accidental slippage from worker hand.

n) The Contractor shall install temporary lightening arrester in tall structures during construction to save human life and to avoid damage to equipment's& machineries. During the possibility of a thunderstorm, all the work at height where a person can be exposed to lightning shall be stopped.

o) To the extent possible use Roller arrangement to shift overhead pipes from one end to other in Pipe Racks Area.

p) Providing of steel scaffold stair tower system with landings at regular intervals as and when required for height work.

q) The Contractor shall ensure positive isolation while working at different levels like in the pipe rack areas. The working platforms with toe boards & hand rails shall be sufficiently strong & shall have sufficient space to hold the workmen and tools& tackles including the equipment's required for executing the job. Such working platforms shall have mid-rails, to enable people work safely in sitting posture.

3.3.5 Scaffoldings& Barricading

a) Suitable steel scaffoldings only shall be provided to workmen for all works that cannot be safely done from the ground or from solid construction except such short period work that

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can be safely done using ladders or certified (by 3rd party competent person) man-basket. When a ladder is used, an extra workman shall always be engaged for holding the ladder. The ladder shall be inspected before use for cracked or split stiles, missing, broken, loose or damaged rungs & splinters. The ladder shall be of adequate length to enable it to extend to at least 1.0m above the landing place or working point. Metallic ladders shall be only used as access.

b) The Contractor shall ensure that the scaffolds used during construction activities shall be strong enough to take the designed load. Main Contractor shall always furnish duly approved construction-design details of scaffold &SWL (from competent designers) free of charge, before they are being installed/ constructed at site. Owner/EIL reserves the right to ask the Contractor to submit certification and or design calculations from his Head Office/ Design/Engineering expert regarding load carrying capacity of the scaffoldings. All steel tubing, couplers and fittings used for scaffolding shall conform to IS 3696 or an acceptable equivalent. Only metallic scaffold boards shall be allowed to use. Steel tubes shall be free from cracks, splits. Surface flaws & other defects. All couplers & fittings shall be properly oiled and maintained. Nuts shall have a free running fit on their bolts. Bolts with worn or damaged thread shall be replaced.

c) All scaffolds shall be inspected by a competent Scaffolding Inspector (person with scaffolding related experience in construction field and having a training of scaffolding supervisor from a institute/agency like National Safety Council etc.). He shall paste a GREEN tag (duly signed by competent Scaffolding Inspector) on each scaffold found safe and a RED tag (duly signed by competent Scaffolding Inspector) on each scaffold found unsafe. Scaffolds with GREEN tag only shall be permitted to be used and Scaffolds with RED ones shall immediately be made inaccessible. Work being found continuing on scaffolds with RED tag shall be considered unauthorized work by Contractor and may invite penalization from EIL/Owner. For every 120-125 m^2 /m^3 area / volume or its parts thereof minimum one TAG shall be provided.

d) The Contractor shall ensure positive barricading (indicative as well as protective) of the excavated, radiography, heavy lift, high pressure hydrostatic & pneumatic testing and other such areas. Sufficient warning signs shall be displayed along the barricading areas.

e) Scaffolding shall be constructed using foot seals or base plates only. Base plates shall be used below each standard on surface .Sole plate of timber shall be used beneath the base plate to achieve greater load distribution.

3.3.6 **Electrical installations**

a) All electrical installations/ connections shall be carried out as per the provisions of latest revision of following codes/standards, in addition to the requirements of Statutory Authorities and IE/applicable international rules& regulations:

- OISD STD 173 : Fire prevention & protection system for electrical installations
- SP 30 (BIS) : National Electric Code

b) All electrical installations shall be approved by the concerned statutory authorities.

c) All temporary electrical installations / facilities shall be regularly checked by the licensed/competent electricians of the Contractor and appropriate records shall be maintained in format no: HSE-12" Inspection of temporary electrical booth/installation at project construction site". Such inspection records are to be made available to EIL/Owner, whenever asked for.

3.3.6.1 The Contractor shall meet the following requirements:

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a. Shall make Single Line Diagram (SLD) for providing connection to each equipment's & machinery and the same (duly approved by EIL/Owner) shall be pasted on the front face of DBs (distribution boards) or JBs (Junction boxes) at every site.(A typical Switch Board Sketch is attached as Appendix -G)

b. Ensure that electrical systems and equipment including tools & tackles used during construction phase are properly selected, installed, used and maintained as per provisions of the latest revision of the Indian Electrical/ applicable international regulations.

c. Shall deploy qualified & licensed electricians for proper & safe installation and for regular inspection of construction power distribution system/points including their earthing. A copy of the license shall be submitted to EIL / Owner for records. Availability of at least one competent (ITI qualified) / licensed electrician (by State Elec. authorities) shall be ensured at site round the clock to attend to the normal/emergency jobs.

d. All switchboards / welding machines shall be kept in well-ventilated & covered shed/ with rain shed protection. The shed shall be elevated from the existing ground level to avoid water logging inside the shed. Installation of electrical switch board must be done taking care of the prevention of shock and safety of machine.

e. No flammable materials shall be used for constructing the shed. Also flammable materials shall not be stored in and around electrical equipment / switchboard. Adequate clearances and operational space shall be provided around the equipment.

f. Fire extinguishers and insulating mats shall be provided in all power distribution centers.

g. Temporary electrical equipment shall not be employed in hazardous area without obtaining safety permit.

h. Proper housekeeping shall be done around the electrical installations.

i. All temporary installations shall be tested before energizing, to ensure proper earthing, bonding, suitability of protection system, adequacy of feeders/cables etc.

j. All welders shall use hand gloves irrespective of holder voltage.

k. Multilingual (Hindi, English and local language) caution boards, shock treatment charts and instruction plate containing location of isolation point for incoming supply, name & telephone No. of contact person in emergency shall be provided in substations and near all distribution boards / local panels.

l. ELCB tester /test meter shall be used for testing the ELCBs operation. ELCBs testing shall be carried out by using ELCB tester on monthly basis but in specific cases like heavy rain as decided by owner/EIC. Record of the testing shall be maintained.

m. Regular inspection of all installations at least once in a month. (**Ref. Format HSE-12**).

3.3.6.2 The following features shall also be ensured for all electrical installations during construction phase by the contractor:

a. Each installation shall have a main switch with a protective device, installed in an enclosure adjacent to the metering point. The operating height of the main switch shall not exceed 1.5 M. The main switch shall be connected to the point of supply by means of armoured cable.

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b. The outgoing feeders shall be double or triple pole switches with fuses / MCBs. Loads in a three phase circuit shall be balanced as far as possible and load on neutral should not exceed 20% of load in the phase.

c. The installation shall be adequately protected against overload, short circuit and earth leakage by the use of suitable protective devices. Fuses wherever used shall be HRC type. Use of rewirable fuses shall be strictly prohibited. ELCB/RCCB (Residual Current Circuit Breaker) must be fitted with all Electrical installation. The earth leakage devices shall have an operating current not exceeding 30 mA.

d. All connections to the hand tools / welding receptacles shall be taken through proper switches, sockets and plugs.

e. All single phase sockets shall be minimum 3 pin type only. All unused sockets shall be provided with socket caps.

f. Only 3 core (P+N+E) overall sheathed flexible cables with minimum conductor size of 1.5 mm^2 copper shall be used for all single phase hand tools.

g. Only metallic distribution boxes with double earthing shall be used at site. No wooden boxes shall be used.

h. All power cables shall be terminated with compression type cable glands. Tinned copper lugs shall be used for multi-strand wires / cables.

i. Cables shall be free from any insulation damage.

j. Minimum depth of cable trench shall be 750 mm for MV & control cables and 900 mm for HV cables. These cables shall be laid over a sand layer and covered with sand, brick & soil for ensuring mechanical protection. Cables shall not be laid in waterlogged area as far as practicable. Cable route markers shall be provided at every 25 M of buried trench route.

When laid above ground, cables shall be properly cleated or supported on rigid poles of atleast 2.1 M high. Minimum head clearance of 6 meters shall be provided at road crossings.

k. Underground road crossings for cables shall be avoided to the extent feasible. In any case no underground power cable shall be allowed to cross the roads without pipe sleeve.

l. All cable joints shall be done with proper jointing kit. No taped/temporary joints shall be used.

m. An independent earthing facility should preferably be established within the temporary installation premises. All appliances and equipment shall be adequately earthed. In case of armored cables, the armour shall be bonded to the earthing system. IS: 3043 Code for earthing practices shall be followed at project site.

n. All cables(green colour) and wire rope used for earth connections shall be terminated through tinned copper lugs.

o. In case of local earthing, earth electrodes shall be buried near the supply point and earth continuity wire shall be connected to local earth plate for further distribution to various appliances. All insulated wires for earth connection shall have insulation of green colour. Periodical check tests of all electrodes should be carried out and record shall be maintained of such checks.

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p. Separate core shall be provided for neutral. Earth / Structures shall not be used as a neutral in any case.

q. ON/OFF position of all switches shall be clearly designated / painted for easy isolation in emergency.

3.3.7 Welding/ Grinding/Gas cutting

a) Contractor shall ensure that flash back arrestors conforming to BS:6158 or equivalent are installed on all gas cylinders as well as at the torch end of the gas hose, while in use.

b) All cylinders shall be mounted on trolleys and provided with a closing key. Empty & filled-up gas cylinders shall be stored separately with TAG, protecting them from direct sun or rain. Minimum 2 nos. of Portable DCP type fire extinguishers (10 kg) shall be maintained at the gas cylinder stores. Stacking & storing of compressed gas cylinders shall be arranged away from DG set, hot works, Elect. Panels / Elec. boards, etc.

c) The burner and the hose placed downstream of pressure reducer shall be equipped with Flash Back Arrester/Non Return Valve device.

d) The hoses for acetylene and oxygen cylinders must be of different colours. Their connections to cylinders and burners shall be made with a safety collar.

e) At end of work, the cylinders in use shall be closed and hoses depressurized.

f) Cutting of metals using gases, other than oxygen &acetylene, shall require written concurrence from Owner.

g) Grinding activity shall not be carried out in confined spaces without a valid work permit.

h) All grinding/cutting machines shall be guarded and fitted with Dead-Man switch and this shall not be bypassed any time.

i) All welding/grinding machines shall have effective earthing at least at distinctly isolated two points.

j) In order to help maintain good housekeeping, and to reduce fire hazard, live electrode bits shall be contained safely and shall not be thrown directly on the ground.

k) The hoses of Acetylene and Oxygen shall be kept free from entanglement & away from common pathways / walkways and preferably be hanged overhead in such a manner which can avoid contact with cranes, Hydraulic Mobile Crane or other mobile construction machinery.

l) Hot spatters shall be contained / restricted appropriately (by making use of effective fire-retardant cloth/fabric) and their flying-off as well as chance of contact with near-by flammable materials shall be stopped. The Fire retardant blanket shall be woven from ceramic yarn with eyelets.

m) The Contractor shall arrange adequate systems & practices for accumulation / collection of metal & other scraps and remnant electrodes and their safe disposal at regular interval so as to maintain the fabrication and other areas satisfactorily clean & tidy.

n) All gas cylinders must have a cylinder cap on at all times when not in use.

3.3.8 Ergonomics and tools & tackles

a) The Contractor shall assign to his workmen, tasks commensurate with their qualification, experience and state of health. Competency of the crane operator to be thoroughly checked prior to engaging in crane operation.

b) All lifting tools, tackles, equipment, trailers, trucks/dumpers, accessories including cranes shall be tested periodically by statutory/competent authority for their condition and load carrying capacity. Valid test & fitness certificates from the applicable authority shall be submitted to Owner/EIL for their review/acceptance before the lifting tools, tackles,

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equipment, trailers, trucks/dumpers, accessories and cranes are used. Third party inspection certificate is mandatory for all lifting tools & tackles before put into use.

c) Load testing of Cranes by competent person must be made mandatory after each modification/alteration of crane configuration/change in boom length. All heavy equipment's including cranes must be maintained in good condition &record of such maintenance shall be maintained. Routine preventive maintenance of the crane to be carried out& record to be maintained for such preventive maintenance. Healthiness of the crane to be checked by Crane Expert on regular basis as per manufacturer guidelines.

d) HIRAC/JSA for assembly/dismantling activity of the crane to be submitted for approval of EIC.

e) No one should stand/work below the mast & boom of the crane. Mast of the crane should not be used for unintended lifts.

f) Mast of the crane to be kept in right position during dismantling activity of the crane.

g) Log book of all crane to be maintained.

h) Only authorized person shall be allowed to give signal to the operator.

i) Lifting/Loading/Unloading activities shall be carried out by the trained riggers under supervision of rigging Foreman.

j) Prior to marching/movement of the crane, obstructions free access/route to be ensured.

k) Skilled Technician to be engaged for AC gas checking and refilling of refrigerant and should follow the safe operating procedure for cranes.

l) Manufacturer's instructions to be followed without any deviation.

m) The contractor shall not be allowed to use defective equipment or tools not adhering to safety norms.

n) Adequate capacity of Chain pulley blocks with valid TPI certificate to be used for lifting/lowering/dragging/erection of piping material .

o) Colour coding system for lifting tools & tackles shall be followed on quarterly basis for a particular colour as mentioned below:

Period	Colour Code
January, February, March	Blue
April,May, June	Yellow
July, August, September	Green
October, November, December	Orange
For Quarantine (Unsafe Tools & Tackles)	Red

Contractor shall arrange non-sparking tools for project construction works in operating plant areas / hydrocarbon prone areas.

i. Wherever required the Contractor shall make use of Elevated Work Platforms (EWP) or Aerial Work Platforms (mobile or stationary) to avoid ergonomical risks and workmen shall be debarred to board such elevated platform during the course of their shifting / transportation.

ii. Contractor shall ensure installation of Safe Load Indicator (SLI) on all cranes (while in use) to minimize overloading risk. SLI shall have capability to continuously monitor and display the load on the hook, and automatically compare it with the rated crane capacity at the operating condition of the crane. The system shall also provide visual and audible warnings at set capacity levels to alert the operator in case of violations.

iii. The contractor shall be responsible for safe operations of different equipments mobilized and used by him at the workplace like transport vehicles, Tower Crane, engines, cranes, mobile ladders, scaffoldings, work tools, etc. Strictly avoid standing close to Hydraulic Mobile Crane/vehicles tyres during operation.

iv. The contractor shall deploy cranes in good working condition of maximum allowable years of service from the year of manufacture as specified below: -

20 years for cranes of 50 MT & below capacity,25 years for 51 MT to 100 MT,30 years for cranes above 101 MT.

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v. In general Man basket shall not be lifted by Hydraulic Mobile Crane. Generally Crane shall be used for lifting the man basket.

vi. Tower Crane, Crane, Hydraulic Mobile Crane or equivalent, Hydraulic Rig &Boom Lift shall be inspected on fortnightly basis as per Format No. HSE-20, HSE-21, HSE-22, HSE-23 & HSE-24.

vii. The Contractor shall arrange periodical training for the operators of Hydraulic Mobile Crane, crane, excavator, mobile machinery, Tower Crane, etc. at site by utilizing services from renowned manufacturers.

viii. Hydraulic Mobile Crane or equivalent having steering control mechanism shall be permitted at construction site only for the purpose of loading/unloading. However, continuous rigger availability during marching of hydraulic crane at site shall be ensured by contractor.

3.3.9 Occupational Health

a) The contractor shall identify all operations that can adversely affect the health of its workers and issue & implement mitigation measures.

b) For surface cleaning operations, sand blasting shall not be permitted even if not explicitly stated elsewhere in the contract.

c) To eliminate radiation hazard, Tungsten electrodes used for Gas Tungsten Arc Welding shall not contain Thorium.

d) Appropriate respiratory protective devices(hood with respiratory devices) shall be used to protect workmen from inhalation of air borne contaminants like silica, asbestos, gases, fumes, etc.

e) Workmen shall be made aware of correct methods for lifting, carrying, pushing & pulling of heavy loads. Wherever possible, manual handling shall be replaced by mechanical lifting equipment's.

f) Fuelling of construction equipments/Diesel Generator set shall be carried out by hand operated pump.

g) In view of the congested working environment and associated hazards, deployment of manpower/machineries shall be in staggered manner keeping adequate safe distance between two adjacent work spot.

h) For jobs like drilling/demolishing/dismantling/steam blowing/cardboard blasting etc. where noise pollution exceeds the specified limit of 85decibels, ear muffs shall be provided to the workers. The Noise level monitoring record shall be maintained.

i) To avoid work related upper limb disorders (WRULD) and backaches, Display Screen Equipments' workplace stations shall be carefully designed & used with proper sitting postures. Power driven hand-held tools shall be maintained in good working condition to minimize their vibrating effects and personnel using these tools shall be taught how to operate them safely & how to maintain good blood circulation in hands.

j) The Contractor shall arrange health check-up(by registered medical practitioner) for all the workers at the time of induction. Health check may have to be repeated if the nature of duty assigned to him is changed necessitating health check or doubt arises about his wellness. EIL/Owner reserves the right to ask the contractor to submit medical test reports. Regular health check-ups are mandatory for the workers assigned with Welding, Radiography, Blasting, Painting, Heavy Lift and Height (>2m) jobs. All the health check-ups shall be conducted by registered Medical practitioner and records are to be maintained by the Contractor.

k) The Contractor shall arrange Medical Camps at regular intervals at work sites and labor colonies to assess health condition of workers.

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l) The Contractor shall ensure vaccination of all the workers including their families, during the course of entire project span.

3.3.10 Hazardous substances

a) Hazardous, inflammable and/or toxic materials such as solvent coating, thinners, anti-termite solutions, water proofing materials shall be stored in appropriate containers preferably with lids having spillage catchment trays and shall be stored in a good ventilated area. These containers shall be labeled with the name of the materials highlighting the hazards associated with its use and necessary precautions to be taken. Respective MSDS (Material Safety Data Sheet) shall be made available at site &may be referred whenever problem arises.

b) Where contact or exposure of hazardous materials are likely to exceed the specified limit or otherwise have harmful effects, appropriate personal protective Equipment's such as gloves, goggles/face-shields, aprons, chemical resistant clothing, respirator, etc. shall be used.

c) The work place shall be checked prior to start of activities to identify the location, type and condition of any asbestos materials which could be disturbed during the work. In case asbestos material is detected, usage of appropriate PPEs by all personnel shall be ensured and the matter shall be reported immediately to EIL/ Owner.

3.3.11 Slips, trips & falls

a) The contractor shall establish a regular cleaning and basic housekeeping programme that covers all aspects of the workplace to help minimize the risk of slips, trips & falls. The contractor shall take positive measures like keeping the work area tidy, storing waste in suitable containers & harmful items separately, keeping passages, stairways, entrances & exits especially emergency ones clear, cleaning up spillages immediately and replacing damaged carpet/ floor tiles, mats & rugs at once to avoid slips, trips & falls.

b) Grating removal permit system should be implemented during construction phase. So that after permanent gratings are installed on platforms and tech structure floors; removal of any gratings for whatever purpose (including for lifting piping material etc.) is required to be sanctioned by signed permit by HSE officers of both contractor and Engineer-in-charge. The spot where gratings are removed shall be hard-barricaded during course of work. The removed gratings shall be re-installed immediately after completion of work or at the time of cessation of work every day whichever is earlier and the permit shall be closed on daily basis. A register shall be maintained for recording all the grating removal permits and their closure shall be monitored on daily basis.

3.3.12 Radiation exposure

a) All personnel exposed to physical agents such as ionizing &non-ionizing radiation, including ultraviolet rays or similar other physical agents shall be provided with adequate shielding or protection commensurate with the type of exposure involved.

b) For Open Field Radiography works, requirements of Bhabha Atomic Research Centre (BARC)/ Atomic Energy Regulatory Board (AERB) shall be followed.

c) The Contractor shall implement an effective system of control (as described in the AERB regulations) at site for handling radiography-sources & for avoiding its misuse & theft.

d) The contractor shall generate the Format No: HSE-8 "Permit for radiation work" before start of work.

e) In case the radiography work has to be carried out at day time, suitable methodology to be used so that other works, people are not affected.

3.3.13 Explosives/Blasting operations

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a) Blasting operations shall be carried out as per latest Explosive Rules (Indian/ International) with prior permission. The Contractor shall obtain license from Chief Controller of Explosives (CCoE) for collection, transportation, storage of explosives as well as for carrying out blasting operations.

b) The Contractor shall prepare exclusive method statement (in cognizance with statutory requirements)for rock blasting works &diffusing unfired explosives, if any, at project site before carrying out actual task. Nowhere blasting shall be carried out by the Contractor or its agency without the involvement of competent supervisor and licensed blaster.

3.3.14 Demolition/ Dismantling

a) The contractor shall adhere to safe demolishing/ dismantling practices at all stages of work to guard against unsafe working practices.

b) The contractor shall disconnect service lines (power, gas supply, water, etc.)/ make alternate arrangements prior to start of work and restore them, ifrequired as directed by EIL/ Owner at no extra cost.

c) Before carrying out any demolition/dismantling work, the contractor shall take prior approval of EIL/Owner and generate the Format No.HSE-9. For revamp jobs in operating plants where location of underground utilities is not known with certainty, the contractor shall depute an experienced engineer for supervision and shall make adequate arrangements for Fire-fighting& First-Aid during the execution of these activities.

d) The Contractor shall arrange approved HIRAC/ Method Statement for the specific demolition / dismantling task and corresponding action plan commensurate with hazards / risks associated therein. In no case any activity related to demolition / dismantling shall be carried out by the Contractor without engaging own supervision / field engineer.

3.3.15 Road Safety

a) The Contractor shall ensure adequately planned road transport safety management system.

b) The vehicles shall be fitted with reverse warning alarms & flashing lights / fog-lights and usage of seat belts shall be ensured.

c) The Contractor shall also ensure a separate pedestrian route for safety of the workers and comply with all traffic rules & regulations, including maintaining speed limit of 20 KMPH or indicated by owner for all types of vehicles / mobile machinery. The maximum allowable speed shall be adhered to.

d) In case of an alert or emergency, the Contractor must arrange clearance of all the routes, roads, access. The Contractor shall deploy sufficient number of traffic controllers at project site routes / roads/ accesses, to alert reversing movement of vehicles & machinery as well as pedestrians. Experienced drivers/operators with valid driving license (LMV/HMV)shall be allowed to drive/operate the vehicles/equipment's. The Contractor shall maintain copy of PUC,RC and Insurance etc. for all the vehicles/equipment's.

e) Dumpers, Tippers, etc. shall not be allowed to carry workers within the plant area and also to & from the labour colony to & from project sites.

f) Hydraulic Mobile Crane or equivalent)shall only be allowed for handling(loading/unloading) the materials at fabrication/ storage yards and in no case shall be allowed to transport the materials over project / plant roads.

g) The Contractor shall not deploy any such mobile machinery / Equipment's, which do not have competent operator and / or experienced banks-man/signal-man. Such machinery/equipment's shall have effective limit-switches, reverse-alarm, front& rear-end lights etc. and shall be maintained in good working order.

h) The Contractor shall not carry-out maintenance of vehicles / mobile machinery occupying space on project / plant roads and shall always arrange close supervision for such works.

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i) For pipeline jobs, the contractor shall submit a comprehensive plan covering transportation, loading / unloading of pipes, movement of side booms, movement of vehicles on the ROW, etc.

j) Height barrier/Restriction to be provided on both side of the HT lines, if required.

k) Contractor's shall arrange /install visible road signs, diversion boards, caution boards, etc. on project roads for safe movement of men and machinery.

3.3.16 Welfare measures

Contractor shall, at the minimum, ensure the following facilities at work sites:

a) A crèche at site where 10 or more female workers are having children below the age of 6 years.

b) Adequately ventilated / illuminated rooms at labour camps & its hygienic up-keeping.

c) Reasonable canteen facilities at site and in labour camps at appropriate location depending upon site conditions. Contractor shall make use of "industrial" variety of LPG cylinder & satisfactory illumination at the canteens. Necessary arrangement for efficient disposal of wastes from canteens & urinals /toilets shall also be made and regular review shall be made to maintain the ambience satisfactorily hygienic &shall also comply with all applicable statutory requirements.

d) Adequately lighted & ventilated Rest rooms at site (separate for male workers and female workers).

e) Provision for suitable mobile toilets to be made available by Contractor for remote/scattered job locations.

f) Urinals, Toilets, drinking water, washing facilities, adequate lighting at site and labour camps, commensurate with applicable Laws/ Legislation.

g) The contractor shall ensure the test report of drinking water.

h) The contractor at periodic interval shall arrange to prevent mosquito breeding by fumigation/spraying of insecticides at workplace/fabrication yard.

3.3.17 Environment Protection

Contractor shall ensure proper storage and utilization methodology of materials that are detrimental to the environment. Where required, Contractor shall ensure that only the environment friendly materials are selected and emphasize on recycling of waste materials, such as metals, plastics, glass, paper, oil & solvents. The waste that cannot be minimized, reused or recovered shall be stored and disposed of safely. In no way, toxic spills shall be allowed to percolate into the ground. The contractor shall not use the empty areas for dumping the wastes.

The contractor shall ensure availability of stack emission test report of DG set. Monitoring of air quality emission of DG stack shall be carried out on yearly basis. However, air quality emission shall be monitored first time on commissioning of DG Set.

Contractor to submit Environmental Aspect Impact Register detailing the list of activities in his scope, the respective environmental impact and the actions taken to minimize the impact. Environmental Aspect Impact Register to be prepared as per Format HSE-18 and to be updated and maintained till job completion. Environmental Aspect Impact Register of the contractor shall be reviewed by EIL/Owner on half-yearly basis.

The contractor shall strive to conserve energy and water wherever feasible.

The contractor shall ensure dust free environment at workplace by sprinkling water on the ground at frequent intervals. The air quality parameters for dust, poisonous gases, toxic releases,

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harmful radiations, etc. shall be checked by the contractor on daily basis and whenever need arises.

The contractor shall not be allowed to discharge chemicals, oil, silt, sewage, sullage and other waste materials directly into the controlled waters like surface drains, streams, rivers, ponds. A discharge plan suggesting the methods of treating the waste before discharging shall be submitted to EIL/Owner for approval.

For pipeline jobs, top soil shall be stacked separately while making ROW through fields. This fertile soil shall be placed back on top after backfilling.

For offshore construction barges, arrangements shall be made for safe disposal of human, food & other wastes and applicable laws in this regard shall be followed.

3.3.18 Rules & Regulations

All persons deployed at site shall be knowledgeable of and comply with the environmental laws, rules & regulations relating to the hazardous materials, substances and wastes. Contractor shall not dump, release or otherwise discharge or disposes off any such materials without the express authorization of EIL/Owner. An indicative list of Statutory Acts & Rules relating to HSE is given under Appendix-D.

3.3.19 Weather Protection

Contractor shall take appropriate measures to protect workers from severe storms, rain, solar radiations, poisonous gases, dust, etc. by ensuring proper usage of PPEs like Sun glasses, Sun screen lotions, respirators, dust masks, etc. and rearranging/ planning he construction activities to suit the weather conditions. Effective arrangement (without creating inconvenience to project facilities & permanent installations) for protecting workmen from hailstorm, drizzle in the form of temporary shelter shall be made at site.

3.3.20 Communication

All persons deployed at the work site shall have access to effective means of communication so that any untoward incident can be reported immediately and assistance sought by them.

All health & safety information shall be communicated in a simple & clear language easily understood by the local workforce.

For information to all, typical subjects that should be communicated are: -

Inside the company (Top to down)

a. Quality Policy
b. HSE Policy contents
c. Environment Policy
d. HSE Objectives
e. Safety Cardinal Rules
f. HSE Target – reached or missed
g. Praises & Warnings to personnel for HSE Management
h. Safety Walk Through Reports and safety defects / shortfalls (by management)
i. HSE Audit results
j. Revised Statutory Health & Safety provisions, if any
k. H & S publicity
l. Suggestions

Inside the Company (Bottom to up)

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a. Complaints
b. Compliances on safety defects / shortfalls
c. Suggestions
d. Proposals for changes & improvements
e. HSE Reports (including near-miss reports)

3.3.21 Confined Space Entry

The contractor shall generate a work permit (Format No. HSE -7) before entering a confined space. People, who are permitted to enter into confined space, must be medically examined & certified by registered doctor, confirming their 'medical fitness for working in confined space'. All necessary precautions mentioned therein shall be adhered to. An attendant shall be positioned outside a confined space for extending help during an emergency. Effective communication shall be maintained between personnel in confined space and outside by combination of visual/voice or portable radio. Compressed gas cylinders shall not be taken into confine space. Entry Register for confined space to be maintained with the name and time of entry/exit. All appropriate PPEs and air quality parameters shall be checked before entering a confined space. It shall be ensured that the piping of the equipment which has to be opened is pressure- free by checking that blinds are in place, vents are open and volume is drained. Inside confined space works, only electrical facilities / installations of 24V shall be permitted. Contractor shall ensure usage of safe & suitable arrangement of oxygen supply for individual workmen (during the course of work in confined space), if oxygen concentration is found to be less than 19.5% (v/v) there. All persons must be made aware of the risk associated with Nitrogen &all precautionary measures shall be taken when vessel/sphere/pipelines etc. are being purged with nitrogen.
Rescue arrangement must be readily available at workplace to fulfill requirement of the emergency situation.

3.3.22 Heavy Lifts

a) The contractor shall submit detailed rigging study/ plan for EIL/ Owner approval prior to lifting equipment requiring a crane of approx. 100 MT capacity or more due to constraints of its dimensions, location of foundation height, approach & weight.
b) Contractor shall generate the format no. HSE-15 "Permit for heavy lift/critical erection"
c) The Safe Working Load (SWL) and manufacturer's serial numbers shall be clearly marked on the slings and the lifting gears, either by tagging, stamping, engraving or embossing.
d) Prior to actual lifting activities, contractor shall check the validity of the crane inspection certificate issued by statutory/ competent authority. This requirement shall also apply to all rigging equipment's utilized for the job.
e) The contractor shall, at all times, be responsible for all rigging activities.
f) The Contractor shall ensure medical fitness of all workmen who are engaged / involved in erection of equipment's, vessels etc. and such fitness checks shall be carried-out every six months interval with the help of a registered medical practitioner & record shall be maintained
g) Adequate safety measures such as positive barricading, usage of appropriate PPEs, permit to work, etc. shall be taken during all heavy or critical lifts.
h) Ground condition should be suitable to sustain the Ground Bearing Load of the Crane with full load condition.
i) For lifting any material (irrespective of shape, size or volume), at any height, it is always advisable to prepare a Plan of Erection (PoE) taking into consideration hazards & risks associated therein – this can enable people to put their own experiences of various natures & side-by-side establish a practical method for risk-free erection / lifts. The contractor shall

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prepare PoE & shall document the same, when risks are identified as "medium" or "high" and the same shall be approved by its competent / qualified engineer.

3.3.23 Key Performance Indicators

The contractor shall measure an activity in both leading & trailing indicators for statistical and performance measurement. The activities pertaining to key performance indicators are covered in Monthly HSE Report (Format No. HSE-5). The contractor shall try to achieve a statistically fair record and strive for its continual improvement.

Leading Indicators viz:-:

- Number of Safety Inductions carried-out at site (for workmen & staff members)
- Number of HSE inspections carried out
- Number of "Safety Walk Through" carried-out by site-head.
- Number of HSE shortfalls / lapses identified per contractor& closed-out in time.
- Number of Safety Meetings conducted (in-house / with contractors)
- Number of HSE Audits made (internal & external) vis-à-vis non conformances raised
- Number of HSE Awareness / Motivational program conducted by contractors
- Number of HSE Trainings conducted at site for supervisors & workmen
- Study of Near miss case reported
- Encouragements / Awards / Recognitions to workmen, job supervisors & field engineers.
- Suggestions for improvement

Trailing Indicators viz:-:

- Calculation of HSE statistics viz frequency rate, severity rate, LTA free man hours etc.
- Analysis of incidents / accidents (nature, severity, types etc.)
- Study of Incident / Accident with respect to :-
    - Variety
    - Period of the year / project span
    - Timings of the incident / accident
    - Age profile of victims
    - Body parts involved
    - Penalty levied for causing incident / accident

3.3.24 Unsuitable Land Conditions

Contractor shall take appropriate measures and necessary work permits/clearances if work is to be done in or around marshy areas, river crossings, mountains, monuments, etc. The Contractor shall make right assessment and take all necessary action for developing work areas to make them safe & suitable for crane operations or other vehicular movement before carrying out any project related activity / operation. Contractor shall take all necessary actions to make the surroundings of its site establishments (site office, stores, lay-down area etc.) work-worthy safe and secure.

3.3.25 Under Water Inspection

Contractor shall ensure that boats and other means used for transportation, surveying & investigation works shall be certified seaworthy by a recognized classification society. It shall be equipped with all life saving devices like life jackets, adequate fire protection arrangement sand shall possess communication facilities like cellular phones, wireless, walkie-talkie. All divers used for seabed surveys, underwater inspections shall have required authorized license, suitable life-saving kit. Number of hours of work by divers shall be limited as per regulations. EIL/ Owner shall have the right to inspect the boat and scrutinize documents in this regard.

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3.3.26 Excavation

The Contractor shall obtain permission from competent authorities prior to excavation wherever required.

The Contractor shall locate the position of buried utilities (water line, cable route, etc.) by referring to project / plant drawing / in consultation with EIL/Owner. The Contractor shall start digging manually to locate the exact position of buried utilities & thereafter use mechanical means.

In case of non-availability of sufficient data/drawings, underground services i.e. underground cable/ pipe shall be checked by cable detector/pipe locator by the contractor.

The Contractor shall keep soil heaps at least 1.5 M away from edge or a distance equal to depth of pit (whichever is more)

All excavated pits greater than 10 Sq.M plan area and depth more than 1.5M shall have at least two access routes for ingress and egress. Also, additional access routes shall be provided such that distance between any two access routes shall not be more than 20M.

The Contractor shall maintain sufficient "angle of repose" during excavation – shall also provide slope or suitable bench as decided by EIL / Owner.

The Contractor shall arrange "battering" or "benching" wherever required for preventing collapse of edge of excavations.

Avoid vertical wall of less than 2mtrs between two adjacent deep excavated pit/area. Further deep excavation should not be kept open for a longer duration.

The Contractor shall identify & arrange de-watering pump or well-point system to prevent earth collapse due to heavy rain / influx of underground water.

The Contractor shall arrange protective fencing/hard barricading with warning signal around excavated pits, trenches, etc. along with minimum 2 (two) entries, exits / escape ladders.

The Contractor must avoid "underpinning" / under-cutting to prevent collapse of chunk of earth during excavation.

The Contractor shall use "stoppers" to prevent over-run of vehicle wheels at the edge of excavated pits / trenches. Vehicles movement should be restricted to minimum three meters away from the excavated pit.

The Contractor shall arrange strengthening of "shoring" & "strutting" proactively to avoid collapse of earth / edges due to vehicular movement in close proximity of excavated areas / pits/ trenches, etc.

3.4 Tool Box Talks (TBT)

Contractor shall conduct daily TBT with workers prior to start of work and shall maintain proper record of the meeting. A suggested format is given below. The Job specific TBT is to be conducted by the immediate supervisor of the workers.

The Contractor shall conduct TBT before start of every morning or evening shift or night shift activities, for alerting the workers on specific hazards and their appropriate dos & don'ts. The Contractor shall provide sufficient rests to the site workmen and their foremen to avert fatigue & thereby endangering their lives during the course of site works.

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TOOLBOX TALK RECORDING SHEET		
Date & Time		
Work Location		
Subject (Nature of work)		
Presenter		
Hazards involved		
Precautions to be taken		
Worker's Name	Signature	Section
Remarks, in any		

The topics during TBT shall include

- Hazards related to work assigned on that day and precautions to be taken.
- Any forthcoming HSE hazards/events/instruction/orders, etc.

The above record can be kept in local language, which workers can read. These records shall be made available to EIL/ Owner whenever demanded.

3.5 Training & Induction Programme

a) Initial induction of workers into Construction oriented activities and appraising them about the methodology of works and how to carry-out safely and the same should not be inter mixed with Tool Box Talks or HSE Training. In this regard careful action should be made& maintained for imparting HSE induction to every individual, irrespective of his task/designation/level of employment, whereas, HSE Training should be imparted to specific person/group of people who are to carry-out that specific task more than once – for example, Riggers must be trained for working at heights, welders must be trained for work in confined space, fitters/carpenters, mesons must be trained for work at heights, etc.
Contractor shall arrange suitable facilities (e.g training room/place, audio visual facilities etc.) for organizing such training on HSE.

b) Contractor shall conduct Safety induction programme on HSE for all his workers and maintain records. Sticker for "Safety Induction" shall be pasted on the safety helmet of the site personnel. The Gate Pass shall be issued only to those workers who successfully qualify the Safety induction programme. Contractor to conduct effective safety induction program at work site by making efforts to arrange Video film/Virtual Reality (VR) technology pertaining to the escape routes, assembly points, risks involved in the event of an emergency etc while imparting safety induction.

c) The Contractor brief the visitors about the HSE precautions which are required to be taken before their proceeding to site and make necessary arrangements to issue appropriate PPEs like Aprons, hard hats, ear-plugs, goggles & safety shoes etc., to his visitors. The Contractor shall always maintain relevant acknowledgement from visitor on providing him brief information on HSE actions.

d) Contractor shall submit job specific training schedule for approval of EIL/Owner &ensure that all his personnel possess appropriate training to carry out the assigned job safely. The training should be imparted in a language understood by them and should specifically be trained about

- Potential hazards to which they may be exposed at their workplace

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- Measures available for prevention and elimination of these hazards

The topics during training shall cover, at the minimum: -

- Why safety should be considered during work - explanation
- Education about hazards and precautions required
- Employees' duties & responsibilities
- Emergency and evacuation plan
- HSE requirements during project activities
- Fire fighting and First-Aid
- Use of PPEs
- Occupational health issues – dos & don'ts
- Local laws on intoxicating drinks, drugs, smoking in force
- Common environmental subjects – lighting, ventilation, vibration, smoke/fumes etc.

e) Records of the training shall be kept and submitted to EIL/ Owner.

f) The Contractor shall make regular program for conducting Safety Training on various topics related to various activities & their safe-guarding utilizing experienced persons / outside agency / faculty. A program for Safety Training (indicative list as per Appendix –F) shall be furnished by the Contractor in its HSE Plan.

g) For offshore and jetty jobs, contractor shall ensure that all personnel deployed have undergone a structured sea survival training including use of lifeboats, basket landing, use of radio communication etc. from an agency acceptable to Owner/EIL.

3.6 ADDITIONAL SAFETY REQUIREMENTS FOR WORKING INSIDE A RUNNING PLANT

As a minimum, the contractor shall ensure adherence to following safety requirements while working in or in the close vicinity of an operating plant:

a) Contractor shall obtain permits for Hot work, Cold work, Excavation and Confined Space from Owner in the prescribed format.

b) The contractor shall monitor record and compile list of his workers entering the operational plant/unit each day and ensure & record their return after completing the job.

c) Contractor's workers and staff members shall use designated entrances and proceed by designated routes to work areas only assigned to them. The workers shall not be allowed to enter units' area, tanks area, pump rooms, etc. without work authorization permit.

d) Work activities shall be planned in such a way so as to minimize the disruption of other activities being carried out in an operational plant/unit and activities of other contractors.

e) The contractor shall submit a list of all chemicals/toxic substances that are intended to be used at site and shall take prior approval of the Owner.

f) Specific training on working in a hydrocarbon plant shall be imparted to the work force and mock drills shall be carried out for Rescue operations/First-Aid measures.

g) Proper barricading/cordoning of the operational units/plants shall be done before starting the construction activities. No unauthorized person shall be allowed to trespass. The height and overall design of the barricading structure shall be finalized in consultation with the Owner and shall be got approved from the Owner.

h) Care shall be taken to prevent hitting underground facilities such as electrical cables, hydrocarbon piping during execution of work.

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i) Barricading with water curtain shall be arranged in specific/critical areas where hydrocarbon vapors are likely to be present such as near horton spheres or tanks. Positioning of fire tenders (from owner) shall also be ensured during execution of critical activities.

j) Emergency evacuation plan shall be worked out and all workmen shall be apprised about evacuation routes. Mock drill operations may also be conducted.

k) Flammable gas test shall be conducted prior to any hot work using appropriate measuring instruments. Sewers, drains, vents or any other gas escaping points shall be covered with flame retardant tarpaulin.

l) Respiratory devices shall be kept handy while working in confined zones where there is a danger of inhalation of poisonous gases. Constant monitoring of presence of Gas/Hydrocarbon shall be done.

m) Clearance shall be obtained from all parties before starting hot tapping, patchwork on live lines and work on corroded tank roof.

n) Positive isolation of line/equipment by blinding for welding/cutting/grinding shall be done. Closing of valve will not be considered sufficient for isolation.

o) Welding spatters shall be contained properly by using fire retardant blanket and in no case shall be allowed to fall on the ground containing oil. Similar care shall be taken during cutting operations. Fire watcher to be deployed to ensure the same.

p) The vehicles, cranes, engines, etc. shall be fitted with spark arresters on the exhaust pipe and got it approved from Safety Department of the Owner.

q) Plant air should not be used to clean any part of the body or clothing or use to blow off dirt on the floor.

r) Gas detectors should be installed in gas leakage prone areas as per requirement of Owner's plant operation personnel.

s) Flame proof electrical distribution board, plug and socket shall be used for electrical appliances.

t) Experienced full time safety personnel shall be exclusively deployed to monitor safety aspects in running plants.

3.7 Self-Assessment and Enhancement

The contractor shall develop a method of check & balance through self-assessment& enhancement techniques and shall explore the opportunities for continual improvement in the HSE system.

3.8 HSE Promotion

The contractor shall encourage his workforce to promote HSE efforts at workplace by way of organizing workshops/seminars/training programs, celebrating HSE awareness weeks &National Safety Day, conducting quizzes & essay competitions, distributing pamphlets, posters & material on HSE, providing incentives for maintaining good HSE practices and granting incentives/ bonus for completing the job without any lost time accident.

3.9 Lock Out and Tag Out(LOTO) for Isolation of Energy Source

a) Contractor shall follow the LOTO/Isolation procedure of owner for all energy source isolations installed/under purview by /of owner i.e. "Brown field"

b) For all the other energy source (not under purview of client/owner)i.e. "Green field" Contractor shall develop a system to ensure the isolation of equipments, pipelines, Vessel, electrical panels from the energy source covering following as minimum:-

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- Identification of all energy source viz electrical, mechanical, hydraulic, pneumatic, chemical, thermal, gravitational, radiation and other forms of stored or kinetic energy.
- Establishing the energy isolation devices viz manually operated electrical circuit breakers, disconnection switches, blind flanges, etc.
- Installation of Lock Out devices for preventing the inadvertent release of stored energy and Tag Out devices ("Danger", "Do Not operate" or Do not Remove"tags) to indicate that testing, maintenance or servicing is underway and the device cannot be operated until the tag out device is removed.
- Lock Out and Tag out log book
- Permit for isolation and de-isolation of energy source as per format No.: HSE-16
- Availability of competent persons like experienced operators at substations, pump house, units etc. supervisors etc.

c) Contractor shall ensure that all the sources are locked out and tagged properly before giving clearance to start the job.

d) After the completion of job, contractor shall ensure all tools and tackles are removed and nobody is present in the working area and signing on LOTO log book.

e) Only on confirmation of above the contractor will remove their lock and tag from the isolation points and give instructions for energizing the same. Only the person carrying out the task shall himself carry the key for the lock in /Lock out.

4.0 DETAILS OF HSE MANAGEMENT SYSTEM BY CONTRACTOR

4.1 On Award of Contract

The Contractor shall submit a comprehensive Health, Safety and Environmental Plan or programme for approval by EIL/Owner prior to start of work. The Contractor shall participate in the pre-start meeting with EIL/Owner to finalize HSE Plans which shall including the following:

- HSE policy & Objectives
- Job procedure to be followed by the Contractor for construction activities including handling of equipment's, scaffolding, electric installations, etc. describing the risks involved, actions to be taken and methodology for monitoring each activity. Indicative list of procedures is enclosed as Annexure-H
- EIL/Owner review/audit requirement.
- Organization structure along with responsibility and authority, on HSE activities.
- Administrative & disciplinary steps involving implementation of HSE requirements
- Emergency evacuation plan/ procedures for site and labour camps
- Procedures for reporting & investigation of accidents and near misses.
- HSE Inspection
- HSE Training programme at project site
- HSE Awareness program eat project site
- Reference to Rules, Regulations and statutory requirements.
- HIRAC
- Environment Aspect Impact Register
- Legal Register
- HSE documentation viz reporting, analysis & record keeping.

4.2 During Job Execution

Contractor shall implement approved Health, Safety and Environment management plan or programme including but not limited to as brought out under para 3.0. Contractor shall also ensure:

a) to arrange workmen compensation insurance, registration under ESI Act, third party liability insurance, registration under BOCW Act etc., as applicable.

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b) to arrange all HSE permits before start of activities (as applicable), like permits for hot work, working at heights (Refer Format No. HSE-6), confined space (Refer Format No. HSE-7), Radiation Work Permit (Refer Format No. HSE-8), Demolishing/ Dismantling Work Permit (Refer Format No. HSE-9),Permit for erection/modification & dismantling of scaffolding(Refer Format No:HSE-14),Permit for heavy lift/critical erection (Refer Format No:HSE-15) ,Permit for energy Isolation & De-isolation" (HSE-16) ,storage of chemical/explosive materials & its use and implement all precautions mentioned therein. In this regard, requirements of *Oil industry Safety Directorate Standard No.* Std -105 "Work Permit Systems" shall be complied with while working in existing Oil or Gas processing plants. List of the persons involved shall be maintained as annexure to the work permit issued for a particular activity.

c) to submit, timely, the completed checklist on HSE activities in Format No.HSE-1, Monthly HSE report in Format No.HSE-5 (use of web based package (www.eil.co.in/conthse) is compulsory wherever the facility is available else a hard copy is to be submitted), accident/ incident reports, investigation reports etc. as per EIL/Owner requirements. Compliance of instructions on HSE shall be done by Contractor and informed urgently to EIL/Owner.

d) that his top most executive at site attends all the Safety Committee/HSE meetings arranged by EIL/Owner and carries out safety walk regularly. Only in case of his absence from site that a second senior most person shall be nominated by him, in advance, and communicated to EIL/Owner for performing the above tasks.

e) display at site office and at prominent locations HSE Policy, caution boards, list of hospitals, emergency services available, safety signs like Men at work, Speed Limits, Hazardous Area, various do's & don'ts, etc.

f) provide posters, banners for safe working to promote safety consciousness.

g) identify, assess, analyze & mitigate the construction hazards& incorporate relevant control measures before actually executing site works. (HIRAC = Hazard Identification, Risk Analysis and Control).

h) identify, assess, analyze & mitigate the environmental impact & incorporate relevant control measures through Environmental Aspect Impact Register

i) Identify and comply to all applicable HSE related legal requirements by preparing and maintaining a Legal register.

j) To maintain & monitor the level of legal compliance at site, a committee shall be formed comprising of contractor's RCM as Head and lead representatives as member(s)from HR/Legal, HSE and discipline engineer(s) (Civil, Mechanical, Electrical, Instrumentation) as applicable. Committee shall review the applicable legal requirements during periodical meetings and monitor the compliance status.

k) arrange testing, examination, inspection of own as well as borrowed construction equipment's/ machinery (stationary &mobile) before being used at site and also at periodical interval, through own resources and also by 3rd party competent agencies (as deemed fit in statutes). Records of such test, examination etc. shall be maintained & shall be submitted to EIL/Owner as & when asked for.

l) carryout audits/inspection (internal & external) at his works as well as sub-contractor works as per approved HSE plan/procedure/programme & submit the compliance reports of identified shortfalls for EIL/Owner review.

m) Arranging HSE training for site workmen (of his own &subcontractors) through internal or external faculty at periodical intervals.

n) Assistance& cooperate during HSE audits by EIL/Owner or any other 3rd party and submit compliance report.

o) Generate & submit of HSE records/report as per this specification.

p) Contractor shall arrange minimum 100 lux. illumination level at construction site for night works& record shall be maintained.

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q) Mobile phones shall not be permitted in operational area of the Project Site. However, intrinsically safe mobile phone can be permitted on approval from EIL/Owner. Alternatively, telephone booth(s) may be set up by the contractor after obtaining approval from EIL/Owner. Use of mobile phone shall also be restricted during construction activities such as height work, erection of material, confined space and Pre-commissioning & Commissioning activities at all project sites.

r) The contractor shall assign responsible person as in charge for night works and it shall be informed to owner/EIL.

s) Appraise EIL/Owner on HSE activities at site regularly.

t) Carry-out all dismantling activities safely, with prior approval of EIL/Owner representative.

u) The Contractor shall ensure that "Hot works" and painting works do not continue at the same place/ location at project site for which chance or probability of "fire" incident exists.

4.3 During Short Listing of the Sub-Contractors

The contractor shall review the HSE management system of the sub-contractors in line with the requirements given in this specification. The contractor shall be held responsible for the shortcomings observed in the HSE management system of the sub-contractor(s) during execution of the job.

5.0 RECORDS

At the minimum, the contractor shall maintain/ submit HSE records in the following reporting formats:

Safety Walk Through Report	HSE-1
Accident/ Incident Report	HSE-2
Supplementary Accident/ Incident Investigation report	HSE-3
Near Miss Incident Report	HSE-4
Monthly HSE Report	HSE-5
Permit for working at height	HSE-5
Permit for working in confined space	HSE-7
Permit for radiation work	HSE-8
Permit for demolishing/ dismantling	HSE-9
Daily Safety checklist	HSE-10
Housekeeping Assessment & compliance	HSE-11
Inspection of temporary electrical booth/installation	HSE-12
Inspection for scaffolding	HSE-13
Permit for erection/modification &dismantling of scaffolding	HSE-14
Permit for heavy lift/critical erection.	HSE-15
Permit for Energy isolation and de-isolation.	HSE-16
Permit for Excavation	HSE-17
Environmental Aspect Impact Register	HSE-18
HIRAC Register	HSE-19
Checklist for Tower Crane	HSE-20
Crane Inspection Checklist	HSE-21
Hydraulic Mobile Crane Inspection Checklist	HSE-22
Hydraulic Rig Inspection Checklist	HSE-23

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Boom Lift Inspection Checklist	HSE-24
Inspection reports of Equipment/tools/tackles	*
Report of Toolbox Talks	As indicated in specification
PPE issue report/register	*
Site inspection reports	*
Training records	*

(*) The formats shall be developed by contractor in consultation with EIL/Owner.

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APPENDIX-A
(Sheet 1 of 2)

A. IS CODES ON HSE

SP: 53	Safety code for the use, Care and protection of hand operated tools.
IS: 838	Code of practice for safety & health requirements in electric and gas welding and cutting operations
IS: 1179	Eye & Face precautions during welding, equipment etc.
IS: 1860	Safety requirements for use, care and protection of abrasive grinding wheels.
IS: 1989 (Pt -II)	Leather safety boots and shoes
IS: 2925	Industrial Safety Helmets
IS: 3016	Code of practice for fire safety precautions in welding & cutting operation.
IS: 3043	Code of practice for earthing
IS: 3764	Code of safety for excavation work
IS: 3786	Methods for computation of frequency and severity rates for industrial injuries and classification of industrial accidents
IS: 3696	Safety Code of scaffolds and ladders
IS: 4083	Recommendations on stacking and storage of construction materials and components at site
IS: 4770	Rubber gloves for electrical purposes
IS: 5121	Safety code for piling and other deep foundations
IS: 5216 (Pt-I)	Recommendations on Safety procedures and practices in electrical works
IS: 5557	Industrial and Safety rubber lined boots
IS: 5983	Eye protectors
IS: 6519	Selection, care and repair of Safety footwear
IS: 6994 (Pt-I)	Industrial Safety Gloves (Leather & Cotton Gloves)
IS: 7293	Safety Code for working with construction Machinery
IS: 8519	Guide for selection of industrial safety equipment for body protection
IS: 9167	Ear protectors
IS: 11006	Flash back arrestor (Flame arrestor)
IS: 11016	General and safety requirements for machine tools and their operation
IS: 11057	Specification for Industrial safety nets
IS: 11226	Leather safety footwear having direct moulded rubber sole
IS: 11972	Code of practice for safety precaution to be taken when entering a sewerage system
IS: 13367	Code of practice-safe use of cranes
IS: 13416	Recommendations for preventive measures against hazards at working place

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APPENDIX-A
(Sheet 2 of 2)

B. INTERNATIONAL STANDARDS ON HSE

Safety Glasses	:	ANSI Z 87.1, ANSI ZZ 87.1, AS 1337, BS 2092, BS 1542, BS 679, DIN 4646/ 58311
Safety Shoes	:	ANSI Z 41.1, AS 2210, EN 345
Hand Gloves	:	BS 1651
Ear Muffs	:	BS 6344, ANSI S 31.9
Hard Hat	:	ANSI Z 89.1/89.2, AS 1808, BS 5240, DIN 4840
Goggles	:	ANSI Z 87.1
Face Shield	:	ANSI Z 89.1
Breathing Apparatus	:	BS 4667, NIOSH
Welding & Cutting	:	ANSI Z49.1
Safe handling of compressed:		P-1 (Compressed Gas Association Gases in cylinders 1235 Jefferson Davis Highway, Arlington VA 22202 - USA)
Full body harness	:	EN-361
Lanyard	:	EN-354
Karabiner	:	EN-362 and EN-12275

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APPENDIX-B

DETAILS OF FIRST AID BOX

SL. NO.	DESCRIPTION		QUANTITY
1.	Small size Roller Bandages, 1 Inch Wide	(Finger Dressing small)	6 Pcs.
2.	Medium size Roller Bandages, 2 Inches Wide	(Hand & Foot Dressing)	6 Pcs.
3.	Large size Roller Bandages, 4 Inches Wide	(Body Dressing Large)	6 Pcs.
4.	Large size Burn Dressing	(Burn Dressing Large)	4 Pkts.
5.	Cotton Wool	(20 gms packing)	4 Pkts.
6.	Antiseptic Solution Dettol (100 ml.) or Savlon		1 Bottle
7.	Mercurochrome Solution (100 ml.) 2% in water		1 Bottle
8.	Ammonia Solution (20 ml.)		1 Bottle
9.	A Pair of Scissors		1 Piece
10.	Adhesive Plaster (1.25 cm X 5 m)		1 Spool
11.	Eye pads in Separate Sealed Pkt.		4 pcs.
12.	Tourniqut		1 No.
13.	Safety Pins		1 Dozen
14.	Tinc. Iodine/ Betadine (100 ml.)		1 Bottle
15.	Polythene Wash cup for washing eyes		1 No.
16.	Potassium Permanganate (20 gms.)		1 Pkt.
17.	Tinc. Benzoine (100 ml.)		1 Bottle
18.	Triangular Bandages		2 Nos.
19.	Band Aid Dressing		5 Pcs.
20.	Iodex/Moov(25 gms.)		1 Bottle
21.	Tongue Depressor		1 No.
22.	Boric Acid Powder (20 gms.)		2 Pkt.
23.	Sodium Bicarbonate (20 gms.)		1 Pkt.
24.	Dressing Powder (Nebasulf) (10 gms.)		1 Bottle
25.	Medicinal Glass		1 No.
26.	Duster		1 No.
27.	Booklet (English& Local Language)		1 No. each
28.	Soap		1 No.
29.	Toothache Solution		1 No.
30.	Vicks (22 gms.)		1 Bottle
31.	Forceps		1 No.
32.	Snake –Bite Lancet		1No.
33.	Note Book		1 No.
34.	Splints		4 Nos.
35.	Lock		1 Piece
36.	Life Saving/Emergency/Over-the counter Drugs		As decided at site

Box size: Suitable size first aid box to be used for first aid items

Note : The medicines prescribed above are only indicative. Equivalent medicines can also be used. A prescription, in this regard, shall be required from a qualified Physician.

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APPENDIX-C

TYPE OF FIRES VIS-À-VIS FIRE EXTINGUISHERS

Fire / Extinguisher	Water	Foam	CO_2	Dry Powder	Multi purpose (ABC)
Originated from paper, clothes, wood	✔	✔	can control minor surface fires	can control minor surface fires	✔
Inflammable liquids like alcohol, diesel, petrol, edible oils, bitumen	×	✔	✔	✔	✔
Originated from gases like LPG, CNG, H_2	×	×	✔	✔	✔
Electrical fires	×	×	✔	✔	✔

LEGEND : ✔ : CAN BE USED

× : NOT TO BE USED

Note: Fire extinguishing equipment must be checked atleast once a year and after every use by an authorized person. The equipment must have an inspection label on which the next inspection date is given. Type of extinguisher shall clearly be marked on it.

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APPENDIX-D

List of Statutory Acts & Rules Relating to HSE

- The Indian Explosives Act and Rules
- The Motor Vehicle Act and Central Motor Vehicle Rules
- The Factories Act and concerned Factory Rules
- The Petroleum Act and Petroleum Rules
- The Workmen Compensation Act
- The Gas Cylinder Rules and the Static & Mobile Pressure Vessels Rules
- The Indian Electricity Act and Rules
- The Indian Boiler Act and Regulations
- The Water (Prevention & Control & Pollution) Act
- The Water (Prevention & Control of Pollution) Cess Act
- The Mines & Minerals (Regulation & Development) Act
- The Air (Prevention & Control of Pollution) Act
- The Atomic Energy Act
- The Radiation Protection Rules
- The Indian Fisheries Act
- The Indian Forest Act
- The Wild Life (Protection) Act
- The Environment (Protection) Act and Rules
- The Hazardous Wastes (Management & Handling) Rules
- The Manufacturing, Storage & import of Hazardous Chemicals Rules
- The Public Liability Act
- The Building and Other Construction Workers (Regulation of Employment and Condition of Service) Act
- Other statutory acts Like EPF, ESIS, Minimum Wages Act.

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APPENDIX-E(Sheet 1 of 12)

CONSTRUCTION HAZARDS, THEIR EFFECTS & PREVENTIVE MEASURES

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
(A) EXCAVATION Pit Excavation upto 3.0m	Falling into pit	Personal injury	Provide guard rails/ barricade with warning signal Provide atleast two entries/ exits. Provide escape ladders.
	Earth Collapse	Suffocation/ Breathlessness Buried	Provide suitable size of shoring and strutting, if required. Keep soil heaps away from the edge equivalent to 1.5m or depth of pit whichever is more. Don't allow vehicles to operate too close to excavated areas. Maintain atleast 2m distance from edge of cut. Maintain sufficient angle of repose. Provide slope not less than 1:1 and suitable bench of 0.5m width at every 1.5m depth of excavation in all soils except hard rock. Battering/benching the sides.
	Contact with buried electric cables Gas/ Oil Pipelines	Electrocution Explosion	Obtain permission from competent authorities, prior to excavation, if required. Locate the position of buried utilities by referring to plant drawings. Start digging manually to locate the exact position of buried utilities and thereafter use mechanical means.
Pit Excavation beyond 3.0m	Same as above plus Flooding due to excessive rain/ underground water	Can cause drowning situation	Prevent ingress of water Provide ring buoys Identify and provide suitable size dewatering pump or well point system
	Digging in the vicinity of existing Building/ Structure	Building/Structure may collapse Loss of health & wealth	Obtain prior approval of excavation method from local authorities. Use under-pining method Construct retaining wall side by side.
	Movement of vehicles/ Equipments close to the edge of cut.	May cause cave-in or slides. Persons may get buried.	Barricade the excavated area with proper lighting arrangements Maintain at least 2m distance from edge of cut and use stop blocks to prevent over-run Strengthen shoring and strutting

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APPENDIX-E: (Sheet 2 of 12)

CONSTRUCTION HAZARDS, THEIR EFFECTS & PREVENTIVE MEASURES (...Contd.)

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
Narrow deep excavations for pipelines, etc.	Same as above plus Frequent cave-in or slides	May cause severe injuries or prove fatal	Battering/benching of sides Provide escape ladders
	Flooding due to Hydro- static testing	May arise drowning situation	Same as above plus Bail out accumulated water Maintain adequate ventilation.
Rock by excavation blasting	Improper handling of explosives	May prove fatal	Ensure proper storage, handling & carrying of explosives by trained personnel. Comply with the applicable explosive acts & rules.
	Uncontrolled explosion	May cause severe injuries or prove fatal	Allow only authorized persons to perform blasting operations. Smoking and open flames are to be strictly prohibited
	Scattering of stone pieces in atmosphere	Can hurt people	Use PPE like goggles, face mask, helmets etc.
Rock excavation by blasting (Contd)	Entrapping of persons/ animals.	May cause severe injuries or prove fatal	Barricade the area with red flags and blow siren before blasting.
	Misfire	May explode suddenly	Do not return to site for atleast 20 minutes or unless announced safe by designated person.
Piling Work	Failure of pile-driving equipment	Can hurt people	Inspect Piling rigs and pulley blocks before the beginning of each shift.
	Noise pollution	Can cause deafness and psychological imbalance.	Use personal protective equipment's like ear plugs, muffs, etc.
	Extruding rods/casing	Can hurt people	Barricade the area and install sign boards Provide first-aid
	Working in the vicinity of 'Live-Electricity'	Can cause electrocution/ Asphyxiation	Keep sufficient distance from Live-Electricity as per IS code. Shut off the supply, if possible Provide artificial/rescue breathing to the injured
(B) CONCRETING	Air pollution by cement	May affect Respiratory System	Wear respirators or cover mouth and nose with wet cloth.
	Handling of ingredients	Hands may get injured	Use gloves & other PPE.
	Protruding reinforcement rods.	Feet may get injured	Provide platform above reinforcement for movement of workers or provide end caps for protection on reinforcement bars.

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APPENDIX-E :(Sheet 3 of 12)

CONSTRUCTION HAZARDS, THEIR EFFECTS & PREVENTIVE MEASURES (...Contd.)

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
	Earthing of electrical mixers, vibrators, etc. not done.	Can cause electrocution/ asphyxiation	Ensure earthing of equipments and proper functioning of electrical circuit before commencement of work.
	Falling of materials from height	Persons may get injured	Use hard hats Remove surplus material immediately from work place. Ensure lighting arrangements during night hours
	Continuous pouring by same gang	Cause tiredness of workers and may lead to accident.	Insist on shift pattern Provide adequate rest to workers between subsequent pours.
	Revolving of concrete mixer/ vibrators	Parts of body or clothes may get entrapped.	Allow only mixers with hopper Provide safety cages around moving motors Ensure proper mechanical locking of vibrator.
Super-structure	Same as above plus Deflection in props or shuttering material	Shuttering/props may collapse and prove fatal	Avoid excessive stacking on shuttering material Check the design and strength of shuttering material before commencement of work Rectify immediately the deflection noted during concreting.
	Passage to work place	Improperly tied and designed props/planks may collapse	Ensure the stability and strength of passage before commencement of work. Do not overload and stand under the passage.
(C) REINFOR-CEMENT	Curtailment and binding of rods	Persons may get injured	Use PPE like gloves, shoes, helmets, etc. Avoid usage of shift tools
	Carrying of rods for short distances/at heights	Workers may get injured their hands and shoulders.	Provide suitable pads on shoulders and use safety gloves. Tie up rods in easily liftable bundles Ensure proper staging.
	Checking of clear distance/ cover with hands	Rods may cut or injure the fingers	Use measuring devices like tape, measuring rods, etc.
	Hitting projected rods and standing on cantilever rods.	Persons may get injured and fell down	Use safety shoes and avoid standing unnecessarily on cantilever rods Avoid wearing of loose clothes

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APPENDIX-E:(Sheet 4 of 12)

CONSTRUCTION HAZARDS, THEIR EFFECTS & PREVENTIVE MEASURES (...Contd.)

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
	Falling of material from height	May prove fatal	Use helmets Provide safety nets
	Transportation of rods by trucks/ trailers	Protruded rods may hit the persons	Use red flags/lights at the ends Do not protrude the rods in front of or by the side of driver's cabin. Do not extend the rods 1/3rd of deck length or 1.5m whichever is less
(D)WELDING AND GAS CUTTING	Welding radiates invisible ultraviolet and infra-red rays	Radiation can damage eyes and skin.	Use specified shielding devices and other PPE of correct specifications. Avoid thoriated tungsten electrodes for GTAW
	Improper placement of oxygen and acetylene cylinders	Explosion may occur	Move out any leaking cylinder Keep cylinders in vertical position Use trolley for transportation of cylinders and chain them Use flashback arrestors
	Leakage/ cuts in hoses	May cause fire	Purge regulators immediately and then turn off Never use grease or oil on oxygen line connections and copper fittings on acetylene lines Inspect regularly gas carrying hoses Always use red hose for acetylene & other fuel gases and black for oxygen
	Opening-up of cylinder	Cylinder may burst	Always stand back from the regulator while opening the cylinder Turn valve slowly to avoid bursting Cover the lug terminals to prevent short circuiting
	Welding of tanks, container or pipes storing flammable liquids	Explosion may occur	Empty & purge them before welding Never attach the ground cable to tanks, container or pipe storing flammable liquids Never use LPG for gas cutting

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APPENDIX-E:(Sheet 5 of 12)

CONSTRUCTION HAZARDS, THEIR EFFECTS & PREVENTIVE MEASURES ...(Contd.)

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
(E) RADIOGRAPHY	Ionizing radiation	Radiations may react with the skin and can cause cancer, skin irritation, dermatitis, etc.	Ensure Safety regulations as per BARC/AERB before commencement of job. Cordon off the area and install Radiation warning symbols Restrict the entry of unauthorized persons Wear appropriate PPE and film badges issued by BARC/AERB
	Transportation and Storage of Radiography source	Same as above	Never touch or handle radiography source with hands Store radiography source inside a pit in an exclusive isolated storage room with lock and key arrangement. The pit should be approved by BARC/AERB. Radiography source should never be carried either in passenger bus or in a passenger compartment of trains. BARC/AERB has to be informed before source movement. Permission from Director General of Civil Aviation is required for booking radio isotopes with airlines.
	Loss of Radio isotope	Same as above	Try to locate with the help of Survey Meter. Inform BARC/AERB (*)
(F) ELECTRICAL INSTALLATION ANDUSAGE	Short circuiting	Can cause Electrocution or Fire	Use rubberized hand gloves and other PPE Don't lay wires under carpets, mats or door ways. Allow only licensed electricians to perform on electrical facilities Use one socket for one appliance Ensure usage of only fully insulated wires or cables Don't place bare wire ends in a socket Ensure earthing of machineries and equipment's Do not use damaged cords and avoid temporary connections Use spark-proof/flame proof type field distribution boxes.

(*) Atomic Energy Regulatory Board (AERB),
Bhabha Atomic Research Centre (BARC)
Anushakti Nagar, Mumbai – 400 094

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APPENDIX-E:(Sheet 6 of 12)

CONSTRUCTION HAZARDS, THEIR EFFECTS & PREVENTIVE MEASURES (...Contd.)

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
			Do not allow open/bare connections Provide all connections through 30mAELCB Protect electrical cables/equipments from water and naked flames Check all connections before energizing
	Overloading of Electrical System	Bursting of system can occur which leads to fire	Display voltage and current ratings prominently with 'Danger' signs. Ensure approved cable size, voltage grade and type Switch off the electrical utilities when not in use Do not allow unauthorized connections. Ensure proper grid wise distribution of Power
	Improper laying of overhead and underground transmission lines/cables	Can cause electrocution and prove fatal	Do not lay un armoured cable directly on ground, wall, roof of trees Maintain atleast 3m distance from HT cables All temporary cables should be laid atleast 750 mm below ground on 100 mm fine sand overlying by brick soling Provide proper sleeves at crossings/ inter-sections Provide cable route markers indicating the type and depth of cables at intervals not exceeding 30m and at the diversions/termination
(G) FIRE PREVENTION AND PROTECTION	Small fires can become big ones and may spread to the surrounding areas	Cause burn injuries and may prove fatal	In case a fire breaks out, press fire alarm system and shout "Fire, Fire". Keep buckets full of sand & water/ fire extinguishing equipment near hazardous locations. Confine smoking to 'Smoking Zones' only. Train people for using specific type of fire fighting equipments under different classes of fire. Keep fire doors/shutters, passages and exit doors unobstructed. Maintain good housekeeping and first-aid boxes (for details refer Appendix-B). Don't obstruct assess to Fire extinguishers. Do not use elevators for evacuation during fire. Maintain lightening arrestors for elevated structures. Stop all electrical motors with internal combustion.

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APPENDIX-E :(Sheet 7 of 12)

CONSTRUCTION HAZARDS, THEIR EFFECTS & PREVENTIVE MEASURES (...Contd.)

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
			Move the vehicles from dangerous locations. Remove the load hanging from the crane booms Remain out of the danger areas.
	Improper selection of Fire extinguisher	It may not extinguish the fire	Ensure usage of correct fire extinguisher meant for the specified fire (for details refer Appendix-C). Do not attempt to extinguish Oil and electric fires with water. Use foam cylinders/CO_2/sand or earth.
	Improper storage of highly inflammable substances	Same as above	Maintain safe distance of flammable substances from source of ignition. Restrict the distribution of flammable materials to only min. necessary amount. Construct specifically designed fuel storage facilities. Keep chemicals in cool and dry place away from heat. Ensure adequate ventilation. Before welding operation, remove or shield the flammable material properly. Store flammable materials in stable racks, correctly labeled preferably with catchment trays. Wipe off the spills immediately
	Short circuiting of electrical system	Same as above Can cause Electrocution	Don't lay wires under carpets, mats or door ways Use one socket for one appliance. Use only fully insulated wires or cables. Do not allow open/bare connections. Provide all connections through 30mAELCB. Ensure earthing of machineries and equipments.
(H) VEHICULAR MOVEMENT	Crossing the Speed Limits (Rash driving)	Personal injury	Obey speed limits and traffic rules strictly. Always expect the unexpected and be a defensive driver. Use seat belts/helmets. Blow horn at intersections and during overtaking operations. Maintain the vehicle in good condition. Do not overtake on curves, bridges and slopes.
	Adverse weather condition	Same as Above	Read the road ahead and ride to the left. Keep the wind screen and lights clean. Do not turn at speed. Recognize the hazard, understand the defense and act correctly in time.

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APPENDIX-E :(Sheet 8 of 12)

CONSTRUCTION HAZARDS, THEIR EFFECTS & PREVENTIVE MEASURES (...Contd.)

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
	Consuming alcohol before and during the driving operation	Same as above	Alcohol and driving do not mix well. Either choose alcohol or driving. If you have a choice between hitting a fixed object or an on-coming vehicle, hit the fixed object Quit the steering at once and become a passenger. Otherwise take sufficient rest and then drive. Do not force the driver to drive fast and round the clock. Do not day dream while driving
	Falling objects/ Mechanical failure	May prove fatal	Ensure effective braking system, adequate visibility for the drives, reverse warning alarm. Proper maintenance of the vehicle as per manufacturer instructions
(I) PROOF TESTING (HYDROSTATIC/ PNEUMATIC TESTING)	Bursting of piping Collapse of tanks Tanks flying off	May cause injury and prove fatal	Prepare test procedure & obtain EIL/owner's approval. Provide separate gauge for pressurizing pump and piping/equipment. Check the calibration status of all pressure gauges, dead weight testers and temperature recorders. Take dial readings at suitable defined intervals and ensure most of them fall between 40-60% of the gauge scale range. Provide safety relief valve (set at pressure slightly higher than test pressure) while testing with air/ nitrogen. Ensure necessary precautions, stepwise increase in pressure, tightening of bolts/nuts, grouting, etc. before and during testing. Keep the vents open before opening any valve while draining out of water used for hydro-testing of tanks. Pneumatic testing involves the hazard of released energy stored in compressed gas. Specific care must therefore be taken to minimize the chance of brittle failure during a pneumatic leak test. Test temperature is important in this regard and must be considered when the designer chooses the material of construction.

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APPENDIX-E :(Sheet 9 of 12)

CONSTRUCTION HAZARDS, THEIR EFFECTS & PREVENTIVE MEASURES (...Contd.)

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
			A pressure relief device shall be provided, having a set pressure not higher than the test pressure plus the lesser of 345 KPa (50 psi) or 10% of the test pressure. The gas used as test fluid, if not air, shall be nonflammable and nontoxic.
(J) WORKING AT HEIGHTS	Person can fall down	May sustain severe injuries or prove fatal	Provide guard rails/barricade at the work place Use PPE like full body harness, life line, helmets, safety shoes, etc. Obtain a permit before starting the work at height above 2 meters Fall arrest and safety nets, etc. must be installed Provide adequate working space(min. 0.6 m) Tie/weld working platform with fixed support Use roof top walk ladder while working on a slopping roofs Avoid movement on beams
		May hit the scrap/material stacked at the ground or in between	Keep the work place neat and clean Remove the scrap immediately
	Material can fall down	May hit the workers working at lower levels and prove fatal	Same as above plus Do not throw or drop materials or equipment from height. i.e. do not *bomb* materials All tools to be carried in a tool-kit Bag or on working uniform Remove scrap from the planks Ensure wearing of helmet by the workers working at lower levels. Multiple activities at same location to be avoided. .
(K) CONFINED SPACES	Suffocation/ drowning	Unconsciousness, death	Use respiratory devices, if reqd. Avoid overcrowding inside a confined space Provide Exhaust fans for ventilation Do not wear loose clothes, neck ties, etc. Fulfill conditions of the permit

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APPENDIX-E:(Sheet 10 of 12)

CONSTRUCTION HAZARDS, THEIR EFFECTS & PREVENTIVE MEASURES (...Contd.)

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
			Check for presence of hydrocarbons, O_2 level Obtain work permit before entering a confined space Ensure that the connected piping of the equipment which is to be opened is pressure free, fluid has been drained, vents are open and piping is positively isolated by a blind flange
	Presence of foul smell and toxic substances	Inhalation can pose threat to life	Same as above plus Check for hydrocarbon and Aromatic compounds before entering a confined space Depute one person outside the confined space for continuous monitoring and for extending help in case of an emergency
	Ignition/ flame can cause fire	Person may sustain burn injuries or explosion may occur	Keep fire extinguishers at a hand distance Remove surplus material and scrap immediately Do not smoke inside a confined space Do not allow gas cylinders inside a confined space Use low voltage (24V) lamps for lighting Use tools with air motors or electric tools with max. voltage of 24V Remove all equipment's at the end of the day
(L) HANDLING AND LIFTING EQUIPMENTS	Failure of load lifting and moving equipment's	Can cause accident and prove fatal	Avoid standing under the lifted load and within the operating radius of cranes. Check periodically oil, brakes, gears, horns and tyre pressure of all moving machinery. Check quality, size and condition of all chain pulley blocks, slings, U-clamps, D-shackles, wire ropes, etc. Allow crane to move only on hard, firm and leveled ground. Allow lifting slings as short as possible and check gunny packings at the friction points. Do not allow crane to tilt its boom while moving Install Safe Load Indicator. Ensure certification by applicable authority.

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APPENDIX-E :(Sheet 11 of 12)

CONSTRUCTION HAZARDS, THEIR EFFECTS & PREVENTIVE MEASURES (...Contd.)

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
	Overloading of lifting equipments	Same as above	Safe lifting capacity of derricks and winches written on them shall be got verified The max. safe working load shall be marked on all lifting equipments Check the weight of columns and other heavy items painted on them and accordingly decide about the crane capacity, boom and angle of erection Allow only trained operators and riggers during crane operation.
	Overhead electrical wires	Can cause electrocution and fire	Do not allow boom or other parts of crane to come within 3m reach of overhead HT cables Hook and load being lifted shall preferably remain in full visibility of crane operators.
(M) SCAFFOLDING, FORMWORK AND LADDERS	Person can fall down	Person May sustain severe injuries and prove fatal	Provide guard rails for working at height. Face ladder while climbing and use both hands. Ladders shall extend about 1m above landing for easy access and tying up purpose. Do not place ladders against movable objects and maintain base at 1/4 unit of the working length of the ladder. Suspended scaffolds shall not be less than 500 mm wide and tied properly with ropes. No loose planks shall be allowed. Use PPE, like helmets, safety shoes etc.
	Failure of scaffolding material	Same as above	Inspect visually all scaffolding materials for stability and anchoring with permanent structures. Design scaffolding for max. load carrying capacity. Scaffolding planks shall not be less than 50X250 mm full thickness lumber or equivalent. These shall be cleated or secured and must extend over the end supports by at least 150mm and not more than 300mm. Don't overload the scaffolds. Do not splice short ladders to make a longer one. Vertical ladders shall not exceed 6m.
	Material can fall down	Persons working at lower level gets injured	Remove excess material and scrap immediately. Carry the tools in a tool-kit bag only. Provide safety nets.

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APPENDIX-E:(Sheet 12 of 12)

CONSTRUCTION HAZARDS, THEIR EFFECTS &PREVENTIVE MEASURES (...Contd.)

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
(N) STRUC-TURAL WORKS	Personal negligence and danger of fall	Can cause injury or casualty	Do not take rest inside rooms built for welding machines or electrical distribution system. Avoid walking on beams at height. Wear helmet with chin strap and full body harness while working at height. Use hand gloves and goggles during grinding operations. Cover or mark the sharp and projected edges. Do not stand within the operating radius of cranes.
	Lifting/ slipping of material	Same as above	Do not stand under the lifted load. Stack properly all the materials. Avoid slippage during handling. Control longer pieces lifted up by cranes from both ends. Remove loose materials from height. Ensure tightening of all nuts & bolts.
(O)PIPELIN E WORKS	Erection/ lowering failure	Can cause injury	Do not stand under the lifted load. Do not allow any person to come within the radii of the side boom handling pipes. Check the load carrying capacity of the lifting tools & tackles. Use safe Load Indicators (SLI). Use appropriate PPEs.
	Other	Same as above	Wear gum boots in marshy areas. Allow only one person to perform signaling operations while lowering of pipes. Wedges to be provided below the pipe to prevent spool/pipe roll out. Provide night caps on pipes. Provide end covers on pipes for stoppage of pigs while testing/ cleaning operations.
(P) GRIT BLASTING	Pollution in neighboring area, hit by grit sand high pressure air	Can cause personal injury	Ensure the blasting is done in enclosed shed. Keep safe distance while blasting operations. Wear positive pressure blast hood or helmet with view-window, ear-muff/plug, gloves, overall or leather coat /apron, rubber shoes.

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APPENDIX-F

TRAINING SUBJECTS / TOPICS

(For contractors' personnel)

1. The Law & Safety – Statutory Requirement / Applicable statutes / Duties of employer / employee.
2. Policy & Administration – Why HSE? / Duties & Responsibilities of Safety Personnel at project site / Effect of incentive on accident prevention.
3. HSE & Supervision – Duties of Supervisor / HSE integrated supervision / Who should be held responsible for site accidents?
4. Safety Budget / Cost of Accidents – Direct costs / Indirect costs.
5. Hazard Identification / Type of hazards / HIRAC.
6. Behavioral Safety & Motivation.
7. Housekeeping – Storage / Stacking / Handling of materials / Hydraulic Mobile Crane handling.
8. Occupational Health in Construction sector.
9. Personal Protective Equipment's – Respiratory & Non- respiratory.
10. Electricity & Safety – ELCB / Fuse / Powered tools / Project illumination.
11. Handling of Compressed Gas – Transportation / Storage / FBAs / Fire prevention.
12. Machine Safety – Machine guarding / Maintenance.
13. Transportation – Hazards & risks in transp. of materials / ODC consignments.
14. Cranes & Other Lifting machinery – Legal requirements vis-à-vis essential safety requirements.
15. Communication – HSE Induction / TBTs / Safety Committee / Safety meeting / Safety propaganda / Publicity.
16. Excavation – Risks & Dangers / Safety measures.
17. Working at Heights – Use of ladder / Work on roofs / Scaffolds / Double harness lanyards / Life-line / Fall arrester / Safety Nets / Floor openings.
18. Hazards in Welding & important safety precautions.
19. Gas Cutting – Hazards & safety measures.
20. Fire prevention & fire protection.

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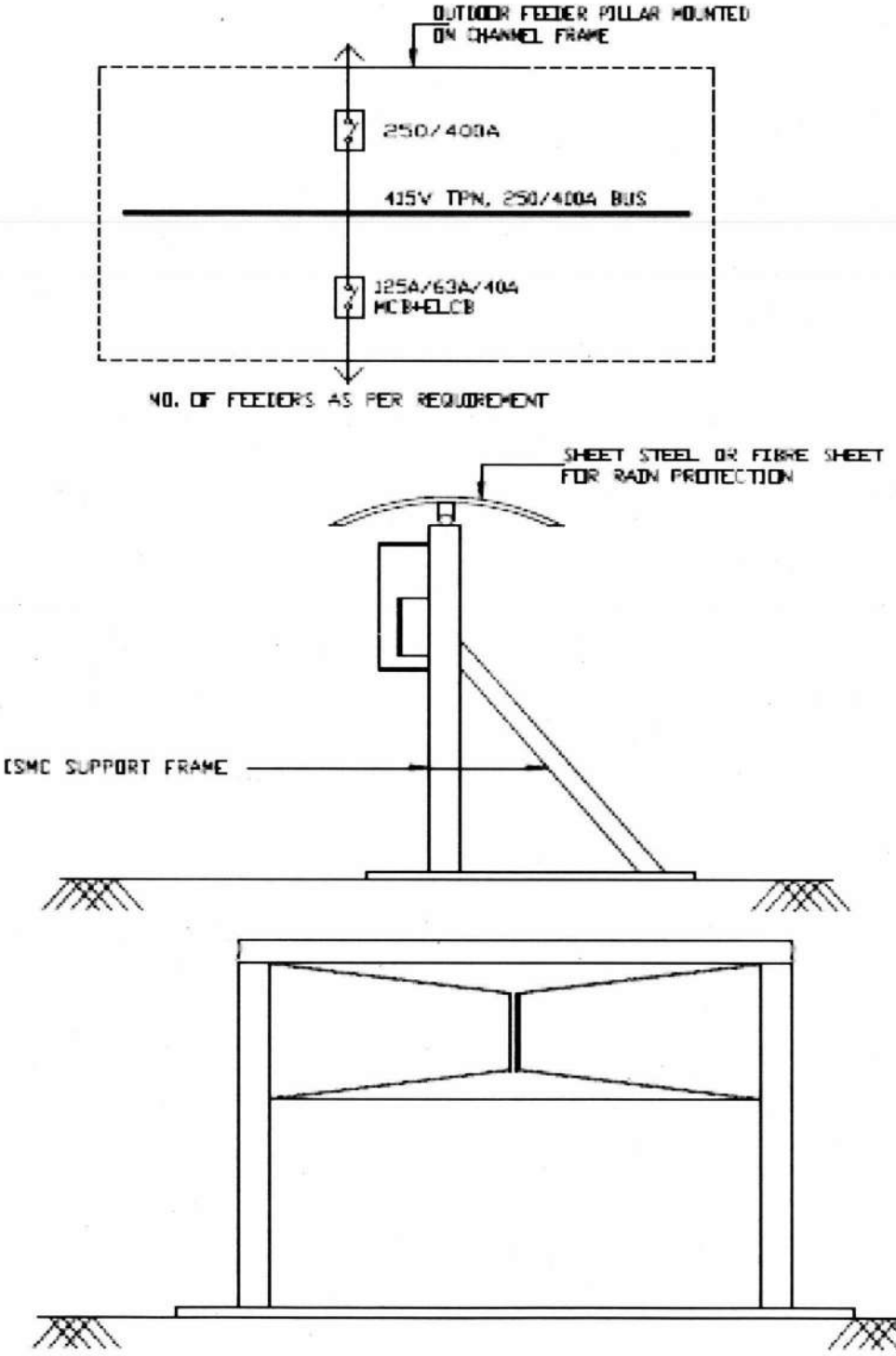
APPENDIX - G

CONSTRUCTION POWER BOARD(typ)



NOTES:-

1. CONTRACTOR TO INSTALL TEMPORARY CONST. POWER BOARD AS SHOWN IN THE DRG. ITS LOCATION SHALL BE EASILY ACCESABALE.
2. POWER DISTRIBUTION BOARD SHALL BE EARTHED AT TWO POINTS BY MINIMUM 40X5MM GI STRIP FROM THE AVILABLE GRID OR DIRECTLY CONNECTED TO TWO DIRECTLY DRIVEN EARTH ELECTRODES.
3. DISTRIBUTION BOARD SHALL BE FABRICATED BY USING 14MM CRCA SHEET STEELWITH HINGED DOORSAND ALL COMPONENT MOUNTED IN IT.
4. ALL INCOMING AND OUTGOING CABLESSHALL HAVE BOTTOM ENTRY.

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APPENDIX-H

LIST OF PROCEDURES (MINIMUM) TO BE FORMING PART OF HSE PLAN:-

A. HSE Management Procedures:

- HSE Risk Management (including HIRA)
- HSE Legal Compliance and Other Requirements
- HSE Objectives & Performance
- HSE Training and Competence (including Induction)
- HSE Motivation &Award Scheme
- HSE Audits
- HSE Sub Contractor Management
- HSE Emergency Management
- HSE Incidents Reporting and Management
- HSE procedure for Behaviour based Safety
- First Aid & Management
- Roles, Responsibility, accountabilities and Authorities

B. Job procedures/Safe Operating procedures

- Setting Up Site &Signages
- Working at Height
- Confined Space Entry
- Permit to Work (including hot works)
- Housekeeping
- Transportation of materials including Manual Handling
- Earthmoving Operations & excavation
- Scaffolding
- Fire Prevention/Protection
- Hazardous Substance handling & Storage
- Personal Protective Equipment

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APPENDIX-I

LIFE SAVING RULES

Bypassing Safety Controls

Obtain authorisation before overriding or disabling safety controls

- I understand & use safety-critical equipment and procedure which apply to my task
- I obtain authorization before:
  - disabling or overriding safety equipment
  - deviating from procedures
  - crossing a barrier

Confined Space

Obtain authorisation before entering a confined space

- I confirm energy sources are isolated
- I confirm the atmosphere has been tested and is monitored
- I check and use my breathing apparatus when required
- I confirm there is an attendant standing by
- I confirm rescue plan is in place
- I obtain authorization to enter

Driving

Follow safe driving rules

- I always wear a seatbelt
- I do not exceed the speed limit, and reduce my speed for road conditions
- I do not use phones or operate devices while driving
- I am fit, rested and fully alert while driving
- I follow journey management requirements

Energy Isolation

Verify isolation and zero energy before work begins

- I have identified all energy sources
- I confirm that hazardous energy sources have been isolated, locked and tagged
- I have checked there is zero energy and tested for residual or stored energy

Hot Work

Controls flammables and ignition sources

- I identify and control ignition sources
- Before starting any hot work:
  - I confirm flammable material has been removed or isolated
  - I obtain authorization
- Before starting hot work in a hazardous are I confirm:
  - a gas test has been completed
  - gas will be monitored continually

Line of Fire

Keep yourself and others out of the line of fire

- I position myself to avoid:
  - moving objects
  - vehicles
  - pressure releases
  - dropped objects
- I establish and obey barriers and exclusion zones
- I take action to secure loose objects and report potentialdropped objects

Safe Mechanical Lifting

Plan lifting operations and control the area

- I confirm that the equipment and load have been inspected and are fit for purpose
- I only operate equipment that I am qualified to use
- I establish and obey barriers and exclusion zones
- I never walk under a suspended load

Work Authorization

Work with a valid permit when required

- I am authorised to perform the work
- I understand the permit
- I have confirmed that hazards are controlled and it is safe to start
- I stop and reassess if conditions change

Work at Height

Protect yourself against a fall when working at height

- I inspect my fall protection equipment before use
- I secure tools and work materials to prevent dropped objects
- I tie off 100% to approved anchor points while outside a protected area

Excavation

Follow safe excavation procedure

- Before starting any excavation:
  - I confirm availability of underground utilities
  - I obtain authorization
  - I take adequate precautions to prevent collapse of soil

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FORMAT NO. : HSE-1 REV 1

(Sheet 1 of 6)

SAFETY WALK-THROUGH REPORT

(Name & signature of walk through performer to be inserted at the bottom of each page)

Project : _____ Report no. : _____

Date : _____ Ccontractor : _____

Inspection by : _____ Owner : _____

Frequency : Monthly Job no. : _____

Note : Write 'NA' wherever the item is not applicable

SL. NO.	ITEM	Satisfactory/ Yes	Non satisfactory/ No	Remarks	Action
1.	HOUSEKEEPING				
a)	Waste containers provided and used				
b)	Sanitary facilities adequate and Clean				
c)	Passageways and Walkways Clear				
d)	General neatness of working areas				
e)	Other				
2.	PERSONNEL PROTECTIVE EQUIPMENT				
a)	Goggles; Shields				
b)	Face protection				
c)	Hearing protection				
d)	Foot protection				
e)	Hand protection				
f)	Respiratory Masks etc.				
g)	Full body harness conforming to CE, EN 361				
h)	Hard hat (HDPE)				
i)	Other				
3.	EXCAVATIONS/OPENINGS				
a)	Openings properly covered or barricaded				
b)	Excavations shored				
c)	Excavations barricaded				
d)	Overnight lighting provided				
e)	Other				

Safety walk-through performer (Name & Signature).....

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FORMAT NO. : HSE-1 REV 1

(Sheet 2 of 6)

SL. NO.	ITEM	Satisfactory/ Yes	Non satisfactory/ No	Remarks	Action
4.	WELDING & GAS CUTTING				
a)	Gas cylinders chained upright				
b)	Cables and hoses not obstructing				
c)	Screens or shields used				
d)	Flammable materials protected				
e)	Live electrode bits contained properly				
f)	Fire extinguisher (s) accessible				
g)	Other				
5.	SCAFFOLDING & BARRICADING				
a)	Fully decked platforms				
b)	Guard and intermediate rails in place				
c)	Toe boards in place				
d)	Adequate shoring				
e)	Adequate access				
f)	Positive barricading for critical activities				
g)	Installation of warning signs				
h)	Other				
6.	LADDERS				
a)	Extension side rails 1 m above				
b)	Top of landing				
c)	Properly secured				
d)	Angle + 70^0 from horizontal				
e)	Other				

Safety walk-through performer (Name &Signature).....

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FORMAT NO. : HSE-1 REV 1

(Sheet 3 of 6)

SL. NO.	ITEM	Satisfactory/ Yes	Non satisfactory/ No	Remarks	Action
7.	HOISTS, CRANES AND DERRICKS				
a)	Condition of cables and sheaves OK				
b)	Condition of slings, chains, hooks and eyes O.K.				
c)	Inspection and maintenance log-books maintained				
d)	Outriggers used				
e)	Reverse horn installed / active / coupled with gear				
f)	Signs/barricades provided				
g)	Signals observed and understood				
h)	Qualified operators				
i)	Other				
8.	MACHINERY, TOOLS AND EQUIPMENT				
a)	Proper instruction				
b)	Safety devices				
c)	Proper cords				
d)	Inspection and maintenance				
e)	Other				
9.	VEHICLE AND TRAFFIC				
a)	Rules and regulations observed				
b)	Inspection and maintenance				
c)	Licensed drivers				
d)	Other				

Safety walk-through performer (Name &Signature).....

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FORMAT NO. : HSE-1 REV 1

(Sheet 4 of 6)

SL. NO.	ITEM	Satisfactory/ Yes	Non satisfactory/ No	Remarks	Action
10.	TEMPORARY FACILITIES				
a)	Emergency instructions posted				
b)	Fire extinguishers provided				
c)	Fire-aid equipment available				
d)	Secured against storm damage				
e)	General neatness				
f)	In accordance with electrical requirements				
g)	Other				
11.	FIRE PREVENTION				
a)	Personnel trained& instructed to make use of facility				
b)	Fire extinguishers checked periodically & record maintained				
c)	No smoking in Prohibited areas.				
d)	Fire Hydrants not obstructed				
e)	Regular fire drill conducted				
12.	ELECTRICAL				
a)	Use of 3-core armored cables everywhere				
b)	Usage of 'All insulated' or 'double-insulated' electrical tools				
c)	All electrical connection are routed through ELCB				
d)	Natural Earthing at the source of power (Main DB)				
e)	Continuity and tightness of earth conductor				
f)	Effective covering of junction boxes, panels and other energized wiring places				
g)	Ground fault circuit interrupters provided				
h)	Prevention of tripping hazards maintained				
f)	DCP extinguishers arranged & licensed electrician engaged at site				

Safety walk-through performer (Name &Signature).....

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FORMAT NO. : HSE-1 REV 1

(Sheet 5 of 6)

SL. NO.	ITEM	Satisfactory/ Yes	Non satisfactory/ No	Remarks	Action
13.	HANDLING AND STORAGE OF MATERIALS				
a)	Safely stored or stacked				
b)	Passageways clear / free from obstructions				
c)	Fire fighting facility in place				
14.	FLAMMABLE GASES AND LIQUIDS				
a)	Containers clearly identified / protected from fire				
b)	Safe storage & transportation arrangement made				
c)	Fire extinguishers positioned nearby				
d)	Facilities kept away from electric spark, hot spatters & ignition source.				
15.	WORKING AT HEIGHT				
a)	Approved Erection plan and work permit in place				
b)	Safe access, Safe work platform & Safety nets provided				
c)	Life lines, Fall arrester, Full body harness with double lanyards used;				
d)	Health Check record available for workers going up?				
e)	Protective handrails arranged around floor openings				
16.	CONFINED SPACE				
a)	Work Permit obtained from requisite authority				
b)	Test for toxic gas and sufficient availability of oxygen conducted & status				
c)	Supervisor present at site & at least one person outside the confined space for monitoring deputed				
d)	Availability of safe means of entry, exit and ventilation (register for entry & exit maintained)				
e)	Fire extinguisher and first-aid facility ensured				
f)	Lighting provision made by using 24V Lamp				
g)	Proper usage of PPEs ensured				
17.	RADIOGRAPHY				
a)	Proper storage and handling of source as per BARC/ AERB guidelines (authorized radiographer available)				
b)	Work permit obtained				

Safety walk-through performer (Name &Signature).....

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FORMAT NO. : HSE-1 REV 1

(Sheet 6 of 6)

SL. NO.	ITEM	Satisfactory/ Yes	Non satisfactory/ No	Remarks	Action
c)	Cordoning of the area done				
d)	Use of appropriate PPE's ensured				
e)	HSE training to workers/supervisors imparted during the fortnight (indicate topic)				
f)	Minimum occupancy of workplace ensured				
18.	HEALTH CHECKS				
a)	All Workers medically examined and found be fit for working at heights (slinging, rigging, painting etc.) in confined space in excavation / trenching in shot blasting				
b)	Availability of First Aid box with contents				
c)	Proper sanitation at site, office and labour camps				
d)	Arrangement of medical facilities.				
e)	Measures for dealing with illness at site & labour camps.				
f)	Availability of Potable drinking water for workmen & staff.				
g)	Provision of crèches for children.				
h)	Stand by vehicle / ambulance available for evacuation of injured				
i)	Adherence to Govt. Guidelines/procedures during epidemic and pandemic (as applicable).				
19.	ENVIRONMENT				
a)	Chemical and Other Effluents properly disposed				
b)	Cleaning liquid of pipes disposed off properly				
c)	Seawater used for hydro-testing disposed off as per agreed procedure				
d)	Lubricant Waste/Engine oils properly disposed				
e)	Waste from Canteen, offices, sanitation etc. disposed properly				
f)	Disposal of surplus earth, stripping materials, Oily rags and combustible materials done properly				
g)	Green belt protection				

Safety walk-through performer (Name &Signature).....

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FORMAT NO. : HSE-2 REV 0

(Sheet 1 of 3)

ACCIDENT REPORT

(To be submitted by Contractor after every Accident within 24 hours to EIL/ Owner)

Report No.: _____ **Date:** _____

Project site: _____ **Name of work:** _____

Contractor's name: _____ Contractor's Job Engineer (name) _____

Non-disabling injury (Non-LTI)	Hospitalized but resumed duty before end of 48 hrsof accident	
Disabling injury (other LTI)	Hospitalized & failed to resume duty within next 48 hrs	
Fatal (LTI):	Death / Expiry	
First Aid case	Resume duty after first aid	

Name of the injured:_____ Father's name of victim: _____

Sub Contractor's Name: .....

Gate Pass No.:.....Age: _____Yrs. Victim's medical fitness exam. (Pre-empl.) date: - _____

Date & time of Accident / Incident: _____

Names of Witnesses: (1_____ (2)_____ (3) _____

Profession of victim:

Bar bender		Carpenter		Meson	
Fitter		Helper		Gas cutter	
Grinder		Welder		Electrician	
Driver		Rigger		M/c.operator	
Engineer		Manager		Other/specify	

Qualification

No formal education		Non-Matriculate		Matriculate	
Graduate		Post- grad		Other/specify	

Job Experience

NIL		Less than 2 yrs		2-5 yrs	
5-10 yrs		11-15 yrs		15 years and above	

Location where the incident happened: _____

_____

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FORMAT NO. : HSE-2 REV 0

(Sheet 2 of 3)

Activity / Works that were continuing during incident / accident: -

Excavation		Demolition		Concrete carrying	
Concrete pouring		Transportation of materials (manually)		Transportation of materials (mechanically)	
Work on or adjacent to water		Work at height (+2.0 mts)		Scaffold preparation	
Scaffold dismantling		Piling works		Welding	
Grinding		Gas-cutting		Pipe fit-ups & fabrication	
Structural fabrications		Machine works		Hydro-testing works	
Electrical works		Erection activities		Other/specify	

What exactly the victim was doing just before the incident / accident? .....

.....

.....

Nature of injury:

Bruise or Contusion		Abrasion (superficial wound)		Sprains or strains	
Cut or Laceration		Puncture or Open wound		Burn	
Inhalation of toxic or Poisonous fumes or gases		Absorption		Amputation	
Fracture		Other/specify			

Parts of body involved in incident / accident

Head		Face		Eyes	
Throat		Arm (above wrist)		Hand (including wrist)	
Fingers		Truck (Abdomen / Back / Chest / Shoulder)		Throat	
Leg (above ankle)		Foot (incl. ankle)		Toes	
Multiple				Other/specify	

Accident type:

Struck against		Struck by		Fall from Elevation	
Fall on same level		caught in		caught under	
caught in between		Rubbed or abraded		Contact with (Electricity)	
Contact with (Temp./ extremes)		Contact with chemicals oroils		Vehicle accident	
Other/specify					

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FORMAT NO. : HSE-2 REV 0

(Sheet 3 of 3)

Medical Aid provided:-(indicate specific aids / treatment etc.)-

.....

.....

Actions taken to prevent recurrence of similar incident / accident:.....

.....

.....

.....

.....

.....

.....

Intimation to local authorities (Dist. Collector / Local Police Station / ESI authority): Yes / No / NA.

If yes, to whom .....

Safety Officer
(Signature and Name)
Stamp of Contractor

Site Head / Resident Construction Manager
(Signature and Name)

To : Owner
: RCM/Site-in-charge EIL (3 copies)
- Nodal Officer HO through RCM (In case of major accident)
- Divisional Head (Constn) through RCM
- Project Manager, EIL, through RCM

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FORMAT NO. : HSE-3 REV 0

(Sheet 1 of 5)

SUPPLEMENTARY ACCIDENT INVESTIGATION REPORT

TICK THE APPROPRIATE ONEAS APPLICABLE (furnish within 72 hours)

Supplementary to Incident / Accident Report No: _____ (Copy enclosed)

Report No.: _____ **Date**: _____

Project site: _____ **Name of work:** _____

Contractor's name: _____ Contractor's Job Engineer (name) _____

Non-disabling injury (Non-LTI **)**	Hospitalized but resumed duty before end of 48 hrs of accident.	
Disabling injury (other LTI**)**	Hospitalized & failed to resume duty within next 48 hrs.	
Fatal (LTI)	Death / Expiry	
First Aid case	Resume duty after first aid	

Name of the injured: _____ Father's name of victim: _____

Sub Contractor's Name: .....

Gate Pass No.:..... Age: _____Yrs. Victim's medical fitness exam. (Pre-empl.) date: - _____

Date & time of Accident / Incident: _____

Names of Witnesses: (1_____ (2)_____ (3) _____

Profession of victim:

Bar bender		Carpenter		Meson	
Fitter		Helper		Gas cutter	
Grinder		Welder		Electrician	
Driver		Rigger		M/c. operator	
Engineer		Manager		Other/specify	

Qualification

No formal education		Non-Matriculate		Matriculate	
Graduate		Post- grad		Other/specify	

Job Experience

NIL		Less than 2 yrs.		2-5 yrs.	
5-10 yrs.		11-15 yrs.		15 years and above	

Location where the incident happened: _____

_____

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FORMAT NO. : HSE-3 REV 0

(Sheet 2 of 5)

Activity / Works that were continuing during incident / accident: -

Excavation		Demolition		Concrete carrying	
Concrete pouring		Transportation of materials (manually)		Transportation of materials (mechanically)	
Work on or adjacent to water		Work at height (+2.0 mts)		Scaffold preparation	
Scaffold dismantling		Piling works		Welding	
Grinding		Gas-cutting		Pipe fit-ups & fabrication	
Structural fabrications		Machine works		Hydro-testing works	
Electrical works		Erection activities		Other/specify	

What exactly the victim was doing just before the incident / accident? .....

.....

.....

Particular of tools & tackles being used and condition of the same after incident/accident:

.....

.....

Description of Incident/Accident (How the incident was caused) : .....

.....

.....

.....

Nature of injury:

Bruise or Contusion		Abrasion (superficial wound)		Sprains or strains	
Cut or Laceration		Puncture or Open wound		Burn	
Inhalation of toxic or Poisonous fumes or gases		Absorption		Amputation	
Fracture		Other/specify			

Parts of body involved in incident / accident

Head		Face		Eyes	
Throat		Arm (above wrist)		Hand (including wrist)	
Fingers		Truck (Abdomen / Back / Chest / Shoulder)		Throat	
Leg (above ankle)		Foot (incl. ankle)		Toes	
Multiple				Other/specify	

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FORMAT NO. : HSE-3 REV 0

(Sheet 3 of 5)

Accident type:

Struck against		Struck by		Fall from Elevation	
Fall on same level		caught in		caught under	
caught in between		Rubbed or abraded		Contact with (Electricity)	
Contact with (Temp./ extremes)		Contact with chemicals or oils		Vehicle accident	
Other/specify					

Name & Designation of person who provided First-Aid to the victim: _____

Name & Telephone number of Hospital where the victim was treated _____

Mode of transport used for transporting victim – Ambulance / Private car / Tempo / Truck / Others

How much time taken to shift the injured person to Hospital_____

In case of FATAL incident, indicate clearly the BOCW Registration No. of the victim/Company.....
...

Comments of Medical Practitioner, who treated / attended the victim/injured (attached / described here)_____

What actions are taken for investigation of the incident, please indicate clearly – (Video film / Photography / Measurements taken etc. .....)

Immediate cause (Please tick the right applicable) –

Hazardous methods or procedures inadequately guarded		Poor housekeeping		Inadequate or improper PPE	
Environmental hazards (excess noise/ space constraint/ inadequate ventilation		improper illumination/Moving on oval surface		Working on dangerous equipment	

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FORMAT NO.: HSE-3 REV 0

(Sheet 4 of 5)

Failure to secure		Horse-play		Failure to use PPE	
Inattention to surroundings		Improper use of hands & body-parts		By-passing safety devices	
Unsafe mixing or placement of tools & tackles		Bypassing standard procedures		Failure in communication	
Operating without authority		Improper use of equipment or tools & tackles		drug or alcoholic influence	
excessive haste		Others(specify)			

Basic cause

Over confidence		Impulsiveness		over-exertion	
Faulty judgement or poor understanding		Failing to keep attention constantly		Nervousness & Fear	
Fatigue		Defective vision		Ill health or sickness	
Slow reaction		Others(specify)			

Root cause

Inadequate Engg.		Improper Design		Inadequate Planning & organization	
Inadequate knowledge		Inadequate skill		Inadequate training	
Inadequate supervision		Improper work procedure		Inadequate compliance with standard	
Substandard performance		Inadequate maintenance		Improper inspection	
Others(specify)					

Loss of man days and impact on site works, (if any) –

Remarks from Contractor's Safety Officer/ Engineer –

Was the victim performing relevant tasks for which he was engaged /employed? Yes / No
Was the Supervisor present on work-site during the incident? Yes / No
Have the causes of incident rightly identified? Yes / No
Cause of Accident was_____

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FORMAT NO. : HSE-3 REV 0

(Sheet 5 of 5)

Remedial measures recommended by **Safety Officer of Contractor** for avoiding similar incident in future

: .....

.....

.....

.....

.....

.....

.....

Intimation to local authorities (Dist. Collector / Local Police Station / ESI authority): Yes / No / NA.

If yes, to whom .....

Safety Officer
(Signature and Name)

Site Head / Resident Construction Manager
(Signature and Name)
Stamp of Contractor

To : Owner
: RCM/ Site-in-charge of EIL (3 copies)
Nodal Officer HO through RCM (In case of major accident)
Divisional Head (Constn.) through RCM
Project Manager EIL, through RCM

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FORMAT NO. : HSE-4 REV 0

NEAR MISS INCIDENT/ DANGEROUS OCCURRENCE REPORTPROFORMA

(to be submitted within 24 hours)

Report No.: _____

Name of Site: _____ Date: _____

Name of work: _____ Contractor: _____

Incident reported by :

Date & Time of Incident :

Location :

Brief description of incident

Probable cause of incident

Suggested corrective action

Steps taken to avoid recurrence Yes ☐ No ☐

Safety Officer
(Signature and Name)
Stamp of Contractor

Site Head / Resident Construction Manager
(Signature and Name)

Note:

- **Near Miss:** Human injury escaped & no damage to property, equipmentor interruption to work.
- **Dangerous Occurrence**: Occurrences as mentioned below shall be considered as "Dangerous occurrences"

a. collapse or failure of lifting appliances or hoist or conveyors or other similar equipment for handling building or construction material or breakage or failure of rope, chain or loose gears; overturning of cranes used in building or other construction work; falling of objects from height;
b. collapse or subsidence of soil, any wall, floor, gallery, roof or any other part of any structure, platform, staging, scaffolding or any means of access including formwork;
c. collapse of transmission tower;
d. fire and explosion causing damage to property at Construction site.
e. spillage or leakage of hazardous substances and damage to their container;
f. Collapse, capsizing, toppling or collision of transport equipment;
g. Leakage or release of harmful toxic gases at the construction site.

To :Owner
:RCM/Site-in-charge EIL (3 copies)

Divisional Head (Const.) through RCM
Project Manager EIL, through RCM
} (Applicable for Dangerous Occurrence only)

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FORMAT NO. : HSE-5 REV 0

MONTHLY HEALTH, SAFETY &ENVIRONMENTAL (HSE) REPORT

(To be submitted by each Contractor)

Actual work start Date: _____ For the Month of: _____

Project: _____ Report No: _____

Name of the Contractor: _____ Status as on: _____

Name of Work: _____ Job No : _____

(Contractor in consultation with EIL shall generate the reports through web basedpackage (www3.eil.co.in/eilhse)only.

ITEM		UPTO PREVIOUS MONTH	THIS MONTH	CUMULATIVE
1) Average number of Staff & Workmen (average daily headcount, not man days)				
2)Total Man-hours worked				
3) Number of site personnel undergone HSE Induction				
4) Number of HSE meetings organized at site				
5) Number of HSE awareness programmes conducted at site				
6) Number of Tool Box Talks conducted				
7) Number of Loss Time Injuries (LTI)	Fatalities			
	Other LTI			
8) Number of Non disabling injury (Non-LTI)				
9) Number of First Aid Cases				
10) Number of Near Miss Incidents				
11) Number of Dangerous Occurrences				
12) No. of unsafe acts/ practices detected				
13) No. of disciplinary actions taken against staff/ workmen				
14) Man-days lost due to injury				
15) LTI Free man-hours i.e. LTI free man-hours counted from the Last LTI (enter date: .....)				
16) Frequency Rate (No. of reportable LTI per 10lacs man-hours worked)				
17) Severity Rate (No. of man days lost due to LTI per 10lacs man-hours worked)				
18) No. of activities for which HIRAC Completed				
19) No. of incentives/ awards given				
20) No. of occasions on which penalty imposed by EIL/ Owner				
21) No. of Audits conducted				
22) No. of pending NCs in above Audits				
23) Compensation cases raised with Insurance				
24) Compensation cases resolved and paid to workmen				
25) No of Vehicular Accident cases				
26) No of fire/Explosion cases				

27) Whether workmen compensation policy taken			Yes		No
28) Whether workmen compensation policy is valid			Yes		No
29) Whether workmen registered under ESI Act, as applicable			Yes		No
30) Whether HIRAC Register prepared and updated			Yes		No
31) Whether Environment Aspect Impact Register prepared and updated			Yes		No
32) Whether Legal Register prepared and updated			Yes		No
Remarks, if any					

Date:

Prepared by Safety Officer Approved by Site Head / Resident Construction Manager

(Signature and Name)(Signature and Name)

To: -

- RCM EIL

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FORMAT NO. : HSE-6 REV 1

PERMIT FOR WORKING AT HEIGHTS (ABOVE 2.0 METER)

(In duplicate to be issued daily for site and for office)

Permit No…….. Name of Main Contractor……
Name of work executing agency / sub agency / vendor:……..
Date…… Exact Location of work……
Nature of work ……..Duration of work (from) …… (to) ……..
Number of workers covered within this permit……
(*List enclosed with name & gate pass numbers.*)

Sl. No.	Items / Subjects	Status of compliance (Yes / No)	
1	Work areas / Equipment's inspected		
2	Work area cordoned off		
3	Adequate lighting is provided		
4	Precautions against public traffic taken		
5	Concerned persons in & around have been alerted & cautioned		
6	Hazards / risks involved in routine / non-routine task assessed and control measures have been implemented at specific task		
7	ELCB provided for electrical connection & found working		
8	Ladder safely attached / fixed		
9	Scaffoldings are checked and TAGs are found used correctly		
10	Working platforms are provided and are found sound /safe for use		
11	Safe access & egress arrangements (e.g. ladders, fall arresters, life-lines etc.) are satisfactorily incorporated		
12	a. Openings on platform / floors are effectively cordoned / covered		
	b. Safety Nets are provided wherever required		
13	Use of following safety gadgets by people working at area under this permit, is checked and found satisfactory - Safety helmet Safety harness (full body) with double lanyard Safety Shoes Safety gloves Safety goggles		
14	Housekeeping of work area found satisfactorily tidy / clean & clear		
15	Adequate measures have been taken for works being continued at the ground level, when simultaneous works are permitted overhead at that very location.		
16	Materials are not thrown from heights on to ground		
17	Medical examination of workers are made & found satisfactory		
18	Responsible job engineer / supervisor found physically present at work spot for overall administration of work as well as safety of people.		

Above items have been checked & compliance has been found in place. Hence work is permitted to start / continue at the above-mentioned location. Work shall not start till identified lapses are rectified.

Additional Precautions, if any ……
……

Work Permit Receiver Verification By Work Permit issuer
Contractor Job Supervisor Contractor Safety Officer Contractor Engineer/RCM

AT THE END OF THE DAY/WORK:
All works at height are completed & workmen have returned safely from work location at (time)…….. (date)……

(Sig. Contractor Engineer)

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FORMAT NO. : HSE-7 REV 1

CONFINED SPACE ENTRY PERMIT

Project site _____ Sr. No. _____
Name of the work _____ Date _____
Name of Contractor _____ Nature of work _____
Exact location of work _____

Safety Requirements POSITIVE ISOLATION OF THE VESSEL IS MANDATORY

(A) Has the equipment been ?

Y	NR		Y	NR		Y	NR	
☐	☐	Isolated from power/steam/air	☐	☐	water flushed &/or steamed	☐	☐	radiation sources removed
☐	☐	isolated from liquid or gases	☐	☐	Man ways open & ventilated	☐	☐	proper lighting provided
☐	☐	depressurized &/or drained	☐	☐	cont. inert gas flow arranged	☐	☐	
☐	☐	blanked/ blinded/ disconnected	☐	☐	adequately cooled	☐	☐	

(B) Expected Residual Hazards

☐	☐	lack of O_2	☐	☐	combustible gas/ liquid	☐	☐	H_2S / toxic gases
☐	☐	corrosive chemicals	☐	☐	pyrophoric iron / scales	☐	☐	electricity / static
☐	☐	heat/ steam / frost	☐	☐	high humidity	☐	☐	ionizing radiation
☐	☐		☐	☐		☐	☐	

(C) Protection Measures

☐	☐	gloves	☐	☐	ear plug / muff	☐	☐	goggles / face shield
☐	☐	protective clothing	☐	☐	dust / gas / air line mask	☐	☐	personal gas alarm
☐	☐	grounded air duct/blower /AC	☐	☐	attendant with SCBA/air mask	☐	☐	rescue equipment/team
☐	☐	Fire fighting arrangements	☐	☐	safety harness & lifeline	☐	☐	communication equipment
☐	☐		☐	☐		☐	☐	

Authorization / Renewal (It is safe to enter the confined space)

	No. of persons allowed	Name of persons allowed	Signature			Time		Signature
			Work Permit Receiver(Contractor Supervisor)	Verification by Contractor Safety officer	Work permit issuer Contractor Engineer/RCM	From	To	Workman

Permit Closure :

(A) Entry ☐ was closed ☐ stopped ☐ will continue on ...

(B) ☐ Site left in a safe condition ☐ Housekeeping done

(C) Multi lock ☐ removed ☐ key transferred

☐ Ensured all men have come out ☐ Man-ways barricaded

Remarks, if any:

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FORMAT NO. : HSE-8 REV 0

RADIATION WORK PERMIT

Project :
Name of the work :
Name of site contractor :

Sr. No. :
Date :
Job No. :

Location of work :

Source strength :

Cordoned distance (m) :

Name of Radiography agency :

Approved by Owner/EIL ☐

No. of workers engaged :
(List enclosed with name & gate pass numbers.)

The following items have been checked &compliance shall be ensured during currency of the permit:

S. No.	Item description	Done
	Safety regulations as per BARC/AERB ensured while source in use/in transit & during storage	
	Area cordoned off / safe working platform provided	
	Lighting arrangements for working during nights ensured	
	Warning signs/ flash lights installed	
	Cold work permit taken (if applicable)	
	PPEs like film badges, dosimeters used	

Additional precautions, if any _____

(Radiography Agency's BARC/AERB authorized Supervisor)

Permission is granted.

Permit is valid from _____ AM/PM _____ Date to _____ AM/PM _____ Date

(Signature of permit issuing authority-RCM of contractor)
Name : Designation: Date:

Permit renewal:

Permit extended up to		Additional precautions required, if any	Sign of issuing authority with date (of site contractor)	
Date	Time			

Work completed/ stopped/ area cleared at _____ Hrs of Date _____
(Sign. of permit issuing authority)
Name& Signature of site contractor:

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FORMAT NO. : HSE-9 REV 1

DEMOLISHING/DISMANTLING WORK PERMIT

Project : Sr.No. :
Name of the work : Date :
Name of contractor : Job No. :

Name of sub-contractor : No. of workers to be engaged:
(List enclosed with name & gate pass numbers.)

Line No./ Equipment No./ Structure to be dismantled :

Location details of dismantling/ demolition with sketch : (clearly indicate the area)

The following items have been checked &compliance shall be ensured during currency of the permit:

S. No.	Item description	Done	Not Applicable
	Services like power, gas supply, water, etc. disconnected	☐	☐
	Dismantling/ Demolishing method reviewed & approved	☐	☐
	Usage of appropriate PPEs ensured	☐	☐
	Precautions taken for neighboring structures	☐	☐
	First-Aid arrangements made	☐	☐
	Fire fighting arrangements ensured	☐	☐
	Precautions taken for blasting	☐	☐

Work Permit Receiver
(Contractor's Supervisor/Engineer)

Verification by Contractor
(Contractor's Safety Officer)

Permission is granted.

(Work Permit issuer-Client)

Name :
Date :

Completion report:

Dismantling/ Demolishing is completed on _____ Date at _____ Hrs.

Materials/ debris transported to identified location ☐ Tagging completed (as applicable) ☐

Services like power, gas supply, water, etc. restored ☐

(Permit issuing authority-Client)

CONTRACTOR's NAME

FORMAT NO. : HSE-10 REV 0

DAILY SAFETY CHECKLIST

(To make use of before start of day's work)

Project :
Name of the work :
Name of contractor :

Sr.No. :
Date :
Job No. :

Description of Job decided to perform : -

- **Use of PPE / Safety Gadgets**

Sl. No	PPEs	Compliance (Yes / No)	Sl. No	PPEs	Compliance (Yes / No)
1	Safety Helmets		6	Face Shield	
2	Safety Shoes		7	Full body harness	
3	Hand Gloves		8	Fall Arrest System	
4	Dust Musk		9	Safety net	
5	Safety Goggles		10	Horizontal life-line made of steel wire, (dia not less than 8.0 mm.)	

(Serial No. 1 & 2 are compulsory for everyone. Specify & ensure use of other safety gadgets as required for the job)

- **Identify following important unsafe conditions: -**

Sl. No	Conditions	Yes / No
1	Access to work site / emergency escape clear	
2	Soil / Loose earth kept away from excavated pit / slope / ladder provided	
3	Electrical wire / welding lead lying entangled on ground / welding m/c. booth accessible	
4	Elevated work platform / open ends are protected	
5	Ground area cordoned off before lifting works or erection at height / ground area checked & cordoned-off before start of height works	
6	Structural members / erected pipes / wooden boards/pieces etc. are safely anchored at heights and are not likely to fall down on people when working beneath	
7	Ladders tied-up on tall steel structures, long before are removed to get rid of their use	
8	Any Other	

- **Indicate actions taken, if status of any of the above items is found "No"**
  .....
  .....
- **Specific Safety guidelines / precautions, if any** (communicated thro' TBT)
  .....
  .....
- **Above conditions and PPE compliances are checked by undersigned and correct status are indicated after verification**

Prepared by
Contractor Site Engineer

Verification By
Contractor Safety Officer

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FORMAT NO. : HSE-11 REV 0

(Sheet 1 of 2)

HOUSEKEEPING ASSESSMENT& COMPLIANCE

Project :
Name of the work :
Name of contractor :
Name of contractor : Fortnightly

Sr.No. :
Date :
Job No. :

Sl. No.	Subjects of Review	Satisfactory/ Yes	Non satisfactory/No	Remarks	Action
1.	Cleanliness at the Main entry / access of site				
2.	Ground condition / floor areas free from water-logging / oil spillage				
3.	Ground & elevated floors free from rubbish / wastes / accumulated debris / scraps.				
4.	Manholes / openings are covered / fenced				
5.	Trenches are barricaded / walkways are in place				
6.	Drains are cleaned / not choked / not occupied by dumped materials				
7.	Sufficient CAUTION boards / instructions displayed				
8.	Construction machinery are maintained & parked in orderly manner.				
9.	Movement of site people are not obstructed because of dumping / storing of construction materials				
10.	Access / egress to Electrical Distribution Boards / Panels clear from wires / cables / earth-strips etc.				
11.	Electrical panel rooms / sheds / MCC / Control rooms / Substations etc. are clean & tidy and not used for storing dress / clothes, tiffin-box or bicycles.				
12.	Passage behind Elec. panels are free for access				
13.	Fire extinguishers / fire-buckets are accessible without any difficulty.				
14.	Stair-steps, platforms & landings are clear & tidy				
15.	Sheds / rooms & work areas have got sufficient illumination as well as ventilation				
16.	Cables / Wires / welding leads are routed / hanged appropriately & are not creating unsafe condition.				
17.	Stacking / storing of insulation materials or their packing.				
18.	Removal or cleanliness of left-over sand, concrete, brick-bats, insulation-materials, excess earth, wastes etc.				
19.	Storing / stacking of sand, metal chips, re-bars, steel pipes, valves, fittings etc.				
20.	One escape route at ground & minimum two escape routes at elevation available,				

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FORMAT NO. : HSE-11 REV 0

(Sheet 2 of 2)

Sl. No.	Subjects of Review	Satisfactory/ Yes	Non satisfactory/No	Remarks	Action
21.	Captions / Posters / Slogans on various safety instructions are displayed legibly in local language				
22.	Cable trenches are water-free or regular arrangement for taking out accumulated water exists.				
23.	Windows of rooms / offices are regularly cleaned				
24.	Facilities for cycle sheds, drinking water, washing, rest-rooms etc. are maintained in tidy manner.				
25.	Toilet, Urinals, Canteen / kitchen / pantry etc. are maintained & free from obnoxious smell.				
26.	Construction tools / tackles are stored systematically - the items are tagged / tested / certified by competent third party.				
27.	Sufficient numbers of Dust-bins / Waste-bins found at site and are regularly emptied.				

Additional remarks, if any -

.....

.....

.....

Inspected by
Contractor Engineer

Verification By
Contractor Safety Officer

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FORMAT NO. : HSE-12 REV 0

INSPECTION OF TEMPORARY ELECTRICAL BOOTH / INSTALLATION

Project :
Name of the work :
Name of contractor :
Sub Station No:/Booth No

Sr.No. :
Date :
Job No. :
Location:

SL NO	SUBJECTS	OBSERVATION (YES /NO)	ACTION TAKEN
1	Switchboards installed properly are in order and protected from rain & water-logging.		
2	Adequate illumination provided for switchboard operation during night hours & the lamps are protected from direct human contact.		
3	Voltage ratings, DANGER signs, Shock-Treatment-Chart displayed in the installation / booth		
4	Fire extinguisher (DCP or CO_2) & Sand Bucket kept in close vicinity of Switchboards		
5	Valid License & Competent Electrician / Wireman available & name/ license no. displayed at booth / installation.		
6	General housekeeping in & around booth / installation found in order.		
7	Cable-route-markers for U/G cables provided.		
8	Monthly inspection report of Electrical hand tools available in booth / installation.		
9	Electrical Panel door to be in closed condition and Insulated Mat to be provided in front of panel.		
10	Rubber hand gloves available/ used by Electricians		
11	Availability of CAUTION boards for shutdown & / or repairing works.		
12	All incoming & outgoing feeders have proper MCCB / HRC fuses / Switches.		
13	Switchboards "earthed" at two distinctly isolated locations.		
14	Switchboards have adequate operating space at the front face & at the rear face too.		
15	All connections provided through 30mA ELCB.		
16	Testing records of all ELCBs available at site		
17	Only industrial type plugs & sockets are used.		
18	Temporary connections are 3-core double insulated & free from cuts & joints and 3rd core is earthed at both ends		
19	Socket boards are properly mounted on stand & protected from water ingress.		
20	Electrical equipments operating above 250V have two earthing / double earthing.		
21	All incoming / outgoing cables are properly glanded& terminated with "lugs".		
22	Switch-boards are of industrial variety / type.		
23	Sketch for installation / connection (SLD) made & pasted& other safety labels/display boards		
24	Labeling of incoming / outgoing feeders made.		
25	All hand lamps are protected from direct contact.		
26	All electrical cable / joints are in safe condition		

Inspected by
Contractor Engineer

Verification By
Contractor Safety Officer

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FORMAT NO. : HSE-13 REV 0

(Sheet 1 of 2)

INSPECTION FOR SCAFFOLDING

Project : Sr.No. :
Name of the work : Date :
Name of contractor : Job No. :

Sl. No	Description	Yes	No	N.A.	Actions taken
1	Whether work permit is obtained to take up work at height above 1.5 Mts?				
2	Whether atmospheric condition is "stormy" or "raining" and works at heights have been permitted?				
3	Whether steel pipes scaffoldings are used for units /off-site areas?				
4	Whether scaffolding has been erected on rigid/firm/leveled surfaces / ground? Whether "foot-seals" or "base-plates" are used beneath the up-rights (vertical steel pipes)				
5	Whether scaffold construction is as per IS specification with toe-board and hand-rails (top-rail as well as mid-rail)?				
6	Whether distance between two successive up-rights are less than 2.5 Mts (height of scaffold & load carrying capacity governs the distance between two uprights)				
7	Whether all uprights are extended at least 900 mm above the top most working platform (to enable fitting of handrails)?				
8	Whether vertical distance of two successive ledgers is satisfactory? (*varying between 1.3 Mts. To 2.1 Mts)*				
9	Whether the peripheral areas of working at height are cordoned-off? (for avoiding accident to people arising out of dropped / deflected materials)				
10	Whether platform is provided? Is it safely approachable?				
11	Whether end of scaffold platform / board are extended beyond transoms? (125mm to 150 mm)				
12	Whether CE / IS approved quality and worthy conditioned full-body safety harness (with double lanyard & karabiners) are used while working at heights?				
13	Whether life-line of safety harness is anchored to an independent secured support capable of withstanding load of a falling person?				
14	Whether the area around the scaffold is cordoned off to prohibit the entry of unauthorized person / vehicle?				
15	Whether clamps used are of good condition, of adequate strength and free from defects?				
16	Whether ladder is placed at secured and leveled surface?				
17	Whether water-pass and oil-spills are avoided around the scaffold structure?				
18	Whether ladder is extended 1.5mts. above the landing point at height?				
19	Whether more than one access/egress provided to the scaffold?				
20	Whether ladder used are of adequate length and overlapping of short ladders avoided?				
21	Whether metallic ladders are placed much away from near-by electrical transmission line?				
22	Whether rungs of ladder are inspected and found in good order?				
23	Whether fall-arresters provided on both the access/egress routes?				
24	Whether diagonal (cross) bracings are provided at regular interval on the scaffold?				
25	Whether working platform on the scaffold has been made free from "jolt" or "gap"?				
26	Whether tools or materials are removed after completion of the day's job at heights?				
27	Whether a valid Permit for Work (PFW) is obtained before taking up work over asbestos or fragile roof?				
28	Whether sufficient precaution is taken while working on fragile roof?				

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FORMAT NO. : HSE-13 REV 0

(Sheet 2 of 2)

Sl. No	Description	Yes	No	N. A	Actions taken
29	Whether provision is made to arrange duck ladder, crawling board for working on fragile roof?				
30	Whether scaffold has been inspected by qualified civil engineers prior to their use?				
31	Whether the scaffolding has been designed for the load to be borne by the same?				
32	Whether the erection and dismantling of the scaffolding is being done by trained persons and under adequate supervision?				
33	Whether safety net with proper working arrangement and life-line has been provided?				
34	Whether TAGS (Green for acceptable and Red for incomplete/unsafe scaffolds) are used on scaffolds?				
35	Whether sufficient illumination is provided in and around the scaffold and access?				
36	Whether emergency rescue / response arrangements are made in place				

Inspected by
Contractor Engineer

Verification By
Contractor Safety Officer

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FORMAT NO. : HSE-14 REV 1

(sheet 1 of 2)

PERMIT FOR ERECTION / MODIFICATION & DISMANTLING OFSCAFFOLDING

Project :
Name of the work :
Name of contractor :
Nature of activities :

Sr.No. :
Date :
Job No. :
Duration: From.....To.....

SL. No.	SUBJECTS / ITEMS	DONE	NOT DONE	REMARKS
1	Specific task of Erection / Modification / Dismantling of scaffolds, identified & TAGGED accordingly (before as well as after carrying-out jobs).			
2	People engaged in doing the job are identified & are certified by Job Engineer of Main Contractor as experienced / trained.			Names to be noted
3	Concerned persons are alerted by the Job Engineer of Main Contractor in connection with possible hazards & what the workmen MUST do / MUST not do.			
4	Verification by Job Engineer of Main Contractor made for confirming that all persons permitted to carry-out the jobs are making use of Helmet, Safety Shoes, Goggles, Gloves & Double lanyard safety harness and other relevant PPEs.			
5	Area of work is effectively cordoned-off / barricaded / illuminated.			
6	For taking-up / lowering down Scaffolding members / clamps / couplings etc. appropriate ropes / pulleys/ chains etc. have been arranged for use (not to throw any item) & the same have been verified as "fit for purpose".			
7	Items / members of scaffold, being lowered are removed from the area & stacked correctly.			
8	Ropes, chains, pulley blocks etc. being used for lifting or lowering scaffold items, are inspected by the Job Engineer & their certifications as well as physical conditions have been found O.K. before signing this PERMIT.			
9	Safety Net / Life-line / Fall Arresters etc. are arranged in position and Job Engineer has found working conditions favorable for activities to start.			
10	Scaffold erection or dismantling tasks are being supervised by Experienced Engineer / Competent person.			
11	Only competent & experienced people have been selected / engaged in Scaffolding erection, modification or dismantling tasks.			
12	Adequate & effective actions for traffic and movement of people around the cordoned-off area taken to avoid inadvertent incident			
13	Working platforms are protected with handrails & toe-boards.			
14	Access & Exit (for reach & escape) are safe for use by people.			
15	Tools, tackles to be used for above jobs are verified by job Engineers of Main contractor as genuinely good and tied-up at height (to prevent their fall).			
16	Site important Telephone Nos. are made known to everyone			
17	SOP (Safe Operating Procedure) for the specific task is made & followed too.			
18	Emergency vehicle has been arranged at work locations.			

- This permit for work shall be available at specific work location all the time.
- After completion of work, permit shall be returned to safety cell of main contractor, without fail.
- This Permit shall be issued maximum upto (Monday to Sunday).
- Additional Precautions, if any

  .....
- **ACCORD OF PERMISSION** (to be ticked) - **YES** ( )/ NO ( )

  Work Permit Receiver Verification By Work Permit issuer Contractor Job Supervisor
  Contractor Safety Officer Contractor Engineer/RCM

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FORMAT NO. : HSE-14 REV 1

(sheet 2of 2)

Everyday Site working conditions & performance of workmen shall be assessed / checked by Contractor Site Engr. and Safety Officer shall verify the same.

	Name / Sign.	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
Site Engr.								
Safety Off.								

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FORMAT NO. : HSE-15 REV 1

PERMIT FOR HEAVY LIFT/CRITICAL ERECTION

Project :
Name of the work :
Name of contractor :
Nature of activities :
Location of work :
Equipment/Structure to be erected:

Sr. No. :
Date :
Job No. :
Duration: From.....To.....
Name /Type of crane :
Wt. of equipment/ structure to be erected

SL. NO.	Description of Item	COMPLIANCE STATUS			Remarks
		Yes	No	Not applicable	
1)	Is the crane type suitable for lift or as per erection procedure?				
2)	Is the crane have the correct number of counterweights fitted?				
3)	Availability of Load Certification of crane from authorized agency.				
4)	Is the load chart of crane available in carne cabin/or with Crane operator?				
5)	Is the device to check the Wind speed in crane is working? Is the safety features in crane are working?				
6)	Availability of Load certification of slings and other accessories from authorized agency				
7)	Availability of Licensee/certificate for crane operator from authorized agency.				
8)	Availability of approved HIRAC for the subject activities.				
9)	Availability of approved erection/rigging procedures.				
10)	Availability of temporary gratings/ platforms for critical lifting(as applicable)				
11)	Tool Box conducted before erection?				
12)	Has the area been cordoned off?				
13)	Are the authorized persons during erection are identified?				
14)	Does each person identified for erection understand their roles and responsibilities?				
15)	Is the ground on which crane will rest or outrigger support are correct?				
16)	Is hard stand requirement (if any) complied?				
17)	Is the communication system (viz walkie-talkies, etc. are working properly?				
18)	If more than one crane is lifting the load, is an Intermediate rigger will supervise the lift?				
19)	If there is other obstruction within the operating radius of the crane, have correct precautions been taken to prevent collision?				
20)	All the persons are wearing the requisite PPE?				

Work Permit Receiver Verification By Work Permit issuer Contractor Job Supervisor
Contractor Safety Officer Contractor Engineer/RCM

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FORMAT NO. : HSE-16 REV 1

PERMIT FOR ENERGY ISOLATION & DE-ISOLATION

Project :
Name of the work :
Name of contractor :

Sr.No. :
Date :
Job No. :

ENERGY ISOLATION PERMIT

- Clearance required from:.....Hrs .....Date To .....Hrs ....Date
- Name of equipment/ energy source etc. .....
- Nature of job to be done: .....
- Area.....Location:.....

PERMIT VALIDATION	PERFORMING AUTHORITY
I hereby authorize the .....personnel(performer) to isolate the above equipment/energy source from all sources of power and handover the equipment/energy source for maintenance/repair. Issuing authority Client/Contractor RCM (as applicable) Signature: Date: Name:	The work and precautions will be carried out under my overall responsibility.(Testing/execution engineer) Signature: Date: Name:

SAFETY PRECAUTIONS FOR CLEARANCE	NORMALISING AFTER CLEARANCE
1. Notify workers of intent to de- energize ☐ 2. Obtain lock, tag or locking/tagging devices ☐ 3. Shut down, de-energize, dissipate any residual energies. ☐ 4. Apply lock ,tag and locking and/or tagging devices ☐ 5. *Any other job specific precautions ☐ 6. Verify effectiveness of lockout by attempting to restart. ☐ 7. Proper PPE is ensured ☐ I certify that the energy source mentioned above is isolated from all sources and is safe to start the work. Tag No:..... Lock No:..... Issuing authority Client/Contractor RCM (as applicable) Signature: Date: Name: **(*to be included by contractor in consultation with issuing authority)**	1. Notify workers of intent to re- energize ☐ 2. Conduct visual inspection to confirm that the danger zone is clear of workers ☐ 3. Conduct visual inspection to confirm that tools ,equipment's danger zone is clear of workers ☐ 4. Reposition the safety devices(interlocks, valves, guards, covers ,sensors, as applicable, etc.) ☐ 5. *Any other job specific normalizing details ☐ 6. Remove lock, tag and locking and/or tagging devices. ☐ 7. Re-energize. ☐ 8. Confirm system is operating properly& safely I certify that the energy source mentioned above is isolated from all sources and is safe to start the work. Tag No:..... Lock No:..... Issuing authority Client/Contractor RCM (as applicable) Signature: Date: Name: **(*to be included by contractor in consultation with issuing authority)**

ENERGY DE-ISOLATION PERMIT

PERMIT VALIDATION	PERFORMING AUTHORITY
I hereby authorize the .....personnel(performer) to de- isolate the above equipment/energy source from all sources of power and handover the equipment/energy source for normal operation.. Issuing authority Client/Contractor RCM (as applicable) Signature: Date: Name:	I hereby certify that the equipment/energy source mentioned above has been de-isolated and is ready for normal operation.(Testing/execution engineer) Signature: Date: Name: Countersigned by Issuing authority

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FORMAT NO. : HSE-17 REV 1

PERMIT FOR EXCAVATION (depth 2m and above)

(Sheet 1of 2)

Project :
Name of the work :
Name of contractor :
Job Description :
Size of excavation :

Sr.No. :
Date :
Job No. :
Location:

SL. NO.	Description of Item	COMPLIANCE STATUS			Remarks
		Yes	No	Not applicable	
1)	Suitable and sufficient risk assessments and method statements has been carried to ensure that the work shall be undertaken in accordance with specification and standard.				
2)	Are plans/details of underground services available and the same has been reviewed?				
3)	Has survey done to locate the services/obstacles etc.				
4)	Has the live services (electrical, water line, air line, telephone line, etc)has been disabled for carrying out the job.				
5)	Is adequate barriers/fences to protect the excavation are in place?				
6)	Is Adequate warning signs are in place?				
7)	Is Assessment of ground conditions done and remedial action(if any) taken?				
8)	Safe access / egress (e.g. ramp / steps / ladders etc.) provided for site workmen & supervisors.				
9)	Is the excavation work being undertaken in proximity of structure, etc. ?If Yes, it's effect is considered?				
10)	Availability of competent person for supervising the excavation work?				
11)	Adequate safe arrangement to prevent collapse of edges (e.g. shoring / strutting / benching / sloping etc.) made at site.				
12)	Hard barricades (at least 1.0M away from edge & for excavation near site access roads) with warning signs/caution boards are provided				
13)	Accumulation / passage-ways of water at periphery of excavation / trench stopped/ restricted.				
14)	Is the equipment being used for excavation has been checked for adequacy and is in good working condition having all the safety features?				
15)	Age & fitness of workmen ensured by medical test before engagement in job ?				
16)	Arrangement of Monitoring of possible oxygen deficiency or obnoxious gases done & action taken?				

PERMIT GRANTED - Yes / No

(List enclosed with name & gate pass numbers.)

Name & Signature of Site Engr. Name & Signature of Area – In charge/RCM of Contractor (Receiver) Contractor (Issuer)

Verification by Contractor Safety Officer

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FORMAT NO. : HSE-17 REV 1

PERMIT FOR EXCAVATION

(Sheet 2of 2)

NOTES: -

1. Slopes or benches for excavation beyond 2.0M depth shall be designed & approved by Contractor's site head.
2. Excavated earth to be kept at least 1.5M away from edges
3. Safety helmets, Safety shoes or gum-boots, gloves, goggles, Face shield, Safety Harness shall be essential PPEs.
4. Permit shall be made in **duplicate** and original shall be available at site of work.
5. Permit shall be issued for maximum **one week** only (Monday to Sunday)
6. After completion of works, permit shall be closed & preserved for record purpose

GRANT OF PERMIT AND EXTENSIONS

Sl. No.	Validity period From ____To ____	Working Time From _____To _____	Receiver (site Engr. of Main Contractor)	Issuer(Area In charge/RCM of Main Contractor)	Review by EIL / Owner (Remarks with date
1.					
2.					
3.					
4.					
5.					
6.					
7.					

Additional safety instructions if any: -

1.

2.

3.

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FORMAT NO. : HSE-18 REV 0 **(Sheet 1of 2)**

IDENTIFICATION OF ENVIRONMENTAL ASPECTS, IMPACT ASSESSMENT AND CONTROL MEASURES

S.No	Activity	Environmental Aspect	N/A/E	Environment Impact	Control Measures	Consequences						Risk Level	Significant	Gaps/ Recommendations
						A	B	C	D	E	F	G	Yes/No	

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(Sheet 2 of 2)

INITIAL ENVIRONMENT REVIEW TECHNIQUE

Environmental Impacts	AP = Air Pollution	WP = Water Pollution	LC = Land Contamination	DNR = Depletion of Natural Resources	NP = Noise Pollution

Scale	Quantity (A)	Occurrence (B)	Severity of Impact (C)	Detection (D)	Control (E)	Legal and other requirements (F)
1	Negligible	Very Rare	Negligible visual impact	Immediately	Available & effective at place	In compliance or not applicable
2	Low	Once a month or less	Causes Discomfort or Nuisance	Within 1 hour	Has in-built Secondary control	
3	Moderate	Once a day	Resource Depletion	Within 8 hours	Needs human Intervention	
4	High	Several times a Day	Affects Aquatic Life, flora, fauna or global issue	Within 24 hours	Mechanism in place but not reliable	
5	Excessive	Continuous	Human health effect	More than 24 hours	Absent or no effective control	Not in compliance

Risk Level - G : A x B x C x D x Ex F

Aspects with score of **100 and above** are considered as significant.
Also, Irrespective of the score, all legal noncompliance's to be considered as significant

Condition	
N	NORMAL
A	ABNORMAL
E	EMERGENCY

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FORMAT NO. : HSE-19 REV 0 HIRAC

Risk Identification						Desired Controls & Existing Gaps, If Any		Risk Assessment				Recommended Control Actions To Reduce The Risk Level	Action By	Remarks
SN	Activity	Activity Type (R/NR)	Hazards	Condition(N/AN/E)	Associated Risk	Desired Control Measures	Gaps If Any	Probability(P)	Impact (I)	Risk R= P*I	Risk Classification			

Likelihood – Possibility of occurrence of risks based on present gaps (technological / operational / competence / measurement and monitoring);

UL: Unlikely, **L:** Likely, **VL:** Very Likely, **FR:** Frequent, **C**: Continuous

Impact –

SI: Slight Injury, **MI:** Minor Injury, **MJ:** Major Injury, **SF:** Single Fatality, **MF:** Multiple Fatalities

Level of consequence – Refer Guidance criteria for this i.e. possible degree of damage;

Condition- N: Normal, **AN**: Abnormal, **E**-Emergency

Activity Type: R- Routine, NR- Non Routine

RISK –

L: Low Risk, **M:** Moderate Risk, **H:** High Risk

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FORMAT NO.: **HSE-20 REV 0**

Inspection of Tower Crane

Name of Contractor: **Project:**

Name of Work: **Job No:**

Vehicle Identification/Registration No: **Date:**

Sr. No.	Description	Observation	Remarks & Suggestions
1	Serial number plate &SWL marking		
2	Valid TPI Certificate		
3	Valid Insurance		
4	Safe access and egress are provided to the crane operator.		
5	Front glass of Operator cabin		
6	Operator crane cabin is provided with a locking mechanism so as to prevent unauthorised entry.		
7	A safety bar is fitted across the operator's cabin window where there is likelihood of the operator falling through it.		
8	Manufacturer Operating Manual and Maintenance Manual are made available.		
9	An updated Operation and Maintenance log book is available in the operator cabin.		
10	All mounting bolts are in good condition.		
11	Load chart provided		
12	SLI available		
13	Crane hooks have got smooth surface and no dent		
14	Hook-latch / Dog-clamp in hook is effective		
15	Over hoist limit switch		
16	Double body earthing of Tower Crane		
17	Jib angle indicator is provided (For Luffing Jib Tower Crane).		
18	Emergency stop button, which will terminate the operation of the crane engine, is installed in the operator cabin and correctly identified.		
19	Effective braking mechanisms for Hoisting, Derricking, Slewing, Trolley Travelling maintained:		
20	Trolley Travelling limiter to prevent over-travelling of trolley is functional.		
21	Limit switches to prevent over-derricking and over-lowering of jib (For Luffing Jib Tower Crane) is functional.		
22	Slewing limiter to restrict slewing of crane is functional.		
23	Over load Limiter to prevent overloading of crane is functional.		
24	Load Moment Limiter to prevent over-turning moment is functional.		
25	Anti-collision devices are tested to stop the tower crane's operation such that the crane-to-crane interference must be maintained at not less than 3 m.		
26	Condition of boom		
27	Counter weight placement and pins		
28	Winches, pulleys and wire ropes are in good working condition.		
29	Colour coding		
30	Leakage in hydraulic cylinder		

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31	Fire Extinguisher		
32	Tower crane is adequately grounded or protected against lightning.		
33	Wind anemometer is installed and is in good working condition.		
34	Aviation lamp is functional (Reqd. for 30mt and above)		
35	Pre Medical Check-up& Periodic Medical check-up (every 6 months) including vision test for Operator		
36	Safety Induction for Operator		
37	Others		

Signature & Name of Operator:

Signature and name of Job Engineer

Signature & Name of Contractor's Safety Officer

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FORMAT NO. : HSE-21 REV 0

Crane Inspection Checklist

Name of Contractor: **Project:**

Name of Work: **Job No:**

Vehicle Identification/Registration No: **Date:**

Sr. No.	Description	Observation	Remarks & Suggestions
1	Crane hooks have got smooth surface and no dent		
2	Hook-latch / Dog-clamp in hook is effective		
3	Over hoist limit switch		
4	Over Load Indicator		
5	Over Boom limit switch		
6	Boom angle indicator		
7	Colour coding		
8	Condition of boom		
9	Condition of wire rope		
10	Rope drum / sheaves are in good working condition		
11	Swing break & lock		
12	Swing Alarm		
13	Over hoist break & lock		
14	Boom break & lock (For Telescopic Boom)		
15	Leakage in hydraulic cylinder		
16	Condition of Outrigger (For Tyre Mounted Crane)		
17	Outrigger fully extended Marking (For Tyre Mounted Crane)		
18	Condition of Tyre (For Tyre Mounted Crane)		
19	Wheel chokes are present and are used whenever required (For Tyre mounted)		
20	Battery & lamps		
21	Moving & rotating parts guarded		
22	Load chart provided		
23	Reverse horn (For Tyre Mounted Crane)		
24	Body Condition of crane		
25	Front glass of Operator cabin		
26	Both side Mirror		
27	Number Plate (For Tyre Mounted Crane)		
28	Fire Extinguisher		
29	Horn		
30	Windshield and wipers		
31	Working of light & Indicator		
32	SLI		
33	Spark Arrestor(For Running Refinery/ Petrochemical/Chemical Plant)		

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34	Foot-steps and hand-holds are in good working condition for exit /enter in to cabin		
35	TPI Certificate		
36	RC Document (For Tyre Mounted Crane)		
37	Fitness Certificate of Vehicle by authority		
38	Insurance		
39	PUC		
40	HMV License for Operator		
41	Pre Medical Check-up& Periodic Medical check-up (every 6 months) including vision test for Operator		
42	Safety Induction for Operator		
43	Others		

Signature & Name of Operator:

Signature & Name of Contractor's Concern Engineer

Signature & Name of Contractor's Safety Officer

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FORMAT NO. : HSE-22 REV 0

Hydraulic Mobile Crane- Inspection Checklist

Name of Contractor: **Project:**

Name of Work: **Job No:**

Vehicle Identification/Registration No: **Date:**

Sr. No.	Description	Observation	Remarks & Suggestions
1	Identification number of Hydraulic Mobile crane boldly scribed in front and rear end of machine		
2	Operator has got adequate document in support of his competency (i.e. HMV driving license, knowledge & training)		
3	Marking of SWL on hook position is clearly visible		
4	Test & examination of Hydraulic Mobile crane by statutory / competent authority is carried out & document is valid		
5	Colour Coding		
6	RC Document		
7	Fitness Certificate of Vehicle by authority		
8	Valid Insurance		
9	Valid PUC		
10	Pre Medical Check-up& Periodic Medical check-up (every 6 months) including vision test for Operator		
11	Safety Induction for Operator		
12	Crane hooks have got smooth surface and no dent		
13	Hook-latch / Dog-clamp in hook is effective		
14	Over hoist limit switch		
15	Over Load Indicator		
16	SLI		
17	Condition of boom		
18	Condition of wire rope		
19	Rope drum / sheaves are in good working condition		
20	Leakage in hydraulic cylinder		
21	Tyre condition		

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22	Battery		
23	Moving & rotating parts guarded		
24	Break		
25	Parking Break		
26	Front horn		
27	Reverse horn		
28	Hydraulic Mobile Crane cabin body and frame of machine is in good order		
29	Both side Mirror		
30	Fire Extinguisher		
31	Front glass pane of the Hydraulic Mobile operator's cabin is clean & clear (i.e. not cracked / damaged / broken)		
32	Windshield and wipers condition		
33	Working of front & back lights, turn Indicators, parking lights & fog lamps		
34	Spark Arrestor(For Running Refinery/ Petrochemical/Chemical Plant)		
35	Wheel chokes are present and are used whenever required		
36	Foot-steps and hand-holds are in good working condition for exit /enter in to cabin		
37	Others		

Signature & Name of Operator

Signature & Name of Contractor's Concern Engineer

Signature & Name of Contractor's Safety Officer

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FORMAT NO. : HSE-23 REV 0

Hydraulic Rig Inspection Checklist

Name of Contractor: **Project:**

Name of Work: **Job No:**

Vehicle Identification/Registration No: **Date:**

Sr. No.	Description	Observation	Remarks & Suggestions
1	Control panel is clean & all buttons/switches are clearly visible (no paint over spray, etc.)		
2	All switch & mechanical guards are in good condition and properly installed		
3	All Safety Indicator lights work		
4	Drive controls function properly & accurately labelled (up, down, right, left, forward, back)		
5	Motion alarms are functional		
6	Safety decals are in place and readable		
7	Any defects such as cracked welds, fuel leaks, hydraulic leaks, damaged control cables or wire harness, etc.		
8	Braking devices are operating properly		
9	Winches, pulleys and wire ropes are in good working condition.		
10	Function of interlocks and limit switch		
11	The manufacturer's operations manual (in all languages of the operators)		
12	Oil level, Hydraulic Oil Level, Fuel Level, Coolant Level		
13	Battery Charge		
14	Outriggers in place or functioning. Associated alarms working		
15	Moving & rotating parts guarded		

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16	Load chart provided		
17	Fire Extinguisher		
18	Spark Arrestor, if operated by using fuel(For Running Refinery/ Petrochemical/Chemical Plant)		
19	Serial number plate		
20	SLI		
21	TPI Certificate		
22	Colour Coding		
23	Insurance		
24	Pre Medical Check-up& Periodic Medical check-up (every 6 months) including vision test for Operator		
25	Safety Induction for Operator		
26	Others		

Signature & Name of Operator:

Signature & Name of Contractor's Concern Engineer

Signature & Name of Contractor's Safety Officer

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FORMAT NO. : HSE-24 REV 0

Boom Lift Inspection Checklist

Name of Contractor: **Project:**

Name of Work: **Job No:**

Vehicle Identification/Registration No: **Date:**

Sr. No.	Description	Observation	Remarks & Suggestions
1	Operating and emergency controls are in proper working condition, EMO button or Emergency Stop Device		
2	Functional upper drive control interlock (i.e. foot pedal, spring lock, or two hand controls)		
3	Emergency Lowering function operates properly		
4	Lower operating controls successfully override the upper controls		
5	Both upper and lower controls are adequately protected from inadvertent operation.		
6	Control panel is clean & all buttons/switches are clearly visible (no paint over spray, etc.)		
7	All switch & mechanical guards are in good condition and properly installed		
8	All Safety Indicator lights work		
9	Drive controls function properly & accurately labelled (up, down, right, left, forward, back)		
10	Motion alarms are functional		
11	Safety decals are in place and readable		
12	Guardrails and anchor points are in place, and in good condition		
13	Work platform & extension slides are clean, dry, & clear of debris		
14	Work platform extension slides in and out freely with safety locking pins in place to lock setting on models with extension platforms.		
15	Any defects such as cracked welds, fuel leaks, hydraulic leaks, damaged control cables or wire harness, etc.		
16	Braking devices are operating properly		
17	The manufacturer's operations manual is stored on AWP (in all languages of the operators)		
18	Oil level, Hydraulic Oil Level, Fuel Level, Coolant Level		

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19	Battery Charge		
20	Outriggers in place or functioning. Associated alarms working		
21	Tyres and wheels are in good condition, with adequate air pressure if pneumatic		
22	Wheel chokes are present and are used whenever required		
23	Moving & rotating parts guarded		
24	Load chart provided		
25	Fire Extinguisher		
26	Spark Arrestor, if operated by using fuel(For Running Refinery/ Petrochemical/Chemical Plant)		
27	Serial number plate with Load capacity		
28	TPI Certificate		
29	Colour Coding		
30	Insurance		
31	Pre Medical Check-up& Periodic Medical check-up (every 6 months) including vision test for Operator		
32	Safety Induction for Operator		
33	Others		

Signature & Name of Operator:

Signature & Name of Contractor's Concern Engineer

Signature & Name of Contractor's Safety Officer

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FORM OF CONTRACT PERFORMANCE BANK GUARANTEE & FDR

[ANNEXURE- XIII TO SPECIAL CONDITIONS OF CONTRACT]

FORM OF CONTRACT PERFORMANCE GUARANTEE

[ON APPROPRIATE STAMP PAPER]

Beneficiary: Engineers India Limited
Bank Guarantee No. [.....]

THIS DEED OF GUARANTEE is executed on this [.....*insert day*] day of [..... *insert month and year*] at [.....*insert place*] by [.....***INSERT NAME OF BANK***] having its head/registered office at [..... *insert address*], (hereinafter referred to as the "**Guarantor**", which expression shall unless it is repugnant to the subject or context thereof include successors and assigns)

IN FAVOUR OF:

ENGINEERS INDIA LIMITED, a public limited company incorporated under the Indian Companies Act, 1956, having its registered office at [.....], (hereinafter referred to as the "**EIL**", which expression shall unless it is repugnant to the subject or context thereof include successors and assigns).

WHEREAS

I. EIL has entered into a Contract vide Purchase Order/ Letter of Acceptance/ Fax of Acceptance no.....dated ..... **(the "Contract")** with .....**[insert name of Contractor] (*the "Contractor"*)** having its registered office at ..... (the "Contractor", which expression shall, unless it be repugnant to the context or meaning thereof, include its successors-in-title and permitted assigns), for the project.

II. In terms of the Contract, the Contractor is required to furnish to EIL, an unconditional, irrevocable, on demand bank guarantee for an amount..... **[insert amount in figures & words] (the "Guaranteed Amount")** which is equal to.....% of the Contract Price, as security for due and punctual performance/ discharge of the Contractor's obligations under the Contract.

III. At the request of Contractor, the Guarantor has agreed to provide an unconditional, irrevocable and on-demand bank guarantee, for the due and punctual performance/ discharge by the Contractor of its obligations under the Contract during the Contract Validity Period.

NOW THEREFORE THIS DEED WITNESSETH AS FOLLOWS:

1. The Guarantor hereby irrevocably and unconditionally guarantees and secures (as primary obligor and not merely as guarantor) to EIL (as beneficiary) the payment in full of all amounts at any time that may be due, owing or payable to EIL from the Contractor for the failure of the Contractor to duly and punctually perform all of its obligations under the Contract (the "Guarantee"), without any demur, reservation, protest or recourse, immediately on receipt of a demand from EIL.

   The Guarantor further agrees that this Guarantee does not limit the number of claims that may be made by EIL against the Guarantor upto the value of Guaranteed Amount.

   Payment made hereunder shall be made free and clear of and without any deductions so that EIL receives the full Guaranteed Amount due hereunder.

2. The Guarantor shall, pay to EIL sums not exceeding the Guaranteed Amount, within 5 (five) Business Days of receipt of a written demand from EIL stating that the Contractor has failed to meet its performance obligations under the Contract. The Guarantor shall not be required to go into the veracity of any breach or failure on the part of the Contractor or status /stage of the contract or validity of demand so made by EIL and shall pay the amount specified in the demand notwithstanding any direction to the contrary given or any dispute whatsoever raised by the Contractor or any other Person. The Guarantor's obligations hereunder shall

subsist until all such demands are duly met and discharged in accordance with the provisions hereof.

3. The obligations of the Guarantor herein are absolute and unconditional, irrespective of the value, genuineness, validity, regularity or enforceability of the Contract or the insolvency, bankruptcy, reorganization, dissolution or liquidation of the Contractor or any sanctions on the Contractor or any change in ownership of the Contractor, or the pendency of any suit or other legal proceedings including arbitration or conciliation pending before any court, tribunal or arbitrator or conciliator(s) relating thereto or any purported assignment by the Contractor or any other circumstance whatsoever which might otherwise constitute a discharge or defence of a guarantor or a surety.

   Further, this Guarantee is in no way conditional upon any requirement that EIL first attempt to procure the Guaranteed Amount from the Contractor, or any other Person, or resort to any other means of obtaining payment of the Guaranteed Amount, prior to make any recourse to this Guarantee.

4. EIL shall be entitled to treat the Guarantor as the principal debtor. The obligations of the Guarantor under this Guarantee shall not be affected by any act, omission, matter or thing which would reduce, release or prejudice the Guarantor from any of the Guaranteed Amount or prejudice or diminish the Guaranteed Amount in whole or in part, including (whether or not known to it, or EIL):

   (a) any time or waiver granted to, the Contractor or any other Person;

   (b) any incapacity or lack of powers, of the Contractor or any other Person;

   (c) any variation of the Contract

   (d) any unenforceability or illegality or invalidity of any obligation of any Person under the Contract or of the Guarantor under this Guarantee or of any Person under any other document or guarantee, to the extent that each obligation under this Guarantee shall remain in full force as a separate, continuing and primary obligation, and its obligations be construed accordingly, as if there were no unenforceability or illegality or invalidity;

   (e) the partial or entire release of any Guarantor or other Person primarily or secondarily liable or responsible for the performance, payment or observance of any of the Contractor's obligations during the Contract Period; or by any extension, waiver, or amendment whatsoever which may release the Guarantor or

   (f) any part performance of the Contract by the Contractor or by any failure by EIL to timely pay or perform any of its obligations under the Contract.

5. If, and to the extent that, for any reason the Contractor enters or threatens to enter into any proceedings in bankruptcy or reorganization or otherwise, or if, for any other reason whatsoever, the performance or payment by the Contractor of the Guaranteed Amount becomes or may reasonably be expected to become impossible, then the Guaranteed Amount shall be promptly paid by the Guarantor to EIL on demand.

6. The Guarantor further represents and warrants to EIL that:
   (a) it has the power to execute, deliver and perform the terms and provisions of this Guarantee and has taken all necessary action to authorize the execution, delivery and performance by it of this Guarantee;
   (b) No actions / omissions of The Guarantor shall effect the legality, validity, binding effect or enforceability of this Guarantee.
   (c) the Guarantor has duly executed and delivered this Guarantee, and this Guarantee constitutes its legal, valid and binding obligation enforceable in accordance with its terms

7. If any one or more of the provisions contained in this Guarantee are or become invalid or unenforceable in any respect, the validity and enforceability of the remaining provisions shall

not in any way be affected or impaired thereby, and the Guarantor shall enter into good faith negotiations with EIL to replace the invalid or unenforceable provision.

8. Any notice, request, demand or claim or other communication to be given or made under this Guarantee shall be in writing addressed to the Guarantor and may be transmitted to the Guarantor either by post or by email address as set opposite its signature hereunder.

9. This Guarantee shall be governed by, and construed in accordance with, the laws of India. The Guarantor irrevocably agrees that any legal action, suit or proceeding arising out of or relating to this Guarantee may be brought in the courts in Delhi.

10. Neither party shall assign or transfer any or all parts of its interest herein to any other person without express written consent of the other party.

11. "Notwithstanding anything contained herein:

a) Our liability under this guarantee shall not exceed..... (Amount in figures & words) and

b) This bank guarantee shall be valid upto.....(expiry date) and

c) We are liable to pay the guaranteed amount only and only if we receive a written claim or demand on or before ..... (not less than 2 months from expiry date).

IN WITNESS WHEREOF the Guarantor has set its hands hereunto on the day, month and year first hereinabove written.

Signed and delivered by its constituted attorney
(Signature of a person authorized to sign on behalf of the Guarantor)
insert name of Bank] Bank by hand

Name:

Designation;

Address:

Email:

Signature Not Verified
Digitally signed by NEERAJ SHRIKANT BORGAONKAR
Date: 2026.05.09 18:53:11 IST
Location: eProcure-EPROC