

Annexure 0 - Project-Specific Safety Requirements Amendments

Supplementary document of HSEP14 Rev.02 for Meja Project Site

DOCUMENT ISSUE SHEET

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This document “**Annexure 0 – Project Specific Safety Requirement Amendments**” is developed as a supplement to BHEL APEX HSE DOCUMENT HSEP14 REV.02 - Health Safety & Environment Plan for Site Operations by Subcontractors by incorporating the specific HSE requirements of **MUNPL Meja Project**. These requirements are in addition to those already covered in HSEP-14 Rev.02.

While every effort has been made to include all relevant HSE guidelines and requirements, this document is not exhaustive. Any further clarification or interpretation on HSE matters will be at BHEL’s discretion.

The eligible Contractor & their employees & workmen including outsourced manpower/ workforce, if any, deployed and/ or visiting the projects site shall comply with the HSE provisions held in this document along with those covered under HSEP14 Rev.02.

Additionally, the Contractor shall abide by and comply with all safety rules and guidelines framed from time to time by the customer (principal occupier/ owner), State Government, Central Government or any appropriate Statutory Body that are relevant to and conducive of safe execution of the project ensuring adequate safety to man, material, asset and environment.

The present document is to be read, understood and its provisions to be implemented in conjunction with HSEP14 rev.02. Wherever there is a conflict between these two documents on HSE issue/ condition mention in both document the provisions held in the present document is to supersede.

INDEX OF CONTENTS

S. No.	Description	Page No.
	DOCUMENT ISSUE SHEET	1
	INDEX OF CONTENTS	2-3
1	SCOPE	4
2	REFERENCES	5
3	BHEL POLICY	6
4	MEMORANDUM OF UNDERSTANDING:	7
5	AMOUNT LINKED TO SAFETY ASPECT/ COMPLIANCE TO SAFETY RULES	8
5.1	AMOUNT LINKED TO SAFETY ASPECTS/ COMPLIANCE TO SAFETY RULES INLINE WITH HSEP14 REV. 02 & THIS SUPPLEMENT DOCUMENT	8
5.2	TERMS & PROCEDURE FOR THE PAYMENT LINKED TO RA BILL FOR SAFETY	8—12
6	HSE ORGANIZATION	13
6.1	DEPLOYMENT (NUMBERS OF HSE PERSONNEL APPLICABLE FOR EACH SHIFT)	13
6.2	MINIMUM QUALIFICATION & EXPERIENCE REQUIREMENTS OF HSE PERSONNEL	13
6.3	SITE HSE COMMITTEE	13-14
6.4	HSE OFFICER & SAFETY SUPERVISOR	14-15
7	HSE PLANNING BY CONTRACTOR	16
7.1	PROVISION OF PPEs	16-17
7.2	MEDICAL CENTRE WITH FIRST AID FACILITY AND AMBULANCE	17-18
7.3	FIRST AIDER	18
7.4	CONFINED SPACE ENTRY	19
8	HSE TRAINING & AWARENESS	20
8.1	HSE INDUCTION TRAINING	20
8.2	SAFETY MESSAGE PROPAGATION	20
9	HSE COMMUNICATION & PARTICIPATION	21
9.1	REPORTING AND INVESTIGATION OF ACCIDENTS AND DANGEROUS OCCURRENCES:	21-22
9.2	HSE COMMUNICATION	23
10	SAFETY DURING WORK EXECUTION & T&Ps	24
10.1	PRECAUTIONS AGAINST THE FALL OF MATERIALS AND PERSONS AND COLLAPSE OF STRUCTURE	24
10.2	NIGHT SHIFT WORK EXECUTION/ ACTIVITY	25
10.3	EMERGENCY PROVISION	25
10.4	FIRE SAFETY	26
1	ANNEXURE – 1 LIST OF SAFETY EQUIPMENT'S & SAFETY PERSONAL PROTECTIVE EQUIPMENT'S	28-31
2	ANNEXURE – 2 INDICATIVE LIST OF INDIAN STANDARD CODES FOR SAFETY	32-35

3	ANNEXURE – 3 RIGGER HANDBOOKS	36
4	ANNEXURE – 4 ELECTRICAL SAFETY MANUAL	37
5	FORMATS USED (Will be provided at site in Hard/ soft copy available in BHEL HSE Observer App)	
	Inspection of First Aid Box Health Check Up HSE Induction Training Tool Box Talk Monthly Site HSE Report Inspection of PPE Inspection of T&Ps Status of T&Ps Inspection of Cranes Inspection of Winches Inspection on Height Working Inspection on Welding & Gas Cutting Inspection on Electrical Installation Inspection on Elevator HSE Penalty Incident Reporting Format Format for Inspection of Labour Colony Format for Maintaining Records of E-waste Handled / Generated Format for Maintaining Records of Hazardous Waste at the Facility Inspection of Illumination Levels Monthly HSE Planning & Review Format Daily HSE Reporting Format A & B HSE Performance Evaluation Checklist	
06	WORK PERMITS (Will be provided at site in Hard/ soft copy available in BHEL HSE Observer App) General Work at Height Permit Burning/ Welding/ Hot Work Permit Confined Area Work Permit Excavation Work Permit Radiation/ Radiography Permit Heavy / Complex / Critical Lifting Activity Permit Night / Holiday Work Permit Material Loading / Unloading Permit Safety Facility Removal Permit (i.e. Grating, Safety Net etc) Lockout / Tag out Permit – (i.e. Live Electrical Maintenance etc.) Beam / truss/ duct/ structure alignment permit Drilling & Blasting Permit Winch Operation Permit Batching Plant Operation Work Permit Elect Motor Operated Sky Climber Operation Work Permit Abrasive Shot Blasting Permit Scaffolding Erect & Dismantle Permit Construction DB Installation Work Permit	

1. SCOPE

- 1.1. Health, Safety and Environment (HSE) Plan for site operations by contractors is a mandatory framework applicable to all contractors, agencies and sub-contractors engaged in the 3X800 MW, Meja Super Thermal Power Project, Stage-II (MUNPL).
- 1.2. This plan aligns with BHEL's General Safety Rules and is designed to ensure comprehensive safety and environmental compliance across all project phases, including dismantling, material management, erection, commissioning, testing, civil works and labour colony operations.
- 1.3. BHEL's HSE Plan emphasizes the systematic identification, evaluation, prevention and control of workplace hazards and environmental impacts. It mandates that all subcontractors adhere to this plan in conjunction with any customer-specific requirements, ensuring compliance with statutory and contractual HSE obligations.
- 1.4. The plan outlines clear objectives, such as ensuring the health and safety of all personnel, protecting the environment, providing trained and competent personnel and maintaining safe work systems. It also sets ambitious targets aiming for **zero incidents across various categories**, including explosions, fatalities, lost-time injuries, fires, vehicle incident & environmental incidents.
- 1.5. As a dynamic and living document, the HSE Plan is subject to revisions to accommodate evolving project needs and regulatory requirements.
- 1.6. This document is applicable for BHEL's Agency/ contractors/ Sub contractor at all activities of 3X800 MW, Meja Super Thermal Power Project, Stage-II (MUNPL) as per the relevant contractual obligations

Note:-

- A. The contractor shall also comply with HSE Targets/ Compliance stipulated by BHEL/ Customer from time to time.
- B. BHEL install IP based CCTV system along with IP based announcement system which shall be used for monitoring safety during construction from Safety control room. It shall be possible to make announcements to alert the workers. Whenever required. These cameras shall be installed at all strategic locations in the plant area. This camera can be wired or wireless as per suitability at site. Initially these installations will be temporary & locations will keep on changing depending upon the work in progress. Drone based safety monitoring shall be done during day to day monitor of all construction activity at a close range.
NOTE :- Assistance for Camera positioning and its safety will be responsibility of contractor working in that area.
- C. Contractor shall take all necessary precautions to protect all the existing equipment, structures, facilities and buildings etc. from damage. In case any damage occurs due to the activities of the contractor on account of negligence, ignorance, accidental or any other reason whatsoever, the damage shall be immediately made good by the contractor at his own cost to the satisfaction of the BHEL/ Customer (3X800 MW, Meja Super Thermal Power Project, Stage-II (MUNPL)). The contractor shall also take all necessary safety measures with specific reference to excavation in rock, at his own cost, to avoid any harm or injury to his workers and staff from the equipment and facilities of the power plant.

2. REFERENCES

2.1	Contract Documents
2.2	Relevant Legislations
2.3	BHEL Power Sector HSE Management System Manual
2.4	ANNEXURE-B to GCC (Safety Rules & Safety Management) Customer Contract
2.5	INSTRUCTIONS TO BIDDERS (ITB) Customer Contract
2.6	TECHNICAL SPECIFICATION SECTION-VI, Forms and Procedures BIDDING DOCUMENT NO. : CS-0362-001-2 Customer Contract
2.7	BHEL to provide contractor hard / soft copies of all applicable HSE Procedures, Work Permits (Soft Copy/ via HSE observer App), Operational Control Procedures, Job Safety Analysis, Hazard Identification & Risk Assessment formats and any other instructions required to be followed by the contractors, as a minimum before commencing operations at site. These shall include, but not limited to: i. HSE Procedures ii. Method Statements iii. JSA & HIRA Standard Format iv. Operational Control Procedures v. Work Permits vi. Inspection & HSE Formats
2.8	Relevant Indian & international standards in case of any ambiguity in/ lack of procedure/ specifications. All IS & BS standards mention in this HSE Plan must follow wherever applicable.
NOTE	1. All contractor must use HSE observer App/Website for raising HSE observation, Near miss, weekly Safety Walk by top management, Daily TBT with Geotagged Photographs, Asset Management system (T&Ps etc.), HSE Inspection, All Work Permit system etc.. In case of any technical error or any specific requirement HARD Copy of work permit system shall be implemented at site, in line with HSE Procedure for Permit To Work (HSEP:12) and format provided by BHEL at Site. 2. However, in case Customer have their own Safety Work Permit system, then same shall be followed. 3. Contractor shall ensure availability and understanding of these requirements prior to commencing work at site. In case the statutory requirements i.e. State or Central Acts and / or applicable rules 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) OHS & WC Code, etc. are more stringent than the requirements stipulated in this document, they shall be applicable.

3. BHEL HEALTH, SAFETY & ENVIRONMENT POLICY



Health, Safety & Environment Policy

BHEL is committed to ensure occupational health & safety of its employees and other people working for the organisation and minimising the environmental footprints of its activities, products and services through active leadership and ensuring availability of required resources. Further, we commit to continually improve our Environmental, Social and Governance (ESG) performance by:

- Strengthening safety culture with an objective to attain Zero Harm,
- Taking up activities for protection of the environment, including prevention of pollution, protection of biodiversity & ecosystems and climate change mitigation & adaptation,
- Taking steps for attaining Net Zero emissions (Scope 1 and Scope 2) by 2047,
- Conserving resources and adopting sustainable waste management practices based on Reduce / Recycle / Reuse approach,
- Managing Environmental impacts and Occupational Health & Safety risks through elimination / substitution / reduction / control approach,
- Ensuring compliance with applicable legislations, regulations and BHEL Management Systems,
- Incorporating appropriate Occupational Health, Safety and Environment criteria into business decisions, conceptualisation and design of products, selection of plants, technologies and services, procurements and in outsourced processes,
- Ensuring consultation and participation of workers and other stakeholders for improvements in the HSE Management System (HSEMS) and reviewing periodically this policy and HSEMS to ensure their relevance, appropriateness and effectiveness,
- Imparting appropriate structured training to persons engaged at our workplaces and promoting awareness amongst customers, contractors and suppliers on HSE issues,
- Communicating this policy within BHEL and making it available to interested parties.

(This policy bears the approval of Chairman & Managing Director, BHEL)



Bharat Heavy Electricals Limited

4. MEMORANDUM OF UNDERSTANDING

This document will be followed as mention in HSEP14 Rev. 02 Section – A, Clause no. 17

Memorandum of Understanding

BHEL, Power Sector Region is committed to Health, Safety and Environment Policy (HSE Policy).

M/s.....do hereby also commit to comply with the same HSE Policy while executing the Contract Number _____

M/s.....have gone through and understood all the HSE requirements of the contract including HSE manpower, tools & equipment, systems & procedures, and agree to fulfill the same as a minimum. Any additional resources and support required for ensuring fulfillment of HSE Objectives shall be provided by subcontractor at no extra cost.

M/s..... agree that in case they fail to comply to the HSE requirements as stipulated in the contract, BHEL shall have the right to implement the same and the cost shall be recovered from the subcontractor with applicable overheads.

M/s..... shall ensure that safe work practices as per the HSE plan. Spirit and content therein shall be imbibed in all workers and supervisors for compliance.

In addition to this, M/s.....shall comply to all applicable statutory and regulatory requirements which are in force in the place of project and any special requirement specified in the contract document of the principal customer.

M/s.....shall co-operate in HSE audits/inspections conducted by BHEL /customer/ third party and ensure to close any non-conformity observed/reported within prescribed time limit.

M/s..... agree that the subcontractor shall seek HSE clearance as per BHEL format before each RA bill as mentioned in clause no. 9. The penalty amounts for not providing Safety manpower and various Safety violations have also been reviewed and agreed.

M/s..... agree to share the HSE Costs (running costs) of common facilities created by BHEL on proportional to contract value basis as calculated at Site by BHEL.

Signed by authorized representative of M/s _____

Name :

Place & Date:

5. AMOUNT LINK TO SAFETY ASPECT/ COMPLIANCE TO SAFETY RULES

5.1	AMOUNT LINKED TO SAFETY ASPECTS/ COMPLIANCE TO SAFETY RULES IN LINE WITH HSEP14 REV. 02 & THIS SUPPLEMENT DOCUMENT i.e. TERMS & PROCEDURE FOR THE PAYMENT LINKED TO RA BILL FOR SAFETY: -
5.2	TERMS & PROCEDURE FOR THE PAYMENT LINKED TO RA BILL FOR SAFETY: There is an amount linked to each RA bill with respect to Safety. Contractor must fulfill all the details mention below to process the amount linked to RA bill for Safety aspect/ safety Rule/ Compliance etc. Agency/ Contractor are advised to price their bids in such a manner that the component for 'Amount linked to Safety Aspects/ compliance to Safety Rules' should not be less than 1 % of the cumulative total of Service Portion of the Contract, i.e. Civil + Installation/ Erection + Structural Works etc.. In case 'Amount linked to Safety Aspects/ compliance to Safety Rules' is less than aforesaid minimum percentage specified of the cumulative total of Service Portion of the Contract, i.e. Civil + Installation/ Erection + Structural Works etc., the amount by which it is lower shall be retained proportionately from the other components mention below of the Contract price while releasing payments of each RA bill. No interest shall be payable on the amounts linked to Safety Aspects / Compliance to Safety Rules including aforesaid retained amount. The amounts linked to Safety Aspects / Compliance to Safety Rules including aforesaid retained amount shall be payable in part or full based on safety compliance duly certified by Package In charge/Engineer, Construction manager/Project Director and Site HSE Head/Safety-in-charge on quarterly basis/ 3-month period.
5.2.1	The amount linked to Safety Aspects/ compliance to Safety shall be paid in two parts, viz,
5.2.1.A	10% of Y amount (calculated as 0.1 Y of the service portion amount of RA bill) shall be linked to Fatal/Major Accidents, and
5.2.1.B	90% of Y amount (calculated as 0.9 Y of the service portion amount of RA bill) shall be linked to various Safety Aspects specified in HSE Plan for Site operation by Contractor.
	NOTE : Y = 1 % of service portion of gross amount (excluding taxes as applicable) of each RA bill raised in 3 months, envisaged for Safety Aspect.
5.2.2	Contractor shall claim Amount linked to Safety Aspects/ Compliance to Safety in such a manner that amount claimed is equal to Y of service portion of gross amount (excluding taxes as applicable) of RA bill.
5.2.3	The amount as elaborated at PARA 5.2.1 (above) shall be withheld from first and second monthly RA bill of the respective quarter/three-month period and shall be released in part or full based on safety compliance duly certified by Package Incharge and Safety-in-charge on quarterly basis. The amount for the entire quarter (i.e. RA bills raised during a 3-month period) shall be paid to the Contractors at the end of that three months period along with 3rd/last RA Bill for the quarter/three months period upon complying the following conditions:

5.2.3.A	Amount of RA bill linked to FATAL/ Major Accidents (0.1Y as mention at clause 5.2.1.A). I. No fatal injury or accident-causing death in that three months' period. AND II. No Major injury or accident causing 25% or more permanent disablement to workmen or employees in that three-month period. Permanent disablement shall have the same meaning as indicated in The Workmen's Compensation Act' 1923 or IS 3786. In case of any fatal injury or accident as elaborated above occurs during that three-month period, the stipulated amount (0.1Y) subject to minimum of Rs 10 Lakh per fatality shall be forfeited and shall not be payable to the contractor under the contract. In case, the amount to be deducted/forfeited exceeds the amount linked to Fatal/ Major Accidents, the same shall be recovered from remaining Amount (0.9Y) linked to Compliance of Safety Rules and/or any other payments immediately due to the contractor under the Contract. In case of any Major injury or accident causing 25% or more permanent disablement to workmen/worker or employees occurs during that three- month period, Rs 4 lakh per Major injury shall be deducted from the amount (0.1Y) linked to Fatal/ Major Accidents and shall not be payable to the Contractor under the contract. In case, the amount to be deducted/forfeited exceeds the amount linked to Fatal/ Major Accidents, the same shall be recovered from remaining Amount (0.9Y) linked to Compliance of Safety Rules and/or any other payments immediately due to the Contractor under the Contract. Further, in case, Contractor doesn't raise RA Bills in any three-month period/quarter and if any fatal injury and/or major accident takes place in that period, Construction Manager shall deduct the amount [Rs 10 Lakh per fatality and Rs 4 lakh per Major injury] pertaining to this particular quarter from his next RA bill/due payment. In case, the amount to be deducted/forfeited exceeds the amount linked to Safety, the same shall be recovered from any other payments immediately due to the contractor under the Contract. The amount deducted/forfeited as mentioned above shall be in addition to the compensation payable to the workmen / employees under the relevant provisions of the Work-men's Compensation Act' 1923 and rules framed there under or any other applicable laws as applicable from time to time.
5.2.3.B	Amount of RA Bill linked to Compliance of Safety Rules (0.9Y i.e. 90% of amount as elaborated as mention at clause 5.2.1.B). Aforesaid amount (on quarterly basis) shall be payable to Contractor in five equal parts under five heads as under: i) Amount payable on deployment of required Safety Personnel One fifth of the amount specified at clause 5.2.3.B (calculated as 0.18Y of Service portion amount of RA Bill), on quarterly basis, shall be paid upon certification by Construction Manager & Safety dept. that required number of Safety personnel/ Officer/ Supervisor etc. as per HSEP14 Rev.02, Section – A, Clause 5 & their Sub clause vide

heading HSE Personnel to be solely provided by the subcontractor have been deployed. The aforesaid amount linked to deployment of requisite safety personnel shall be paid as under:

- a. 50% of the amount referred at 5.2.3.B (i), for deployment of Safety Supervisors shall be paid on pro-rata basis depending upon the actual no. of Safety Supervisors deployed vis-à-vis actual requirement:

(Amount to = $0.09Y \times \text{Service portion of RA bill amount} \times (a/b)$ be paid)

Where 'a' is actual no. of Safety supervisors deployed.

And

'b' is required no. of Safety supervisors as per, This HSE Plan for site operation by contractor.

In case, actual no. of Safety supervisors deployed is more than requisite number (i.e. a/b is more than 1), the amount to be paid shall be restricted to 0.09Y.

- b. 50% of the amount referred at clause 5.2.3.B (i), for deployment of Safety Officers shall be paid on pro-rata basis depending upon the actual no. of Safety Officers deployed vis-à-vis actual requirement:

(Amount to be paid) = $0.09Y \times \text{Service portion of RA bill amount} \times (a/b)$

Where 'a' is actual no. of Safety Officers deployed

And

'b' is required no. of Safety Officers as per HSE plan for site operation by contractor.

In case, actual no. of Safety Officers deployed is more than requisite number (i.e. a/b is more than 1), the amount to be paid shall be restricted to 0.09Y.

- c. In case aforesaid requisite no. of Safety personnel are not deployed by contractor, amount not to be paid as calculated above for that particular quarter/three-month period shall be forfeited and shall not be payable to the contractor under the contract.

NOTE: - In case as per this HSE plan, contractor/ agency has to deploy only Safety supervisor (where worker < 20) & only Safety officers (where worker >20 & <50), then Both a & b portion will be released/ deducted as per compliance. Above case will not be applicable in MM contract.

ii) Amount payable on providing requisite Personal Protective Equipment & Safety Equipment

One fifth of the amount specified at Clause 5.2.3.B (calculated as 0.18Y of Service portion amount of RA Bill), on quarterly basis, shall be paid upon certification by Construction Manager & Safety dept. that contractor has adhered to the requirements mention in HSEP14 Rev.02 & Annexure – 1 of this document (List of Safety Enables - PPEs).

In case of non-compliance by contractor, warning letter/Noncompliance shall be issued by Construction Manager/ Safety Officer of BHEL. Further, if more than two such warning letters/Non Compliance Memos are issued in a quarter/three monthly period, above mentioned amount for that particular quarter/three-month period shall be forfeited and shall not be payable to the contractor under the contract.

Note:- The agency should ensure sufficient inventory of personal protective equipment (PPEs) prior to initial mobilization. After identifying the need of the required PPEs for various activities performed at the site, an additional inventory of approx. 20% of required PPEs should be maintaining during the execution of the work. If sub agency fails to provide the PPEs to worker the same may be issued by BHEL and cost for the PPEs will be recovered from the contractor from regular RA Bill with overhead as per contract.

iii) Amount payable on providing requisite Safety Induction and Training

One fifth of the amount specified at Clause 5.2.3.B (calculated as 0.18Y of Service portion amount of RA Bill), on quarterly basis, shall be paid upon certification by Construction Manager & Safety dept. that contractor has adhered to the requirements of imparting Safety training as per HSEP14 Rev. 02 Clause 11- HSE Training & Awareness to at least 90% of its employees/workmen (who have not been previously provided with requisite training) in a quarter/ three months' period. In case contractor fails in meeting the aforesaid requirement, above mentioned amount for that particular quarter/three-month period shall be forfeited and shall not be payable to the contractor under the contract.

iv) Amount payable on providing requisite Medical and First Aid Amenities

One fifth of the amount specified at clause 5.2.3.B (calculated as 0.18Y of Service portion amount of RA Bill), on quarterly basis, shall be paid upon certification by Construction Manager & Safety dept. that contractor has adhered to the requirements of HSEP14 Rev.02 Section – A , Clause 1, Clause 2 & Annexure -A (i.e. Medical Centre and Ambulance) and this Annexure-0 (Project-Specific Safety Requirements Amendments) clause 7.2 & their sub clauses, clause 7.3 & their sub clauses. In case contractor fails to support BHEL in complying aforesaid mention Clauses in Both document HSEP14 Rev02 and this Supplement document, then even on one incidence in any quarter/three-month period, above mentioned

amount for that particular quarter/three-month period shall be forfeited and shall not be payable to the contractor under the contract.

v) **Amount payable on compliance to Work Permit System**

One fifth of the amount specified at Clause 5.2.3.B (calculated as 0.18Y of Service portion amount of RA Bill), on quarterly basis, shall be paid upon certification by Construction Manager & Safety dept. that contractor has adhered to the requirements of HSEP14 Rev.02, SECTION – B Clause 13.2 Work Permit System. In case of non-compliance by contractor, warning letters/Non-Compliance Memos shall be issued by Construction Manager/ Safety Officer of BHEL. In case of issuance of more than two such warning letters/Non-Compliance Memos in a quarter/three monthly period, above mentioned amount for that particular quarter/three-month period shall be forfeited and shall not be payable to the contractor under the contract.

NOTE :-

1. In case 'Amount linked to Safety Aspects / compliance to HSE Plan for site operation by contractor' is less than 1 % of the cumulative total of Service Portion of the Contract, i.e. Civil/ Installation/ Erection /Structural Works etc., the amount by which it is lower shall be retained proportionately from the other components of RA Bill while releasing payments of each RA bill. No interest shall be payable on the amounts linked and withheld for Safety Aspects / Compliance to HSE Plan for Site operation by contractor including aforesaid retained amount. The amounts linked to Safety Aspects / Compliance to HSE Plan for site operation by contractor including aforesaid retained amount shall be payable in part or full based on safety compliance duly certified by Construction Manager and Safety-in-charge on quarterly basis/ after 3 month period.
2. Amount deducted by customer against amount/ payment linked to RA bill for safety mention in above para, shall be distributed amongst the agencies responsible for the same proportionate to violation made by contractor/ agency.

In case BHEL have deducted any penalty for Safety violation and this penalty category match with above mention terms & procedure for the Payment linked to RA bill for safety (Clause 5.2), then total higher amount penalty shall be deducted from quarterly claim raised for Safety amount withheld for safety aspect by contractor/ vendor.

6. HSE ORGANIZATION

6.1 DEPLOYMENT (NUMBERS OF HSE PERSONNEL APPLICABLE FOR EACH SHIFT): The contractor should deploy sufficient HSE Officers, HSE Supervisors and Stewards, as per requirement given in HSEP14 Rev 02, since initial stage and add more in proportion to the added strength in work force. **This clause is Supplement to HSEP14 Rev. 02, Section A, Clause 05 and its sub-clauses.**

6.2 MINIMUM QUALIFICATION & EXPERIENCE REQUIREMENTS OF HSE PERSONNEL. **This clause is Supplement to HSEP14 Rev. 02, Section A, Clause 05 and its sub-clauses.**

Safety Steward –

- I. 01 nos steward for every 20 nos worker for up to 100 workers.
- II. for above 100 workers; 1 nos additional steward for every 50 workers in addition to 5 nos steward (i.e. up to 100).

QUALIFICATION OF SAFETY STEWARD

HSE Steward	i) Class XII pass certificate AND ii) Trained (Certificate not required) in fire- fighting as well as in safety / occupational health related subjects, with: ✓ Minimum one 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.
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6.3 SITE HSE COMMITTEE - This clause is Supplement to HSEP14 Rev. 02, Section B Clause no. 20, Subclause 19.

6.3.1 Site HSE/ Safety committee shall be formed within each contracting agency comprising of worker representatives with equal no. of management representatives as per the provisions of BOCW Act/rules. This committee in each agency shall meet at least once in every month. The safety officer of the concerned agency shall coordinate these meetings at BHEL/3X800 MW, Meja Super Thermal Power Project, Stage-II (MUNPL)

6.3.2 3X800 MW, Meja Super Thermal Power Project, Stage-II (MUNPL) Safety officer shall be special invitee for Safety Committee meetings. The safety committee functioning shall be in line with the provisions of BOCW Act/Rules.

6.3.3 Apart from the above, each agency shall organize safety meetings every day before start of day's work to educate & motivate the workers about the necessity of safety. Case study of accident/ incident can be shared in these meetings.

6.3.4 The contractor shall also regularly organize safety meetings for all job supervisors/foremen.

6.3.5 Weekly meeting with contractors Safety Officers to be organized by safety department of BHEL/ 3X800 MW, Meja Super Thermal Power Project, Stage-II (MUNPL) and minutes to be recorded, circulated and compliance status to be checked on regular basis.

- 6.3.6 Shall meet monthly and as and when required, to discuss ways and means to eliminate unsafe acts/condition.
- 6.3.7 Shall evaluate a suitable course of action for the effective implementation of safety system & procedures. Committee will also ensure that all the relevant codes & acts / rules are followed.
- 6.3.8 Site HSE committee shall consist of BHEL Project Director/ Construction Manager (Chairman), Site BHEL HSE coordinator (Secretary/Convener), BHEL HOS (Member), Site In charge of contractor (Member) and Safety officer of contractor (Member).
- 6.3.9 Shall monitor the performance of the HSE programs and suggest improvements as required.
- 6.3.10 Shall discuss exception points relating to HSE Audits, sub-contractor HSE practices, incident reports, near miss reports, etc.
- 6.3.11 Shall analyze the high-risk activities to be undertaken in the near future to identify hazards and decide on the control measures to be taken.
- 6.3.12 Shall inspect the site on regular intervals to locate unsafe conditions with reference to the inspection checklist.
- 6.3.13 Shall investigate all incidents and strengthening the safety programme by additional precautions, if any based on the incident investigate.
- 6.4 HSE OFFICER & SAFETY SUPERVISOR - This clause is Supplement to HSEP14 Rev. 02, Section – A, Clause 5.2 (Qualification & Experience requirement of HSE personnel) & Section B, Clause 5.3 & Clause 5.4 and its sub-clauses.**
- 6.4.1 The contractor shall submit the certificates of qualification & experience of HSE manpower at least 10 days before deployment for BHEL to assess suitability as per requirement detailed in this document.
- 6.4.2 As per clause No. 5.1.1 Deployment Plan sub clause No. iv *For less than 20 workers HSE Officer is not mandatory. In case the number of workers exceed 20 for 3 consecutive months, HSE Officer is to be engaged. The HSE Officer shall be deployed for a minimum period of 6 months even if the number of workers fall below 20 in any month subsequent to deployment. If within that 6-month period, the number of workers is more than 20 for at least 3 months, the deployment duration of HSE Officer will extend further 6 months after completion of previous 6-month period.* For packages having a workforce strength of more than 20 workers but less than 50 workers, deployment of a Safety Supervisor is not mandatory. In such cases, deployment of one Safety Officer shall be considered sufficient to look after the HSE in respective package. Above case will not be applicable in MM contract.
- 6.4.3 BHEL shall have the right to reject in case of any deviation. In case of rejection, contractor shall arrange suitable candidates as a replacement and submit resume to BHEL. Penalties will be applicable during the period of non-deployment in such cases as well.

- 6.4.4 At any point of time (in case contractor is not deployed HSE officer), BHEL shall have the right to deploy the required HSE manpower at the risk and cost of contractor with applicable overheads at market determined rates with applicable overheads.
- 6.4.5 In such cases also, the provision of logistics, transportation, food and other logistical support to the HSE personnel shall be in the scope of contractor in addition to the salary
- 6.4.6 Contractor shall ensure physical availability of safety personnel at the place of specific work locations. 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.
- 6.4.7 The Contractor shall prepare an updated organization chart identifying the areas of operations, responsibilities and reporting structure of all safety personnel for each shift and submit the same to BHEL.
- 6.4.8 Blood Alcohol test must be performed regularly/ daily basis by contractor Employee/ designated worker to ensure safe working environment at project site. In case of any employees or workers observed that they consume alcohol/narcotics, same are not allowed at project site for the day. Each contractor should maintain 'breath analyzer' / Alcohol Detector to determine the intoxicated workers at site.
- 6.4.9 Any worker found misbehaving, using abusive language, or engaging in physical altercation with fellow workers, BHEL staff, customer representatives, or any site personnel shall be liable for immediate removal from the site. Such action will be taken at the sole discretion of BHEL.
- 6.4.10 The deployment of HSE personnel shall be part of payment terms

7. HSE PLANING BY CONTRACTOR

7.1 PROVISION OF PERSONAL PROTECTIVE Equipment's (PPE's) - This clause is Supplement to HSEP14 Rev. 02, Section B, Clause 9 & its sub-clauses.

7.1.1 The agency should ensure sufficient inventory of personal protective equipment (PPEs) prior to initial mobilization. After identifying the need of the required PPEs for various activities performed at the site, an additional inventory of approx. 20% of required PPEs should be maintaining during the execution of the work. A PPE plan shall be prepared which gives fair idea regarding issue of PPEs to various personnel. **If sub agency fails to provide the PPEs to worker the same may be issued by BHEL and cost for the PPEs debited to the Sub agency from regular RA Bill. Overhead charges applicable as per contract.**

7.1.2 The following matrix recommends the minimum Job specific PPE's along with mandatory PPEs (Safety Helmet, Safety Shoes, Reflective Jacket, Safety Goggles, and Safety Gloves) required for each respective job. However, this is not exhaustive; the BHEL HSE officer may also guide the agency on appropriate PPEs."

S. No	Type of work	Job Specific PPEs
1	Concrete and asphalt mixing	Nose mask, hand glove, apron and gum boot
2	Welders/Grinders/Gas cutters	Welding/face screen attached with safety helmet, apron, hand gloves, nose mask and ear muffs if noise level exceeds 90dB.
3	Stone/ concrete breakers	Ear muffs, safety goggles, hand gloves
4	Electrical Work	Electrical Rubber hand glove, Electrical Resistance shoes, Arc Suit for High Tension Lines
5	Insulation Work	Respiratory mask, Hand gloves, safety goggles
6	Work at height	Double lanyard full body harness, Safety Harness/ Fall arrestor (specific cases), Retractable fall arrestor.
7	Grit/Sand blasting	Blast suit, blast helmet, respirator, leather gloves
8	Painting	Plastic gloves, Respirators (particularly for spray painting)
9	Radiography	As per BARC guidelines
10	Each contractor should maintain "breath analyser" expected at the worksite if required.	

7.1.3 At least two breathing apparatus sets (complying requirement as per IS: 10245) shall be provided at each site where excavation/tunneling works and Welding/ Cutting operations in confined areas are being carried out, to rescue the victims under exposure to harmful gases/vapors, if any.

7.1.4 Eye Protection: - the contractor shall provide suitable personal protective equipment to his workmen depending upon the nature of hazards and ensure their usage by the workers engaged in operations like welding, cutting, chipping, grinding or similar operations which may cause injuries to his eyes.

7.1.5 Safety PPE's, Equipment and Devices etc. shall be ensured as per Annexure - 1. However, it is not limited to Annexure - 1, contractor must comply for PPE's as per construction activities or instruction from BHEL.

Note: The quantities mentioned in Annexure-1 represent the total requirement for the entire project as per the customer contract. However, separate annexures/documents will be issued by BHEL Site from time to time, as the workforce increases throughout the contract period. The PPE quantity annexure/document issued by the BHEL site shall be considered final and the agency must comply with it during the execution of work.

7.2 MEDICAL CENTRE WITH FIRST AID FACILITY AND AMBULANCE (As per Schedule V, X and XI of BOCW central Rules, 1998) – This clause is Supplement to HSEP14 Rev. 02, including Section A, Clauses 1 and 2 along with their respective sub-clauses; Section B, Clause 10.5 and its sub-clauses; and Annexure A – Medical Centre & Ambulance.

7.2.1 Medical Centre/ Medical facilities, Medical officer, Ambulance with 24 hrs. First Aid Trained Driver (Spec. / mention in Annexure - A), Nursing staff & Medical consumable etc. (Spec. / mention in Annexure - A) will be centrally arranged by BHEL on cost sharing model basis (i.e. expense for this will be apportioned among all the working contractors proportionate to their Awarded contract value).

7.2.2 Following Condition shall be prevailing before start of work.

- i. Ambulance as required will be centrally arranged by BHEL on cost sharing model basis & shall be used by all contractors as & when required. Ambulance with proper equipment for prompt transportation of the injured persons to a physician or a hospital shall be available at work place. (i.e. The expense for this will be apportioned among all the working contractor's proportionate to their Awarded contract value).
- ii. BHEL will deploy full time construction medical officer as per BOCW (qualification as per Schedule XI of BOCW Central Rules -1998) on cost sharing model basis. One additional construction medical officer if required as per BOCW, for providing adequate medical treatment by qualified medical officers and nursing staff, as and when required.

Note: Medical officer will be centrally arranged by BHEL on cost sharing model basis & shall be used by all contractors. (i.e. The expense for this will be apportioned among all the working contractors proportionate to their Awarded contract value).

- iii. Additional staff including one nurse, one dresser-cum compounder, one sweeper-cum-ward boy with each construction medical officer for full working hours shall be arranged by BHEL on cost sharing model basis and distributed to all working contractor proportionate to their Awarded contract value.

- iv. The Telephone nos. of Medical officer, Hospital(s) or ambulance shall also be conspicuously displayed at each work place/ site and Medical Centre.
 - v. In addition to Medical Centre with first aid Amenities & ambulance Hiring by BHEL, All contractor must ensure first aid Box as approved by medical officer shall be provided at accessible points nearby construction activity area in the ratio of at least one first aid box for every 50 employees/ workers.
- 7.2.3 Medical waste shall be disposed as per prevailing legislation (Bio-Medical Waste – Management and Handling Rules, 1998)
- 7.2.4 All the Contractor shall be liable to arrange and pay for the expenses towards the medical treatment in respect of all labour employed by him for the execution of the Contract.
- 7.3 FIRST AIDER - This clause is Supplement to HSEP14 Rev. 02, including Section A, Clauses 1 and 2 along with their respective sub-clauses; Section B, Clause 10.5.2**
- 7.3.1 In addition to Clause 7.2 sub clause 1, sub clause 2 & sub clause 3 being arranged by BHEL on behalf of all contractor on sharing basis and in addition to this all Contractor has to arrange one trained and certified first aider for every twenty workers in each shift. To ensure compliance of first aider, list of first aider along with gate pass / identification no. shall be submitted every month to HSE Officer for his Clearance before RA bill processing. List of First aider must be displayed at Medical Centre.
- 7.3.2 Ensure availability of Qualified First aider throughout the working hours.
- 7.3.3 Every injury shall be treated, recorded and reported.
- 7.3.4 The First Aider should have under gone through valid certification course and have valid certificate.
- 7.3.5 The First Aider shall refer any victim to doctor or any other medical facilities for further treatment if necessary.
- 7.3.6 Refresher course on first aid shall be conducted as necessary.
- 7.3.7 List of Qualified first aiders and their contact numbers should be displayed at conspicuous places.
- 7.3.8 The first aider along with first aid box should be available at a point nearest to the work location wherein majority of the workers are working.

7.4 CONFINED SPACE ENTRY (CONTRACTOR TO HAVE OXIMETER AND TOXIC GAS METER) [This clause is Supplement to HSEP14 Rev. 02.](#)

A hazard assessment must be completed prior to any entry into a confined space (as defined in IS-17296:2020). The hazard assessment must identify the sequence of work to be performed in the confined space, the specific hazards known or anticipated, and the control measures to be implemented to eliminate or reduce each of the hazards to an acceptable level. Entry only permitted until the hazard assessment has been reviewed and discussed by all persons engaged in the activity. Personnel who enter confined spaces must be trained per role e.g. entrant (worker), confined space supervisor & attendant, and must be informed of known or potential hazards associated with the confined spaces to be entered. Number of persons entering shall be kept at minimum. All confined spaces must be inventoried at site and kept on file. Confined spaces must be posted at the entrance with similar type wording "DANGER – Do Not Enter – Confined Space – Permit required".



- 7.5 The Contractor shall ensure that scaffolding is **designed by a competent person**, specifically a Certified Scaffolder. Furthermore, all Construction activity i.e. erection, excavation, or height work etc. activities related to uses of scaffolding must be carried out under the expert supervision of a Certified Scaffolder to maintain safety and compliance. It is to be noted that BHEL Site will inform or intimate the Contractor regarding the deployment of a Certified Scaffolder, as and when required, depending on the nature of work being executed at the site.
- 7.6 The Contractor shall ensure that rigging activities are carried out by a **competent person, specifically a Certified Rigger**. Furthermore, all construction activities involving rigging — such as lifting, shifting, or handling of heavy equipment and materials — must be executed under the expert supervision of a Certified Rigger to maintain safety and compliance. It is to be noted that BHEL Site will inform or intimate the Contractor regarding the deployment of a Certified Rigger, as and when required, depending on the nature of work being executed at the site.

8. HSE TRAINING AND AWARENESS

8.1 HSE INDUCTION TRAINING: This clause is Supplement to HSEP14 Rev. 02, including Section B, Clause 11 (HSE Training & awareness)

- 8.1.1 Each worker deployed by the agency shall be given 2-days induction training which shall include the medical examination and instructions related particular, firefighting, first aid and reporting of accidents. All employees shall be given safety training as per BOCW Act/Rules.
- 8.1.2 One safety trainer is to be deployed by contractor/ agency, where total number of workers exceeds 200 nos workers.

8.2 SAFETY MESSAGE PROPAGATION: This clause is Supplement to HSEP14 Rev. 02, including Section B, Clause 11.8 (HSE Promotion, Signage, Posters, Competition, Awards, Etc.)

- 8.2.1 Minimum one safety message board/hoarding of appropriate size for every 10 workers to be provided and maintained by the concerned agency.
- 8.2.2 Safety suggestion boxes shall be kept at each contractor's office at site for obtaining safety suggestions from the workers. Best suggestions should be implemented and may be rewarded suitably to encourage the workers for safety.

9. HSE COMMUNICATION AND PARTICIPATION

9.1 **REPORTING AND INVESTIGATION OF ACCIDENTS AND DANGEROUS OCCURRENCES:** **This clause is Supplement to HSEP14 Rev. 02, Section B, Clause 12 and their sub clause (HSE COMMUNICATION & PARTICIPATION).**

9.1.1 Reporting of accidents: Notice of any accident (the prescribed format is annexed to the manual) to a worker at the building or construction site that

a.	Causes loss of life; or
b.	Disables a worker from working for a period of 48 hours or more immediately following the accident; Shall forthwith be sent by Telegram, Telephone, Fax, Email or similar other means including special Telephone/ Messenger within four hours in case of fatal accidents and 72 hours in case of other accidents, besides the Engineer-in-charge, to i. The Regional Labour Commissioner (Central); ii. The Board with which the worker involved was registered as a beneficiary; iii. Director General of Building and other construction (regulation of employment and conditions of service) Act/Rules; and iv. The next of kin or other relative of the worker involved in the accident;

9.1.2 Further, notice of accident shall be sent in respect of an accident which

a.	Causes loss of life; or
b.	a. Disables the injured worker from work for more than 10 days to i. The Officer-in-charge of the nearest Police Station; ii. The District Magistrate or, if the District Magistrate by order so desires, to iii. The Sub-Divisional Magistrate;

9.1.3 Where any accident causing disablement that subsequently results in death, notice thereof in writing of such death, shall be sent the Authorities mentioned above within 48 hours of such death.

9.1.4 In case of an accident causing minor injury, first aid shall be administered and that resulting in disability of 48 hours or more, the injured worker shall be given first aid and immediately transferred to a Hospital or other place for medical treatment.

9.1.5 All near-miss accidents shall be reported to BHEL Engineer and Safety Officer as per prescribed format.

9.1.6 Reporting of dangerous occurrences: The following classes of dangerous occurrences shall be reported to the Inspector having jurisdiction, whether or not any disablement or death caused to the worker, namely:

- i. Collapse or failure of lifting appliances, or hoist, or conveyors, or similar equipment for handling of building or construction material or breakage or failure of rope, chain or loose gears; or overturning of cranes used in construction work;
- ii. Falling of objects from height;
- iii. Collapse or subsidence of soil, any wall, floor, gallery, roof or any other part of any structure, platform, staging, scaffolding or means of access including formwork;
- iv. Contract work, excavation, collapse of transmission;
- v. Explosion of receiver or vessel used for storage at a pressure than atmospheric pressure, of any gases or any liquid or solid used as building material;
- vi. Fire and explosion causing damage to any place on construction site where building workers are employed;
- vii. Spillage or leakage of any hazardous substance and damage to their container;
- viii. Collapse, capsizing, toppling or collision of transport equipment;
- ix. Leakage or release of harmful toxic gases at the construction site;
- x. In case of failure of a lifting appliance, loose gear, hoist or building and other construction work, machinery and transport equipment at a construction site, such appliances, gear, hoist, machinery or equipment and the site of such occurrence shall, as far as practicable, be kept undisturbed until inspected by the Authorities;

9.1.7 Every notice given for fatal accidents shall be followed by a written report to the concerned Statutory Authorities and the Engineer In-charge in the specified Form annexed as Schedule, under acknowledgement.

9.1.8 Incident / injury statistics shall be maintained by all agencies cause wise.

9.1.9 Investigation of accidents and dangerous occurrences

9.1.10 Besides reporting, it shall be the responsibility of the contractor to constitute a team (members as per the gravity of the incident) of responsible person to thoroughly investigate all incidents involving near-miss accidents, lost- time and reportable accidents and dangerous occurrences with a view to finding out the causative factor, taking remedial measures and fixing responsibility, and make a copy of the investigation report along with action- plan, specifying a definite time-frame for implementation of the findings, available to the Engineer in-charge forthwith.

9.2 HSE COMMUNICATION This clause is Supplement to HSEP14 Rev. 02, Section B, Clause 12 & their sub clause (HSE COMMUNICATION & PARTICIPATION).

9.2.1 MONTHLY & WEEKLY HSE REPORTING

A	HSE information of Site shall be reported monthly and weekly through Monthly/ Weekly Site HSE report (MSHR) as per format no. (HSEP07 F01).
B	Weekly, Monthly safety meeting conducted by BHEL/Customer are to be attended compulsorily by site in charge, senior area engineers, safety officers.
C	In case Site-In-charge is not available on meeting day, next in command has to attend meetings.
D	Preparation of MSHR shall be done as per" Guidelines for filling up Monthly HSE report"
E	The period of reporting shall be 25th of the preceding month to 24th of the present month and shall be submitted to Regional HQ by the end of the calendar month.
F	The following documents and reports are to be maintained at site and submitted to BHEL site on monthly basis. • HSE induction sign in roster • Pre-employment Health Record Form HSEP 13 F02. • HSE Inspections and audit reports • Environmental monitoring documentation • Method Statements and JSA • Training records • HSE corrective action tracking sheets • 3rd party inspection report of crane, lifting tools & tackles • PPE inspections • First report of incident • Incident investigation reports • Chemical inventory documentation • MSDS of chemicals • PTW and separate permits of critical activities • Vehicle and equipment inspections • Toolbox talk & Pre-job briefings • Safety statistics monthly • Noise monitoring reports • Written safety violations • HSE committee and another MOM • HSE Plan & Emergency Plan • Weekly & Monthly HSE report BHEL Site Office or Headquarters may request additional documents or reports not listed above, as and when required, for audit, review, or compliance purposes.

10.SAFETY DURING WORK EXECUTION and T&Ps

10.1 PRECAUTIONS AGAINST THE FALL OF MATERIALS AND PERSONS AND COLLAPSE OF STRUCTURE: - [This clause is Supplement to HSEP14 Rev. 02.](#)

10.1.1 Use of retractable fall arrestor (as Second Line of Protection) to be ensured in critical/ tricky areas.

10.1.2 Safety Net as per IS: 11057:1984 should be used extensively for prevention/ arrest of men and materials falling from height. The safety nets shall be fire resistant, duly tested and shall be of ISI marked and the nets shall be located as per site requirements to arrest or to reduce the consequences of a possible fall of persons working at different.

10.1.3 Reaching beyond barricaded area without lifeline support, moving with support of bracings, walking on beams without support, jumping from one level to another, throwing objects and taking shortcut must be discouraged.

10.1.4 Use of Rebar steel for making Jhoola and monkey-ladder (Rods welded to vertical or inclined structural members), temporary platform etc. must be avoided. Jhoola should be made with angles and flats and tested like any lifting tools before use.

10.1.5 Monkey Ladder should be properly made and fitted with cages.

10.1.6 Lanyard must be anchored always and in case of double lanyard, each should be anchored separately.

10.1.7 In case of pipe-rack, persons should not walk on pipes and walk on platforms only.

10.1.8 In case of roof work, walking ladder/ platform should be provided along with lifeline and/ or fall arrestor.

10.1.9 Empty drums must not be used.

10.1.10 For chimney or structure painting, both hanging platform and men should be anchored separately to a firm structure (if available) along with separate fall arrestor. Rope ladder should be discouraged.

10.1.11 Ensure the maximum driving speed at site is 15 km/h.

10.2 NIGHT SHIFT WORK EXECUTION / ACTIVITY **This clause is Supplement to HSEP14 Rev. 02**

Night-shift operations, as well as any complex or heavy tasks, should be avoided as far as practicable. If such work becomes necessary, prior administrative approval shall be obtained from BHEL, and a detailed work plan shall be prepared. The following requirements shall be ensured.

10.2.1 Adequate illumination along access, work area and egress Supervision.

10.2.2 Issue of strict instruction to workmen not to stray away from the work area & earmarked approach.

10.2.3 Non-deployment of women workforce.

10.2.4 Non-deployment of fatigued workforce.

10.2.5 Vacating the area immediately on completion of the job

10.2.6 Informing Medical Centre and ambulance in advance

10.3 EMERGENCY PROVISIONS: **This clause is Supplement to HSEP14 Rev. 02**

- a) Flushing and washing water supplies: Ample supplies of tepid flushing and washing water supplies shall be provided at all possible points of discharge, spillage or escape of chemicals.
- b) Adequate provisions shall be made for emergency treatment of the eyes, comprising eye wash bottles, located conveniently to places where discharge, spillage or escape of chemicals can occur.
- c) Safety shower and eye washer shall be provided near the location of chemical handling place.
- d) Safety shower arrangement shall be provided in close proximity to the Ammonia dosing skid. i.e. Two (2) numbers of safety shower units and two (2) number of Eye-fountains.
- e) A suitable first aid treatment room with outside telephone facilities shall be provided within a reasonable distance of the place where chemicals are being used. Chemicals shall be stored with proper identification and with necessary caution boards.
- f) The protective clothing and apparatus required for emergency use shall be made available also near the acid cleaning area.
- g) If signs of skin irritation occur the persons should be removed from contact and referred for medical opinion/ emergency. In the event of the splashing of the chemical to skin, the affected area should be washed thoroughly avoiding spreading contamination to the face and eyes.
- h) Temperature limitations specified for various steps/ area should not be exceeded wherever applicable.
- i) MSDS Posters & Danger boards sign for chemicals.

10.3.1 100W, 220V incandescent (or equivalent LED) DC Emergency lighting shall be provided as follows: [This clause is Supplement to HSEP14 Rev. 02,](#)

- a) One (1) no. in each local control area
- b) Three (3) nos. in each MCC/ Switchgear room and control room
- c) One (1) no in each office room and each pump house
- d) Six (6) nos. in Track hopper shed
- e) Twelve (12) nos in track hopper tunnels
- f) Two (2) nos in each underground portion of TPs
- g) One (1) no at every 5.0m height interval in the staircases of various TPs and buildings and one no in each drive floor in each TP.

10.4 FIRE SAFETY (i.e. Fire Tender along with firefighting staff etc.) [This clause is Supplement to HSEP14 Rev. 02, Section – B, Clause 11 \(Fire Safety\).](#)

10.4.1 Fire Tender of 5000 Ltr Tank Capacity along with Pressure Pump (proposed 2250 LPM) and firefighting Staff - 02 Nos Driver and 04 Nos Crew for 24 Hrs. Service (1 nos. Driver & 2 nos Crew for 12 hours each) and this fire tender must be equipped with essential firefighting accessories.

10.4.2 Fire tender as required above shall be centrally arranged by BHEL on cost recovery model basis & shall be used by all contractor. Fire tender with complete equipment/ accessories shall be available at site for all the emergency fire condition at site.

10.4.3 Out of pocket expenses or total expenditure for hiring of Fire tender & 2 nos DCPO & 4 nos Firefighting staff/ crew (including fuel cost to run fire tender & fire tender pump, Accommodation, transportation of Firefighting staff etc.) be apportioned among all the working contractor's proportionate to their Awarded Contract value. This expense shall be proportionate deducted from contractor monthly RA bill.

10.4.4 Maintenance of fire tender is in scope of Rate contracting agencies, which is part of Rate contract for Fire tender, however in case of any additional expenses which is to be incurred for maintenance, then same shall apportioned among all the working contractor's proportionate to their Awarded Contract Value. These expenses shall be proportionate deducted from contractor monthly RA bill.

10.4.5 Site-in-charge / Safety Officer will make periodical review of the site Fire Protection, Prevention Preparedness Programme, Site conditions and available fire protection equipment. In addition to deployment of fire tender mention in this document.

10.4.6 Emergency telephone number to be displayed at all conspicuous places.

10.4.7 All the safety requirements recommended in NFPA -2001 or as specified by listing authorities shall be incorporated in the installation by the contractor.

10.5 The Contractor shall abide by the following during Construction and Erection activities:

I	Chain pulley block shall not be used for Holding loads more than 2 (Two) ton.
II	Hydra shall not be used for material transport and any work at site.
III	Cage shall necessarily be used to Monkey ladders of height more than 4m.
IV	Fencing shall be provided to all Electrical Distribution boards and transformers for safety.

Note – Only Farana is allowed for work at site and BHEL Material Yard etc.

10.6 Any Heavy equipment (crane, Farana, winch machine, etc.) manufactured less than **15 years** from the current year shall be only allowed to be used at our project Site's. Pre-safety Inspection of the equipment by safety depts. shall be done before mobilizing the equipment at our project site.

ANNEXURE – 1

This clause is Supplement to HSEP14 Rev. 02

LIST OF SAFETY EQUIPMENT'S & SAFETY PERSONAL PROTECTIVE EQUIPMENT'S

The list of minimum suggestive Safety Equipment's & Safety Personal Protective Equipment's to be deployed necessarily by the Contractor is furnished below. However, the actual deployment at site shall not be limited to these and additional equipment's if required shall be mobilized by the contractor. Safety Gadgets, Equipment and Measurement Devices to be ensured in total throughout the duration of the project.

Safety equipment's & Tools cannot be envisaged at the tendering stage for execution of contract without considering the nature and size of contract. It should be planned on monthly basis in line of Form 14 like manpower and resource planning.

Sl. No.	Minimum Suggested List of Safety Equipment's and Safety Personal Protective Equipment's	Minimum Quantity
1	Safety Net (Conforming IS 11057:1984) Safety Net (Net Size: 10m x 5m, Mesh Size: 25 mm, Mesh Rope: 2mm double cord, Border/Tie Cord: 12mm diameter polypropylene rope (tested as per IS: 5175). Two meters length shall be provided at all four corners.	240 Nos.
2	Fall Arrester 'Rope grab fall arrester' & anchorage line. Anchorage Line: 14mm- 16 mm diameter, three strand twisted Polyamide rope. Rope Grab fall arrester: Openable & Guided type Fall Arrestor (on flexible line) conforming EN 353-2 & works on 14-16 mm diameter polyamide rope. material: Nickel Chrome plated Steel Connector: Karbiner conforming to EN 362 (Minimum Strength 22 KN), material: Steel	200 nos. of Rope Grab Fall arrester and Karbiner each. 90 nos. anchorage line, 30-meter long each, 30 nos. anchorage line, 40 meter long each
3	Horizontal life line Stainless Steel Wire rope of 8mm diameter. Minimum six nos. of steel U-bolt clips are required for clamping each wire rope to a rigid support (03 nos. of U-bolt clips at each end).	40 nos. of wire rope, each 40 meter long 90 nos. of wire rope, each 25 meter long.
4	Ladders on column The minimum design live load on metallic ladder shall be a single concentrated load of 100 kilo grams. All rungs shall have a minimum diameter of 1.90 centimeters, and minimum clear length of rungs shall be 40.6 centimeters. The distance between rungs shall not exceed 30.5 centimeters. Each ladder shall have maximum height of 9.0 meter. The ladder shall have proper fastenings for attaching it to a column using positive means such as bolt, weld or other type of fasteners.	cumulative length of ladders is 1200 meters
5	Safety PPEs (Industrial Safety helmet & Industrial Safety Shoes) Industrial Safety Helmet (IS:2925-1984 marked). Industrial Safety/Electrical Shoes (IS:15298-2002 marked). Full body Safety Harness (conforming IS:3521)	1575 nos. 1575 nos. 395 nos.

Note

- a. Above mention quantity is for whole project as per customer contract, however separate annexure/ document will be issued to each contractor at the time of execution of work by Safety officer BHEL with approval of construction manager/ GM/ PD. PPEs Quantity annexure/ document issued by BHEL site will be final and agency must fulfill the same during execution of work. It should be planned on monthly basis in line of form 14 like manpower and resource planning.
- B. Other materials like cables, sling, gloves, goggles, safety belts, safety helmets, heating oven, pre-heating / post weld heat treatment arrangement, material for making platform and platform support etc. shall be mobilized as per requirement.
- C. Other equipment though required for the timely completion of the job but not listed above shall be deployed by the contractor, as per the job requirements and as directed by the HSE Engineer/ BHEL Official.
- D. The contractor shall make suitable provisions for repairs and maintenance of the equipment mobilized and always keep them in good working conditions, as the repair facilities for such equipment are not available at the project site.
- E. The quantities mentioned in Annexure–1 represent the minimum requirements and are subject to increase based on site-specific needs, agencies workforce strength, and the nature of work.

ANNEXURE - 1 Cont.

[This clause is Supplement to HSEP14 Rev. 02](#)

List of Safety Equipment's & safety Personal Protective Equipment's mention in this table are, the list of minimum suggestive Safety Equipment's & Safety Personal Protective Equipment's. However, all the Safety Equipment's & Safety Personal Protective Equipment's to be deployed necessarily by the Contractor wherever required or as per instruction from BHEL HSE officer/ construction manager.

The actual deployment at site shall not be limited to these and additional equipment's if required shall be mobilized by the contractor. Safety Gadgets, Equipment and Measurement Devices to be ensured in total throughout the duration of the project.

Safety Gadgets & Equipment			
	Name	Quantity	Unit
1	Lifelines-steel wire rope min 8mm insulated (Length-100mtr)		
2	Retractable fall arrestors		
3	Safety nets (10m X 5m) or (10mX10m) or (15m X 15 m) etc.		
4	Sky climbers		
5	Fire blanket (5mX 5m)		
6	Honey Bee Removal Suit & Kit		
7	Flashback arrestors		
8	Barricading Tape (100mX 100 nos)		
9	Binoculars		
10	Walkie-Talkies		
11	LOTO kit		
12	24-Volt light		
13	Sand Buckets		
14	Hard barricading		
15	ELCB for welding machine & winches		
16	Fire extinguishers		
17	First aid box covering medicines as per BOCW		
18	Temporary platform material (grating)		
19	Small size u clamps to tie life lines		
20	Vertical lifeline (16mm polyamide rope with fire resistant)		
21	Rescue harness		
22	Mini fogging machine		
23	Gas Welding Igniter		
24	Toe boards (height-150mm)		
25	Portable Aluminum ladder (Length- 3mtrX400mm)		
26	Eye/ Hand Wash Station		
27	Whistle		
28	Sintex plastic water tank-1000L		
29	Earth pits each electrical per panel & connected load		
30	Electrical shed covered for keeping welding machine and electrical panels		
31	Earth flat (Aluminum) (50mmX 400 m) for earthling		
32	Gas cylinder trolley for gas cutting sets.		
33	Sheds for segregating filled and unfilled gas cylinders		

34	100 W LED & its fixture/cable		
35	250 W LED & its fixture/cable		
36	Painting safety kit		
37	Double lanyard full body harness with shock absorber		
38	Multi-purpose Ladder		
39	Urinal provision		
40	As per requirement		
41	Tool carrying bags		
42	Bigger sized Bins for floor for scrap collection		
43	Ladder clamps for beam type of columns		
44	Ladder clamps for box type of columns (with stoppers where inclined or vertical boxes)		
45	Helmet torches		
46	Torches with good capacity		
47	Mobile Tower ladder with platform provision for hopper cavity 350x350		
48	Laser Distance meter		
49	Man Cage for standard wt and with standard wire ropes		
50	Temporary Ladders 3 meters		
51	Exhaust fans		
	Measurement Instruments (All measuring instrument must be calibrated)		
	Name	Quantity	Unit
1	ELCB/RCCB Tester		
2	Multi meter (Light cables)		
3	Electric Tester (to checked low voltage up to 415 V)		
4	Earth Resistance Meter		
5	Lux Meter		
6	Anemometer		
7	Breath Analyzer (Alcohol)		
8	Multi-gas dozi-meter		
9	Gas leakage detector / alarm		
10	Gas monitor (confined space)		
11	Radiation meter & Badges		
12	Blood Pressure Monitor		
13	Fire detectors		
14	Sound level meter		
15	SCBA (Self-contained breathing apparatus)		
16	Siren		
17	Public address system		
18	Emergency lamp – (rechargeable)		
19	Oxygen Meter (while working in confined space etc)		

ANNEXURE – 2

This clause is Supplement to HSEP14 Rev. 02

INDICATIVE LIST OF INDIAN STANDARD CODES FOR SAFETY

S No	CODE NAME	TITLE
PERSONAL PROTECTIVE EQUIPMENT		
(1)	IS : 818-1968 (Reaffirmed 2003)	Code of Practice for safety and health requirements in Electric and Gas Welding and Cutting operations.
(2)	IS: 1179-1967 (Reaffirmed 2003)	Specification for Equipment for Eye & Face protection during welding.
(3)	IS : 1989 (Part 2):1986 (Reaffirmed 1997) IS: 5557-1969	Specification for Leather Safety Boots & Shoes Industrial & Safety Rubber Knee Boot
(4)	IS: 4770 : 1991 (Reaffirmed 2006)	Rubber Gloves – Electricals Purposes-Specification
(5)	IS:8519 – 1977 (Reaffirmed 1983)	Guide for Selection of Industrial Safety Equipment for Body Protection.
(6)	IS:8520 – 1977 (Reaffirmed 2002)	Guide for Selection of Industrial Safety Equipment for Eye, Face and Ear Protection.
(7)	IS: 8807-1978	Code of practice for maintenance and care of industrial safety equipment eye and face protection
(8)	IS: 1224-1985	Safety shoes
(9)	IS: 8940-1978	Code of practice for maintenance and care of industrial safety equipment eye and face protection
(10)	IS: 8990-1978	Code of practice for maintenance and care of industrial safety clothing
(11)	IS: 10667-1983	Guide for selection of industrial safety for protection of foot and leg
(12)	IS: 816-1969	Code of practice for safety and health requirements in electric and gas welding and cutting operations
(13)	IS: 7194-1994	Assessment of noise exposure during work for hearing conservation purposes
(14)	IS: 2925 – 1984 (Reaffirmed 2010)	Specification for Industrial Safety Helmets
(15)	IS: 3521 : 1999 (Reaffirmed 2002)	Industrial Safety Belts & Harnesses-Specification
(16)	IS: 14166:1994 (Reaffirmed 2002)	Respiratory Protective Devices-Full Face Masks Specification
(17)	IS: 14746 : 1999 (Reaffirmed 2003)	Respiratory Protective Devices-Half Masks and Quarter Masks - Specification
CIVIL ENGINEERING OR CONSTRUCTION WORK		
(18)	IS: 2750- 1967(Part II)	Steel scaffolds
(19)	IS: 875-1987	Structural safety of building: loading standards
(20)	IS: 4014-1967	Code of practice for steel tubular scaffolding
(21)	IS: 3646(Part II) – 1966(Reaffirmed 2003)	Code of Practice for Interior Illumination
(22)	IS:3696 (Part I) – 1987 (Reaffirmed 2002)	Safety Code for Scaffolds and Ladders

(23)	IS: 4138-1977	Safety code for working in compressed air
(24)	IS: 7293-1974	Safety code for working with construction machinery
(25)	IS: 9944-1992	Recommendations on safe working load for natural andman-made rope slings
(26)	IS: 3696(Part 2) : 1991 (Reaffirmed 2002)	Scaffolds and Ladders-Code of Safety
(27)	IS:3786 – 1983 (Reaffirmed 2002)	Method for Computation of Frequency and Severity Ratesfor Industrial Injuries and Classification of Industrial Incidents
(28)	IS: 4912 : 1978 (Reaffirmed 2002)	Safety Requirements for Floor and Wall Openings, Railings and Toe Boards
(29)	IS: 5983 – 1980 (Reaffirmed 2002)	Specification for Eye-Protectors
(30)	IS:6519 – 1971 (Reaffirmed 1997)	Code of Practice for Selection, Care and Repair of Safety Footwear
(31)	IS:9167:1979	Specification for Ear-Protectors
(32)	IS:6994(Part I)-1973 (Re affirmed 1996)	Specification for Industrial Safety Gloves Leather and Cotton Gloves
(33)	IS 11006 : 2011	Flash Back (Flame Arrestor) Specification
(34)	IS:9473:2002	Respiratory Protective Devices-Filtering Half Masks to protect Against Particles-Specification.
(35)	IS: 9944:1992 (Reaffirmed 2003)	Natural and Man-made Fiber Rope Slings-Recommendations On Safe working loads.
(36)	IS:11057 – 1884 (Reaffirmed 2001)	Specification for Industrial Safety Nets
(37)	IS: 12254:1993 (Reaffirmed 2002)	Polyvinyl Chloride (PVC) Industrial Boots-Specification
(38)	BS:1129	Portable timber ladders, steps, Trestles & lightweight staging
(39)	BS:1139	Metal scaffolds
(40)	BS:5973	Code of practice for access & working scaffolds
(41)	BS:5974	Code of practice for temporary installed scaffolds andaccess equipment
(42)	BS:5975	Code of practice for false work
FIRE PROTECTION		
(43)	IS: 2193-1992	Code of practice for selection, installation and maintenanceof portable first aid fire extinguishers
(44)	IS: 5896	Code of practice for selection, operation and maintenance offire-fighting appliances
(45)	IS: 8433-1984	Code of practice for dissolved acetylene cylinders
(46)	IS : 15397 :2003 (Reaffirmed 2008)	Portable Extinguisher Mechanical Foam Type(Stored Pressure)-Specification
ELECTRICAL		
(47)	IS: 3043-1987	Code of practice for earthing
(48)	IS: 5424-1969	Rubber mats for electrical purposes
(49)	IS: 3646 (Part II)	Artificial lightings
(50)	IS: 2148 & IS: 2206	Flame proof electrical fittings Machinery
MACHINERY		

(51)	IS:13367(Part 1):1992 (Reaffirmed 20030	Safe Use of Cranes-Code of Practice
(52)	IS: 1860-1980	Code of practice for installation, operation and maintenance of electric passenger and goods lifts
(53)	IS: 1991-1987	Safety requirements for the use, care and protection of abrasive grinding wheels
(54)	IS: 5903-1970	Safety devices for gas cylinders
(55)	IS: 8216-1976	Guide for inspection of lift wire ropes
(56)	IS: 8964-978	Recommendations for safety conditions for woodworking machines
(57)	IS: 9474-1980	Principles of mechanical guarding of machinery
(58)	IS: 11461- 1985	Code of practice for compressors safety
(59)	IS: 19311:2002	Guidelines for Quality and/or Environmental Management Systems Auditing
(60)	IS: 13367-1992	Code of practice for safe use of cranes
(61)	IS:1641	Code of practice for fire safety of buildings – General principles of fire grading and classification.
(62)	IS:1642	Code of practice for fire safety of buildings - Details of construction.
(63)	IS:4081	IS:4081 Safety code for blasting and related drilling operations.
(64)	IS:4130	Demolition of buildings - code of safety.
(65)	IS:5121	Safety code for piling and other deep foundations.
(66)	IS:5916	Safety code for construction involving use of hot bituminous materials
(67)	IS:7205	Safety code for erection of structural steel work.
(68)	IS:7969 (Indian Explosives Act 1940)	Safety code for handling and storage of building materials. (As updated)
(69)	IS:11769	Guidelines for safe use of products containing asbestos

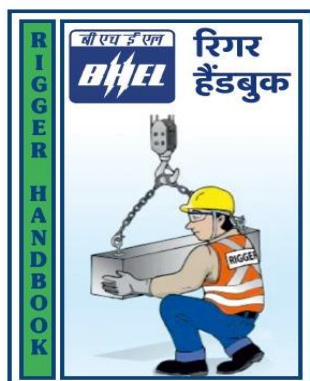
CODES & STANDARDS

This clause is Supplement to HSEP14 Rev. 02

In addition to the codes and standards specifically mentioned in the relevant technical specifications for the equipment / plant / system, all equipment parts, systems and works covered under this specification shall comply with all currently applicable statutory regulations and safety codes of the Republic of India as well as of the locality where they will be installed, including the following:

A	Indian Electricity Act
B	Indian Electricity Rules
C	Indian Explosives Act
D	Indian Factories Act and State Factories Act
E	Indian Boiler Regulations (IBR)
F	Regulations of the Central Pollution Control Board, India
G	Regulations of the Ministry of Environment & Forest (MoEF), Government of India
H	Pollution Control Regulations of Department of Environment, Government of India
I	State Pollution Control Board.
J	Rules for Electrical installation by Tariff Advisory Committee (TAC).
K	Building and other construction workers (Regulation of Employment and Conditions of services) Act, 1996 / New OHS & WC Code-2025.
L	Building and other construction workers (Regulation of Employment and Conditions of services) Central Rules, 1998 / New OHS & WC Code-2025.
M	Explosive Rules, 1983
N	Petroleum Act, 1984
O	Petroleum Rules, 1976
P	Gas Cylinder Rules, 1981
Q	Static and Mobile Pressure Vessels (Unified) Rules, 1981
R	Workmen's Compensation Act, 1923 / New Labor code 2025
S	Workmen's Compensation Rules, 1924 / New Labor code 2025
T	Any other statutory codes / standards / regulations, as may be applicable.
U	Employer's Safety Rules for Construction and Erection
V	Employer's Safety Policy
W	CERC (Indian Electricity Grid Code) Regulations, 2023
X	CEA (Flexible Operation of Coal Based Thermal Power Generating Units) Regulations, 2023
Y	Any other statutory codes / standards / regulations, as may be applicable.

ANNEXURE - 3



एक रिगर क्या है?

- भारो को लाने और उतारने के चयन या निरीक्षण सहित, किसी भार को सुरक्षित रूप से उठाने के लिए तकनीकों का उपयोग करने वाले व्यक्ति को रिगर कहते हैं।

एक योग्य रिगर को पता होना चाहिए कि कैसे...

- विभिन्न प्रकार की रस्सियों, स्लिंग्स, जंजीरों और सहायक उपकरणों का उपयोग करें।
- उठाने के लिए उपयोग की जाने वाली किसी भी रस्सी, स्लिंग या चैन के सुरक्षित कार्य भार (एसडब्ल्यूएल) की गणना करें।
- भार उठाने के लिए भार का आकलन करें।
- उपयुक्त सुरक्षित स्लिंगिंग तकनीकों का चयन करें और उनका उपयोग करें।
- विभिन्न भारों और आकारों के सुरक्षित रूप से स्लिंग लोड का चयन करें।
- जब लोड (सामान), ऑपरटर की दृष्टि से बाहर होता है तो केन या होइस्ट ऑपरटर को लोड की गति में निर्देशित करें।
- भार को निर्देशित करने के लिए हार्न और सीटी से संकेत दें।
- संभावित जाने वाले कुछ भारों का भार-विवरण ड्रिफ्ट पर मुद्रित किया जा सकता है या किस प्रकार से भार पर अंकित किया जा सकता है।

फ्लैट वेबिंग और राउंड सिंथेटिक स्लिंग्स (Flat webbing and round synthetic slings)

फ्लैट वेबिंग और राउंड सिंथेटिक स्लिंग्स को SWL के साथ लेबल किया जाता है। अगर लेबल गायब है तो भार न उठाएं। मर्यादक और पुनः वेबिंग के लिए निर्माता को स्लिंग लोड करें। सिंथेटिक स्लिंग्स रंग कोडित होते हैं।

लोड या डिलीवरी डॉक पर अंकित भार से सावधान रहें। उदाहरण के लिए इमारती लकड़ी, गीली होने पर 50 प्रतिशत भारी हो सकती है। फाउंड्री में, जब बड़े ढलाई को एक संकेत से उठाया जाता है, तो रेत द्वारा निर्मित स्यूषण (Suction) संजन में काफी बृद्धि कर सकता है। पाइप और टेक अक्सर तल पदार्थ, कीचड़ या अन्य सामग्री द्वारा भारित होते हैं।

स्लिंग के विभिन्न प्रकार

प्रत्यक्ष direct) लोड स्लिंग 2 पैर कि स्लिंग

चोकर हिल गोलाकार भार चोकर हिल (वर्ग) भार

सामान्य नियम (Thumb Rule)

स्लिंग का सेफ वर्किंग लोड (एसडब्ल्यूएल) अधिकतम भार है जिसे स्लिंग सामग्री के एसडब्ल्यूएल, वेबिंग व्यवस्था और स्लिंग निर्माण की विधि पर विचार करने के बाद उठाया जा सकता है।

अ) सबीला इन्पुलर तार रस्सी (FSWR) स्लिंग के लिए SWL नीचे दिये गये सूत्र द्वारा दिया जाता है:-

$$\text{SWL (kg)} = D^2 (\text{mm}) \times 8$$

$$D (\text{mm}) = \sqrt{\text{SWL (kg)} / 8}$$

जहाँ, SWL = सुरक्षित कार्य भार और D = रस्सी व्यास

ब) श्रृंखला (Chain) का SWL ग्रेड (G) द्वारा नीचे दिये गये सूत्र द्वारा दिया जाता है:-

$$\text{SWL (किलो)} = D^2 (\text{मिमी}) \times G \times 0.4$$

जहाँ (I.e.), ग्रेड (G) 80 श्रृंखला, 0.4 का उपयोग करें।

WORKING LOAD LIMIT (W.L.L.) IN TONNES UNDER GENERAL CONDITIONS OF USE

Chain Size (mm)	Grade	Single Leg Slings				Slings of 2, 3 or 4 Leg Slings				
		Straight Sling	Adjustable Sling*	Reeved Sling	Bucket Sling Max 60°	Straight sling 60 degree	Straight sling 90 degree	Straight sling 120 degree	Reeved Sling 60 degree	Bucket Sling Max 60 degree
6	80	1.1	1.1	0.8	1.5	1.9	1.6	1.1	1.5	2.5
8	80	2.0	2.0	1.5	2.6	3.5	2.8	2.0	2.6	4.5
10	80	3.2	3.2	2.4	4.1	5.5	4.5	3.2	4.1	7.2
13	80	5.3	5.3	4.0	6.9	9.2	7.5	5.3	6.9	11.9
16	80	8.0	8.0	6.0	10.4	13.8	11.3	8.0	10.4	18.0
20	80	12.5	12.5	9.4	16.3	21.6	17.5	12.5	16.3	28.1
22	80	15.0	15.0	11.3	19.5	26.0	21.2	15.0	19.5	33.8
26	80	21.2	21.2	15.9	27.6	36.7	29.9	21.2	27.6	47.7
32	80	31.5	31.5	23.6	41.0	54.5	44.4	31.5	41.0	70.9
6	100	1.4	1.4	0.8	1.8	2.4	2.0	1.4	1.8	3.2
8	100	2.5	2.5	1.4	3.3	4.3	3.5	2.5	3.3	5.6
10	100	4.0	4.0	2.3	5.2	6.9	5.6	4.0	5.2	9.0
13	100	6.7	6.7	3.8	8.7	11.6	9.4	6.7	8.7	15.1
16	100	10.0	10.0	5.6	13.0	17.3	14.1	10.0	13.0	22.5
20	100	16.0	16.0	9.0	20.8	27.7	22.6	16.0	20.8	36.0
22	100	19.0	19.0	10.7	24.7	32.9	26.8	19.0	24.7	42.8
26	100	26.5	26.5	14.9	34.5	45.8	37.4	26.5	34.5	59.6
32	100	40.0	40.0	22.5	52.0	69.2	56.4	40.0	52.0	90.0
6	120	2.0	2.0	1.1	2.9	3.8	3.2	2.0	2.9	5.2
8	120	3.5	3.5	2.0	4.9	6.4	5.2	3.5	4.9	8.8
10	120	5.5	5.5	3.0	7.4	9.8	7.9	5.5	7.4	13.3
13	120	8.0	8.0	4.3	10.4	13.8	11.3	8.0	10.4	18.0

* On adjustable slings, some grab shortening hooks may derate the W.L.L. by 25%. Advice should be sought from the mfg. नोट - उपर दिये गये सभी कारक मानक के अनुसार हैं और यह वास्तविक परिस्थिति के अनुसार बदल सकते हैं।

चित्र :- उपयोग की सामान्य परिस्थितियों में टन (1000 किलो) में कार्य भार सीमा

सिंगल स्लिंग

प्रत्यक्ष भार आयताकार भार गोलाकार भार

लोडिंग फैक्टर-1 लोडिंग फैक्टर-0.5 लोडिंग फैक्टर-0.75

बास्केट हिट - सिंगल स्लिंग वदिकल लेस - पैरों के बीच के कोण को शामिल करें

गोलाकार भार आयताकार भार गोलाकार भार गोलाकार भार

लोडिंग फैक्टर-2 लोडिंग फैक्टर-1 लोडिंग फैक्टर-1 लोडिंग फैक्टर-1

अंतहीन स्लिंग

बास्केट हिट गोलाकार भार प्रत्यक्ष भार

लोडिंग फैक्टर-1 लोडिंग फैक्टर-1 लोडिंग फैक्टर-1 लोडिंग फैक्टर-1

वायर रोप स्लिंग चोकर हिट के साथ

Choker Hitch Angle

चोकर हिट कोन न्यूनीकरण चार्ट

चोकर हिट (कोन)	सीमित कारक
120-180	1.00
105-120	0.82
90-105	0.71
60-90	0.58
0-60	0.50

रिगर के हाथों के संकेत

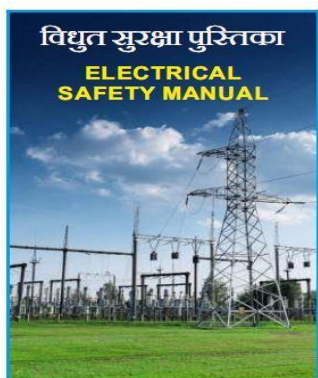
केन की गतिविधियों को निर्दिष्ट करते समय एक रिगर को केन ड्राइवरों को स्पष्ट मौखिक संकेत देना चाहिए। रिगर स्पष्ट रूप से बोले और केन के उस हिस्से का नाम बताएं जिसे पहले ले जाना है - फिर चलने / घूमने की दिशा।

MOTION	HAND SIGNAL	WHISTLE, BELL OR BUZZER SIGNAL
Holding	[Diagram]	2 short **
Raise	[Diagram]	
Luffing boom up	[Diagram]	3 short ***
Luffing boom down	[Diagram]	
Swing right	[Diagram]	1 long, 2 short --
Swing left	[Diagram]	
Hoist-in (telescoping boom extend)	[Diagram]	1 long, 3 short ---
Hoist-out (telescoping boom retract)	[Diagram]	
Travel and traverse	[Diagram]	Not applicable

MOTION	HAND SIGNAL	WHISTLE, BELL OR BUZZER SIGNAL
Holding	[Diagram]	1 long
Lower	[Diagram]	
Luffing boom down	[Diagram]	4 short ----
Luffing boom up	[Diagram]	
Swing left	[Diagram]	1 long, 1 short -
Swing right	[Diagram]	
Hoist-in (telescoping boom extend)	[Diagram]	1 long, 4 short ----
Hoist-out (telescoping boom retract)	[Diagram]	
Stop	[Diagram]	1 short *

क्या करें और क्या न करें

ANNEXURE-4



बिजली क्या है :
बिजली एक किस्म की ऊर्जा है, जो कि संवाहक (कंडक्टर) में धातुनामक व ऋणात्मक बिंदुओं से इलेक्ट्रॉनों के आंदरण से उत्पन्न होती है। बिजली के आवेग के दौरान को विद्युत धारा कहा जाता है, जिसकी तीव्रता सामान्यतः एम्पीयर में मापी जाती है। विद्युत धारा या तो डिस्ट धारा (Direct Current) होती है या फिर प्रत्यावर्ती धारा (Alternate Current) वोल्टेज विद्युतीय शक्ति (विभव शक्ति प्रति युनिट चार्ज) होती है, जिसके कारण सर्किट में धारा प्रवाहित होती है। इसे प्रति कुलंब जूल (वोल्ट) में मापा जाता है।

बिजली के खतरे :-

- 1) **बिजली का झटका** एक खतरनाक स्थिति होती है, जिसमें बिजली की लंबी तारों / पुंजों के सम्पर्क से, ऊर्जा का संचालित अस्वजन होता है।
- 2) **शॉर्ट सर्किट** बिजली के किसी सर्किट के अलग-अलग वोल्टेज के दो बिंदुओं के बीच असामान्य संपर्क के कारण होता है।
- 3) **ज्वलन (फ़्लेमिंग)** का खतरा एक ऐसी स्थिति

होती है, जो विद्युत वाप (आर्क) के कारण ऊर्जा के अस्वजन से उत्पन्न होती है।

- 4) **ओवरवोल्टेज** एक ऐसी स्थिति होती है, जिसमें बिजली की तार या सर्किट पर उसकी क्षमता से ज्यादा एम्पीयर लोड डाला जाता है।
- 5) **अधिक वोल्टता** तब होती है, जब किसी सर्किट या उसके पुंज में वोल्टता, उसकी अधिकतम डिज़ाइन सीमा को लांघ लेती है।
- 6) **ऊपरी लाईन के खतरे** से तात्पर्य है जमीन से ऊपर खुली दवा में लटकती बिजली की ट्रांसमिशन लाइन।

बिजली के झटके (शॉक) को रोकने के लिए सावधानियाँ :

- 1) **इन्सुलेशन निरीक्षण** :- बिजली के उपकरण, झटके (शॉक) से बचाने के लिए इन्सुलेट बनाते हैं। कमजोर इन्सुलेशन से झटके (शॉक) को रोकने के लिए, रोजमर्रा के उपयोग में बिजली के तार और कनेक्शन का ठीक से निरीक्षण करें। सुनिश्चित करें कि प्रत्येक विद्युत कनेक्शन में संपर्क प्रदान किया गया है।
- 2) **केवल एमपीसी/ईएलसी/आरसीसी का उपयोग करें** :- बिजली के झटके से संबंधित घोटों को कम करने के लिए यह सुनिश्चित करें कि एमपीसी/ईएलसी/आरसीसी का मुख्य जंक्शन बॉक्स में उपयोग किया जाता है और ओएसएच विद्युत मानक के अनुसार आवश्यक है कि, उपकरण आउटलेट के लिए या तो ब्राउंड फोल्ड सर्किट इंटरप्टर्स (जीएफसीआई) प्रदान करें या एक सुनिश्चित उपकरण ब्राउंडिंग कंडक्टर उपलब्ध कराएं।
- 3) **व्यक्तिगत सुरक्षा उपकरण (पीपीई)** :- इस उपकरण में स्वर इन्सुलेशन दरताने, आरसीन, चटाई, कंबल, लाइन नली, और गैर-प्रवाहक कवचर टोप (कैप) शामिल हैं। उचित पीपीई को पहनने के अलावा

कर्मचारियों को, पीपीई उपकरण पहनने से पहले उनकी बाफिरी से जांच करें। यदि उपकरण सेवा योग्य नहीं है तो, उसे त्याग दें या उसकी मरम्मत करें।

4) **ताला और टैग** :- बिजली के झटके को कम करने के लिए, तालाबंदी और टैग आउट उपकरण का उपयोग सबसे प्रभावी तरीके में से एक है। रखरखाव करने समय आकस्मिक ऊर्जा को रोकने के लिए, तालाबंदी टैग आउट का उपयोग करने के लिए कर्मचारियों को शक्ति के स्रोत पर या तो एक टैग या ताला लगाना होगा।

5) **पावर लाइन सुरक्षा** :- बिजली की लाइनें सबसे बड़ा विद्युत पावर संकुचित करती हैं, इसलिए एड्रिवाट अतिरिक्त सुरक्षा लेना महत्वपूर्ण है। शिर के ऊपर बिजली लाइनों के पास काम करते समय यह सुनिश्चित करने की आवश्यकता है कि वे केवल लकड़ी या फाइबरग्लास सीढ़ी का उपयोग करें। सुझाई करने से पहले, स्थानीय उपयोगिता कंपनी से तबी हुई बिजली लाइनों के संपर्क को रोकने के लिए जानकारी ले कर सुनिश्चित करें।

घरेलू उपयोग - क्या करें

- मानक आईएसआई/विनिर्दिष्ट उपकरण और सामान का उपयोग करें।
- रेफ्रिजरेटर, वाशिंग मशीन, ओवन, मिक्सर ब्लेंडर को बिजली से कनेक्ट करने के लिये विशेष उपयुक्त रूप से अर्थिंग की हुई तीन पिन वाली प्लग का उपयोग करें।
- मानव संरक्षण हेतु बिजली के सर्किट में 30mA संवेदनशीलता वाला आरसीसीबी (रेसिड्युअल करंट सर्किट ब्रेकर) लगाएं।
- उपयोग में न होने पर बिजली की आपूर्ति बंद कर दें।
- बिजली की तारों को गर्म / गीले उपकरणों से दूर रखें।
- स्विचबोर्ड ऐसी जगह लगाये जहां आसानी से पहुंचा जा सके।
- उपकरणों को साफ और सूखे से मुक्त रखें।
- बिजली से चलनेवाले औजार प्रचलित करते समय स्वर के सोल वाले जुते पहनें।
- साफ करने से पहले, विशेष बिजली की वस्तुओं के प्लग निकाल दें।

- यह सुनिश्चित करें कि सभी किस्म की तारों को फेब्रिक लाइसेंसवाली विद्युतकर्मी ही स्थापित एवं / या सर्विस/मरम्मत करें।
- सर्किट ब्रेकर और फ्यूज उपलब्ध कराएं, जिनसे शॉर्ट सर्किट / ओवरलोडिंग होने पर मुख्य पैनेल से सर्किट अपने-आप बंद हो जाएगा और कोई दुर्घटना नहीं होगी।

घरेलू उपयोग - क्या न करें

- गीले हाथों से बिजली के उपकरण प्रचलित न करें।
- कई उपकरणों से जोड़कर तारों को ओवरलोड न करें।
- फ्यूज की जगह तार न लगाएं।
- बिजली चालु होने पर फ्यूज बल्व / सीएफएल न बदलें।
- लंबी तारे डालकर, बिजली आपूर्ति की निकासी न करें।
- प्लग को सर्किट से निकालने के लिए तार को न खींचें।
- तारों को बीच से न जोड़ें और अगर जोड़ना ही पड़े तो उनपर आवरण लगाएं।
- तारों को कालीन कवच के नीचे न डालें।
- बिजली की लंबी तारों को सर्किट से प्लग के बगैर न डालें।
- बिजली की तारों को कभी न मोड़ें और न ही मरोड़ें या फिर उपकरणों को तार के सटारे न उठाएं।

औद्योगिक उपयोग - क्या करें

- सभी रिचार्ज / रिचार्जिंग की पहचान लिखित करें और उनपर लिखाल लगाएं।
- सभी रिचार्ज / रिचार्जिंग / पैनेलों को पहुंचने योग्य स्थानों पर लगाएं।
- बिजली के पैनेलों के सामने खबर / आवरण गेट का उपयोग करें।
- काम करते समय, विशेष आईएसआई निशान वाले मानक वैद्युतिक संरक्षण उपकरणों (पीपीई) का उपयोग करें।
- प्रत्येक हेतु और बिजली की प्रणाली पर काम करने के लिये कार्य अनुमति / लोटे (LOTO) प्रणाली अपनाएं।
- मानक / आईएसआई निशान वाली सामग्री / वस्तुओं का उपयोग करें।
- बिजली के सभी उपकरणों / मशीनों की दोहरी अर्थिंग करना सुनिश्चित करें।
- कार्यस्थल पर अग्नीशमन रॉबोट / रेत की बाल्टीयों का उपलब्ध होना सुनिश्चित करें।
- जहां कहीं जरूरत हो, खतरे के बोर्ड और अन्य

चेतावनी संकेतों का उपयोग करें।

- बिजली के उपकरणों एवं तारों के फटने-फटने या आवरण क्षतीग्रस्त होने की जांच जरूर करें।
- जब तक साबित न हो जाए, तब तक ब्रेक सर्किट को बिजलीयुक्त मानें।
- ज्वलन संरक्षण वाले उपयुक्त रूप से निर्मित उपकरण का उपयोग करें। संरक्षण हेतु, आर्क जोड़ी कपड़ों और पीपीई का इस्तेमाल करें।
- सुनिश्चित करें कि काम शुरू करने से पहले डेफेंडरों और श्रमिकों ने काम को समझ लिया है।
- बिजली प्रणालि पर काम करने के लिए लिखित प्रक्रिया पत्रिका लिखित करें।
- जहां तक संभव हो, बिजली की ऊपरी तारों को हटा दें, आवरणयुक्त करें या उन्मूलित प्रणाली पर काम करने से पहले, गैर-संपर्क किस्म के वोल्टेज संयुक्त ट्राय वोल्टेज की गैर-जोड़दगी की जांच करें।
- अनव्यास सम्पर्क से बचने के लिए, बिजली की तारों को आवरणयुक्त या स्वरयुक्त बनाएं।
- उपकरण के सिरे पर निशान की जांच द्वारा या

संबंधित व्यक्ति से संपर्क करके सर्विस के वोल्टेज का पता लगाएं।

- अगर सामग्री को बिजली की तारों के नीचे रखना पड़े, तो श्रमिकों को खतरे की जानकारी देते हेतु, चेतावनी पताकारों और संकेत लटकाएं तथा सामान रखने से पहले लिखित प्रक्रियाएं हासिल करें।
- कार्य के अनुकूल, मल्टिमीटर / मापन रॉबोट का चयन करें।

खतरा इलेक्ट्रिक शॉक जोखिम

औद्योगिक उपयोग - क्या न करें

- अस्थायी कनेक्शन न लगाएं।
- विशेषकर सुझाव उपकरणों हेतु प्रयुक्त तारों को बीच से न जोड़ें।
- रिचार्ज / पैनेल आवरणों को खुला न छोड़ें।
- सर्किट के विद्युत - प्रवाहित पुंजें खुले न छोड़ें।

आपातकालीन कॉल करें

महत्वपूर्ण संकेतों की जांच करें

बाई चिन की सांसें चौक करें

बचाव के लिए सांसें दें

सीपीआर दें

मदद के लिए प्रतीक्षा करें

पीपीई सुरक्षा उपकरण



BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR NORTHERN REGION