

# Environmental Monitoring Report

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Project Number: 43253-027  
Semestral Report (February–July 2019)  
July 2019


INDIA: Karnataka Integrated Urban Water  
Management Investment Program (Tranche 2)





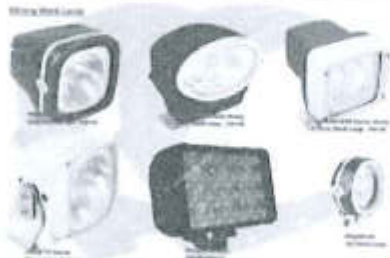
Appendices (PART D)

Prepared by Karnataka Urban Infrastructure Development and Finance Corporation, Government of Karnataka for the Asian Development Bank.


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7	<b>ROTARY LAMP</b> (Must for traffic block / diversion)	Color: Yellow Rotating motor use motor system  Environment friendly: no UV, IR, lead or mercury.	
8	<b>BARRICADE LAMP</b> (Must for barricade along running traffic and additional for traffic blocking / diversion)	Color: Red/ Orange	
9	<b>STICK LAMP</b> (Must for traffic controller / security man / Signaling man)	Color: Red/Orange	 
10	<b>LIGHTING LAMP</b>	Super Bright White LEDS	




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#### 4. IDENTIFYING HAZARDS, ASSOCIATED RISKS & DEFINING CONTROLS

##### 4.1 HSE Management Plan




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## 4.2 IDENTIFICATION OF DANGERS AND CONTROLS OF RISK


Considering all activities with respect to road works hazards and risks are identified and necessary control measures are suggested as below.

IDENTIFICATION OF DANGERS AND CONTROLS OF RISK			
ACTIVITY	POTENTIAL HAZARDS	ASSOCIATED RISKS	CONTROL MEASURES
Travelling by company car	Traffic hazards (Vehicle speed, condition and compliance)	Injury to driver or traveling employee due to hit / collision of vehicle	Fasten your seat belt while driving / traveling by vehicle
			Check condition of vehicle daily - by driver & periodic joint inspection of vehicles by H&S and Admin. Managers
			Install speed governor to limit speed to 60 KMPH & Follow speed limits
			Park the vehicle in designated areas
			Follow traffic signages and safety instructions given by H&S
Travelling by company motor cycle / Bicycle	Traffic hazard (vehicle speed, condition and compliance)	Injury to rider or travelling employees due to hit / collision of vehicles	Crash Helmet is mandatory for rider & pillion rider in case of motor cycle and Bicycle helmet & reflective vest is mandatory in case of Bicycle.
			Check condition of motor cycle before riding, periodic joint inspection by H&S and Admin
			Do not overspeed
			Follow traffic signs
Walking / visual surveying on	Vehicular Traffic	Traffic - Hit or over-run by vehicle	Use pedestrian pathways, plan your activity in case it is mid of the road.

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the streets / roads			Use of PPE's - Safety helmet, Shoes, Reflective vest/jacket is mandatory
			Depute a signaling man with baton (light) to keep watch / control on traffic when working in group
Working on the road	Movement of vehicles pedestrians	Damage injury to general public	Display a sign board " CAUTION - WORK IN PROGRESS" with client logo
			Barricade the area using hard barricading boards.
			Depute a signaling man with baton (light) to control traffic, maintain barricades & control on movement of workmen working on job site
			Keep a vehicle standby and maintain first aid box, drinking water in the vehicle
Excavation work on road	Underground utilities, fall of person / vehicle in to the depth, collapse of soil / edges	Injury to person / damage to vehicles	Check for underground utilities before start of excavation and ensure to locate electric cables / other underground utilities and accordingly define safe work procedures.
			Barricade & signpost the area using hard barricading (1 meter away from edges) & depute a signaling man to guide the traffic, alert the workmen and maintain barricades
			Keep sufficient slope for protection against soil collapse
			Supervisor to inspect work location before start of works each day & periodically and ensure that area is not left unsecured, provide lighting during night


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			Activity to start with work permit issued by concern engineer / manager.
Welding & grinding operation	Electric hazards, radiation - eye, rotating part - grinder, flying chips	Electric shock, Injury to eye, hand and other body parts	Use suitable welding machine and electric power source to avoid open connections / cables etc.
			Welder and his helper must use welding glass (Filter No. 12 or suitable), Leather hand gloves, apron and shoes
			Grinding technician must use suitable machine (rpm of wheel must be compatible to machine and wheel guard in place) leather hand gloves, shoes, eye protectors & ear plugs
			Welding inside the rooms, flammable areas, confined spaces to follow specific procedure for addressing specific risk controls.
Storage of materials beside the road	Blocking pedestrian pathways, roads causing restriction to circulation	Injuries / damages to pedestrians, restriction to vehicle movement	In case the activity requires any storage of material / machines on site: Limit the storage duration and qty., Barricade the material / machines & have visible signage to caution passerby, keep pathways clear
Emergency situation on site	Various hazards	human injuries	Prepare emergency response plan for various scenarios (such as Electrocution, damage to gas pipeline, vehicle collision, vehicle hitting worker etc) and display / place it inside the site vehicles
			Identify & tie-up with hospital nearby work location / areas



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			Train Engineers, supervisors & other staff on site & practice it (Communication of serious incident and response of driver, supervisor and co-workers)
			List certified first aiders with each crew / team

Above IDCR (IDENTIFICATION OF DANGERS AND CONTROLS OF RISK) exercise gives few basic controls which need to be implemented in almost all project activities. As a result, 10 basic rules/checkpoints for implementation and enforcement are listed below in the form of checklist from risk prevention & control point of view.


**Actual Risk assessment as per the Suez procedure to be performed at site covering all activities.**

**4.3 Evaluation of Performance of Subcontractors**

<b>Evaluation of performance of subcontractors - All</b>		Week / Date:							
		Note: Refer AP for details							
<b>Contract:</b>									
Sl. No.	Check points	Subcontractors / Partner / Services							
<b>0 = No compliance:</b> the requirement is almost imperceptible on site. <b>1 = Little compliance:</b> the requirement is most of the time not respected on site <b>2 = Partial compliance:</b> the requirement is most of the time respected on site but non-compliances were seen. <b>3 = Full compliance:</b> the requirement is strictly respected on site. No cases of non-compliances were seen									
1	<b>PPE:</b> The personnel wear their PPE (basic and work specific). The PPE are in good condition.								
2	<b>Tools/Equipment:</b> The tools and equipment used are in good condition (collective protection available, no hazardous wear and tear)								
3	<b>Housekeeping:</b> debris, scraps and other wastes are removed from the work place. Tools and equipment are properly stored.								





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4	<b>Supervision:</b> A supervisor from the subcontractor is on site. He is active and reacts to abnormal situations.									
5	<b>TBT:</b> Tool-Box-Talks are organized at least once a week									
6	<b>Work permits:</b> They are available on site where the job is taking place.									
7	<b>Barricading:</b> work in progress areas are barricaded, signage is available & a signal man is deputed.									
8	<b>Lifting:</b> Loads are not lifted over persons and the workers do not position themselves under a suspended load. Necessary documents are available with lifting machine & operator.									
9	<b>Driving:</b> site vehicle driving rules are respected (speed, seat belt, stoppage/parking, authorized use, etc.)									
10	<b>Excavations:</b> excavated areas are barricaded, signage is available and the access is limited to authorized personnel.									
11	<b>Planning:</b> Check for underground utilities before start of excavation and ensure to locate electric cables / other underground utilities and accordingly define safe work procedures.									

## 5. RISKS IN EXCAVATION AND SAFETY PRECAUTIONS:

Excavation work is unavoidable for repairs and laying of new pipes.


Excavation work may pose various following hazards and related risks:

- Collapse of trench / excavation walls
- Unstable mobile equipment very close to excavated edges / uneven surface
- Contact with electrical power lines
- Breaking of pipes / underground utilities in service
- Injuries caused by the fall of an object
- Falling, from heights or otherwise
- Confined spaces - contaminated soil causing microbial infection

Different type of soils will have different bearing capacity and safe angle of repose will vary as per the bearing capacity i.e. stability of soil. While working on busy road / areas there is no possibility of maintaining safe angle of repose (slope) and therefore as a thumb rule, soil support is a must for excavation deeper than 1.5M.

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Following precautions and controls to be taken for excavation works and excavated areas.

#### **Before Start:**

Plan the activity in advance and inform to all concerns (authorities / employees) to take necessary steps for minimum disturbance and impact to general public and traffic.

- Barricade all sides of the trenches
- Red danger lights for easy visibility from dusk to dawn at an interval of 15-20 m and at all the road crossings.
- Traffic signals and display boards giving direction for diversion of traffic at the appropriate places.
- Locate ground utilities & isolate them for avoiding interference with our activities Use cable and pipe locating tools, detector, and transmitter receiver instruments.
- Depute signaling man / security man for round the clock watch and ward for maintaining all safety regulations at the site of work and protecting the site from unauthorized intrusions.

#### **During Works:**


- In case of deep excavation, store excavated soil / spoil at least 1.5M away from edges.
- Support the soil from possible collapse by providing suitable benching, sloping or shoring.
- Shoring plates to be supported using trench braces at equidistance throughout the trench depth & length.
- Stop unauthorized entry to trench and maintain safe conditions surrounding trenches.

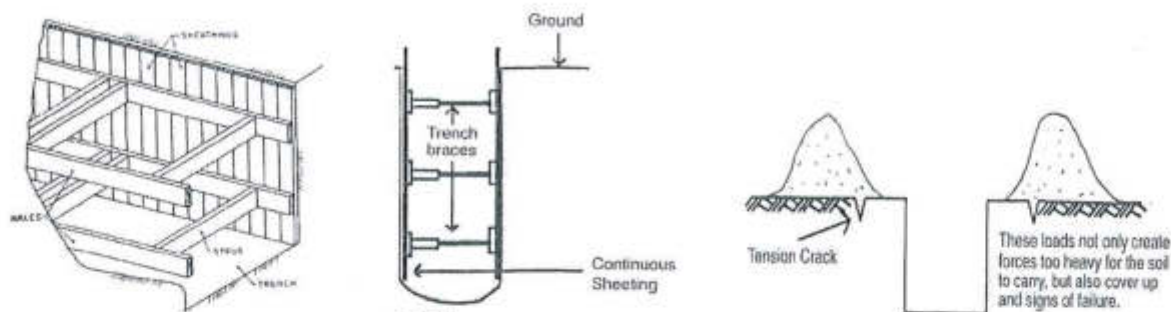
#### **After the work:**

- Ensure that area is leveled and restored to normal after completion of work.
- Inspect the area during recess / work intervals and periodically during the day.





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Soil support to be provided as per the IS-3764 or OHSAS excavation standard

Avoid over loading of edges due to spoil / equipment

### Other precautions while working in excavated areas:

- Where a road or footpath is to be kept opened up in the course of work, special care shall be taken to see that proper protection is provided to prevent any accidents from occurring. Work shall be done in such a manner that it will not unduly inconvenience pedestrians or occupants of building or obstruct road traffic
- Care shall be taken to see that apparatus, tools or other excavating implements are not left in a dangerous or insecure position as to fall or be knocked into the trench thereby injuring any workmen who may be working inside the trench.
- The flags and lams shall be placed in conspicuous position so as to indicate the pedestrians and drivers of vehicles the full extent, i.e. both width and length of the obstruction.
- Where any excavation is not clearly visible for a distance of 25 meters to traffic approaching from any direction or any part of the carriage way of the road, a warning notice shall be placed on the curb of all such roads to make excavated area well visible. Such warning shall be placed at a distance of 25 meters from the excavated area or at least 10 meters from the junction of an entering of intersecting road with in the road in which the excavation exists.
- All warning, in these cases shall be clearly visible and legible. All warning lamps shall exhibit a red light, but white lights may be used in addition to facilitate working at night. Wherever required a passage for pedestrians with foot bridge shall be provided. At excavation tools and all materials likely to offer obstruction shall be properly folded round and protected.
- In case there is any damage to underground gas pipes:
- Evacuate the area, keep everyone clear of leaking area.
- Enforce no smoking and no naked lights.
- Inform immediately SPPL authorized person & service provider company and follow instruction given to you

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- Remember do not put yourself in to danger situation and also to others

### **Disposal of Debris:**

Due to excavation on existing roads the debris will be generated and that waste to be disposed-off with due permission from client in environment friendly way. The debris should not be accumulated on roads causing inconvenience to public and shall be disposed on regular intervals.

These debris shall be dumped in approved debris disposal sites. Debris shall be collected in trucks and covered with dust nets and transported to the approved disposal site.

Avoid disposal of debris in or near water bodies / rivers / residential areas / forest areas.

## **6. FIRE PREVENTION & CONTROL**

Basically, fire is a chemical reaction. Whenever fire occurs there is combustion or burning, in other words, oxidation of substance accompanied by heat, light and smoke. Three things are necessary for fire to occur Fuel, Heat and Oxygen. The danger of fire is greater during the period of construction than it is after the completion. To eliminate the causes of fire, it is important to locate how and where fire starts. The maximum frequency of fire cause is Electrical. There are various other causes like Smoking, Hot work etc.

**Suitable quantity of fire extinguishers shall be maintained for each class as per the fire potential.**

CLASS A FIRES - Wood, Textiles and paper.

CLASS B FIRES - Oil, petroleum, solvents, grease paint & the like.


CLASS C FIRES - Gaseous substance under pressure.

CLASS D FIRES - Reactive chemicals, active metals and the like.

All extinguishers provided at site shall be inspected periodically and maintained in good condition all the time.





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## 7. PROCEDURE IN CASE OF ACCIDENT:


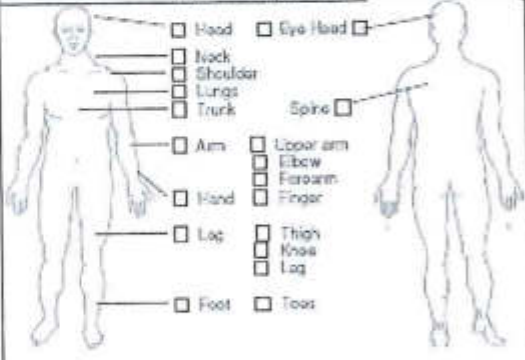
In the event of an incident/accident occurring on site, the SPPL / subcontractor shall provide first aid assistance and ensure transportation to a near hospital if necessary. Same shall be informed immediately to Project Manager SPPL & HSE officer by Phone & then the event shall record and report in writing in the prescribed form by the concern manager/ engineer/ subcontractor's representative to SPPL Project Manager and HSE officer within 24 hours.

Reporting of all kind of incidents is necessary to find root causes and avoid recurrence of similar incidents. This is not to develop blame game but to improve upon workplace conditions and minimize unsafe situations having potential to cause accidents.


The subcontractor has the obligation to report any accident by completing the Accident / Incident Notification Form enclosed below.



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BU:	SA:	Site:	DATE:	TIME:
<b>1 - NATURE OF THE INCIDENT:</b>				
<b>HUMAN</b> <input type="checkbox"/> WORK ACCIDENT <input type="checkbox"/> COMMUTING ACCIDENT <input type="checkbox"/> NEAR MISS		<b>ENVIRONMENT</b> <input type="checkbox"/> POLLUTION WATER <input type="checkbox"/> AIR <input type="checkbox"/> SOIL <input type="checkbox"/> <input type="checkbox"/> WASTE <input type="checkbox"/> NUISANCE NOISE <input type="checkbox"/> CLIMATE <input type="checkbox"/>		<b>INDUSTRIAL SAFETY</b> <input type="checkbox"/> TOXIC DISCHARGE AIR <input type="checkbox"/> WATER <input type="checkbox"/> SOIL <input type="checkbox"/> <input type="checkbox"/> EXPLOSION OF GAS <input type="checkbox"/> OF DUST <input type="checkbox"/> <input type="checkbox"/> FIRE <input type="checkbox"/> OTHER:
<b>ACTUAL SEVERITY OF INCIDENT:</b> <input type="checkbox"/> 0 <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5			<b>POTENTIAL SEVERITY OF INCIDENT</b> <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5	
<b>RELATED TO A LIFE-SAVING RULE?</b> 				
<b>INJURED PERSON:</b> LAST NAME / FIRST NAME: POSITION: COMPANY: <input type="checkbox"/> Employee <input type="checkbox"/> Temp <input type="checkbox"/> Sub-contractor <input type="checkbox"/> Third party:		<b>WITNESS:</b> <input type="checkbox"/> YES <input type="checkbox"/> NO LAST NAME / FIRST NAME: POSITION: COMPANY: <input type="checkbox"/> Employee <input type="checkbox"/> Temp <input type="checkbox"/> Sub-contractor <input type="checkbox"/> Third party:		<b>AUTHOR:</b> LAST NAME / FIRST NAME: POSITION: DATE OF REPORT: HIERARCHY NOTIFIED DATE: AT:
<b>2 - DESCRIPTION OF THE INCIDENT</b>				
What happened (Who?, When?, What?, Where?, How?, estimated quantity?, affected people, duration?):				
1- Before the incident (description of the situation prior to the incident: work data, process conditions, etc):				
2- At the time of the incident (occasional events):				
3- After the incident (what was done: removal of a persistent danger, rescue of the victims, first corrective actions, etc):				
<b>3 - ACTUAL CONSEQUENCES OF THE INCIDENT:</b>				
Part of the body wounded 		Type of injury <input type="checkbox"/> Death <input type="checkbox"/> Lumbago <input type="checkbox"/> Traumatism <input type="checkbox"/> Crushing <input type="checkbox"/> Contusion <input type="checkbox"/> Muscle tear <input type="checkbox"/> Sprain/dislocation <input type="checkbox"/> Fracture <input type="checkbox"/> Abrasion <input type="checkbox"/> Cut <input type="checkbox"/> Bite <input type="checkbox"/> Sting <input type="checkbox"/> Burn <input type="checkbox"/> Visual problems <input type="checkbox"/> Auditory problems <input type="checkbox"/> Intoxication <input type="checkbox"/> Asphyxiation <input type="checkbox"/> Other:		
		Equipment / Process / Environmental damages Type:  Cost (if known):  Other:		
<b>4 - FIRST ACTIONS TAKEN:</b>				
<b>CARE:</b> First aid given: Yes <input type="checkbox"/> No <input type="checkbox"/> Victim transported to: Local nurse <input type="checkbox"/> Doctor <input type="checkbox"/> Hospital/Clinic <input type="checkbox"/> Time off work: Yes <input type="checkbox"/> Until: No <input type="checkbox"/> Adapted assignment proposed: Yes <input type="checkbox"/> No <input type="checkbox"/> Accepted by employee: Yes <input type="checkbox"/> No <input type="checkbox"/>		<b>CONFINEMENT:</b> Containment of a zone: Yes <input type="checkbox"/> No <input type="checkbox"/> Name of the zone: External means contacted: Yes <input type="checkbox"/> No <input type="checkbox"/> Type of actions considered:		<b>ALERT:</b> Triggering of an alert: Yes <input type="checkbox"/> No <input type="checkbox"/> Client contacted: Yes <input type="checkbox"/> No <input type="checkbox"/> Administration contacted: Yes <input type="checkbox"/> No <input type="checkbox"/>
<b>5 - ILLUSTRATIONS</b>				
Photos, diagrams illustrating the incident location, the material involved, the human, environmental or industrial damages				



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## 8. SAFE MEANS OF ACCESS & SCAFFOLD / WORKING PLATFORMS:

Adequate safety measures of access and exit shall be provided at all elevations using suitable means as per standards.

Suitable scaffoldings, ladders and platforms shall be provided for working at height more than 1.5 meter from the ground. Timber bamboo scaffoldings shall not be used.

Every scaffold and every component thereof is of adequate construction, made of sound material and free from defects and is safe for the purposes for which it is intended for use. All metal scaffold used in construction work conform to the relevant national standards.

All scaffoldings shall be examined by the competent person before use and stairways platforms etc. shall be suitably guarded.

The platform shall not project beyond the end support and ladders used as approach shall not be more than 8 meters in length. The upper end of the ladder shall be 1 meter above platform.

Scaffolding shall be properly designed and erected, with its intended use in mind. All hazards involved with the erection or dismantling shall be identified at the planning stage and the appropriate safety precautions taken. Proximity to live electrical equipment or interface problems may need to be considered. SPPL / subcontractor shall take all precautions to prevent any accidental collapse of scaffolding or fall of persons from scaffolding. SPPL / subcontractor shall ensure that scaffolding erection, dismantling and repairs should be done under the expert supervision. The scaffolding shall meet the required strength and other requirements for the purpose for which the scaffold is erected.

## 9. CONFINED SPACE WORK AND PRECATIONS:

Major Hazards and associated risks: -


- Asphyxiation due to lack of oxygen in air.
- Intoxication due to presence and inhalation of toxic gases.
- Fire /explosion due to presence of flammable gases and contact with ignition source
- Slip / fall and injuries due to physical hazards
- Electrocutation and injuries due to electricity and machines

No person shall be required or allowed to enter any chamber, tank, vat, pit, pipe, flue or other confined space in any worksite in which any gas, fume, vapour or dust or other physical hazard is likely to be present to such an extent as to involve risk to persons being overcome thereby, unless it is provided with a man entry of adequate size i.e. safe / effective means of access / egress.

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No person shall be required or allowed to enter any confined space referred above, until all practicable measures have been taken to remove any gas, fume, vapour or dust and physical hazards which may be present so as to bring its level within the permissible limits and to prevent any ingress of such gas, fume, vapour or dust and unless: -

A) a certificate in writing has been given by a competent person, based on a test of confined space atmosphere is carried out by himself that the space is reasonably free from dangerous gas, fume, vapour or dust; or

B) such person is wearing suitable breathing apparatus and a belt securely attached to a rope the free end of which is held by a person outside the confined space or as appropriate

A dedicated signaling man should be placed near entrance with means to raise the alarm in case of any emergency & follow the intervention procedure specifically prepared for the activity after risk assessment.

All personnel working in confined space shall be adequately trained & medically fit for executing the job.

The SPPL / subcontractor shall ensure adequate ventilation / explosion proof lighting (24V hand lamp) in the work place.

Always perform risk assessment and use work permit, LOTO of all energies.

#### **10. LIFTING MACHINES / TOOLS & TACKLES:**

Major hazards and associated risks: -


Improper lifting (arrangements / methods) or failure of lifting devices resulting in fall of materials and consequential injuries to person and/or damage to materials

The SPPL / subcontractor shall ensure all the lifting appliances, tools & tackles including cranes etc. are in good condition, examined & certified by competent person before use and afterwards once in a year according to Section 29 of The Factories Act 1948.

- Copy of third party certificates to be submitted to SPPL before use / furnished on demand.
- SWL of all lifting appliances to be marked on it. Do not use lifting tools to lift loads access to it's SWL.
- Method of use of a sling, chain pulley block etc. can reduce it's SWL considerably when used at higher than recommended angle or in different position / use.
- Never stand below load being lifted. Barricade the area as far as practically possible.





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## 11. WORKING AT HEIGHTS:

Major hazards and associated risks: -

Fall of person or materials from height and consequential injuries to person and/or damage to materials

Working at above 1 meter of height to be considered as height work and all safety precautions to be taken to avoid fall of workers from height.

Person working at height shall have: -

- Working platform with access and handrails
- Full body harness with anchoring point

All working platforms, walk ways etc. shall be maintained free from accumulations of debris or any other material causing obstructions and tripping / falling.

Every opening at elevation from ground level through which a person, material, equipment etc. may fall at a construction work shall be covered and or guarded suitably by the SPPL / subcontractor to prevent such falls.


## 12. WELDING AND GAS CUTTING:

Major hazards and associated risks: -

- Electric shock, Burn injuries, Fire / explosion
- Arc eye due to UV exposure
- Exposure to toxic fumes
- Operation shall be done by authorized persons only after issue of work permit.
- Remove flammable materials from surrounding area before start of welding / cutting / hot work.
- Gas cylinder in use shall be kept upright on a custom-built stand or trolley fitted with a bracket to accommodate the hoses & equipment or otherwise secured. The metal cap shall be kept in place to protect the valve when the cylinder is not connected for use.
- Hose clamp or clip shall be used to connect hoses firmly in both sides of cylinders and torches. Use of makeshift arrangements in place of clamp e.g. wires etc. to be strictly avoided.
- All gas cylinders shall be fixed with pressure regulator & dial gauge.
- Non-return valve & flashback arrestor shall be fixed at both the end of cylinder & torch.
- Domestic LPG cylinder shall not be used for gas welding & cutting purpose.
- DCP or CO2 type fire extinguisher not less than 5 kg shall be fixed at or near to welding process zone in an easily accessible location. Fire extinguisher should confirm to local standards.
- Use firewatchers if there is a possibility of ignition unobserved by the operator.
- Oxygen cylinder and flammable gas cylinders shall be stored separately.

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### 13. FENCING OF ROTATING / DANGER PARTS OF A MACHINE:

Major hazards and associated risks: -

- Abrasion, puncture, cut injuries due to contact of body part with machine part in motion
- Electric shock
- Entanglement of loose cloth / caught in between

Rotating / reciprocating / transverse movement for cutting, punching, bending or other operations may have above potential risks. All machines should be placed safely and Dangerous parts of machines to be suitably guarded all the time. SPPL / Subcontractor shall ensure at a worksite that:

- All chains & friction gearing, dangerous & moving parts of machinery are securely fenced / guarded.
- The fencing of dangerous parts of machinery shall not be removed while such machinery is in motion or in use.
- Machine parts are cleaned when such machine is stopped.
- When a machine is stopped for servicing or repairs, adequate measures (Lock out/ tag out) should be adopted to ensure that such machine does not re-start inadvertently.
- After servicing machine guard shall be reinstalled immediately.

### 14. HAND TOOLS:

#### 14.1. General

Trained manpower shall be engaged and periodically inducted to avoid accidents relating to hand tools. Accidents arising out of hand tools can be attributed to any one of the following reasons:


- Using the wrong tools.
- Using tools, which are in poor condition.
- Using the tool in a wrong way.
- Keeping tools in unsafe places.

If the above four conditions are taken care of, we can eliminate all the hand tool accidents. Also, concern engineer / supervisor must train all operators time to time.

SPPL / Subcontractors / users must carry out inspection of all machines and tools being used on site on monthly basis. Records of such inspections must be visible to identify that tool / machine is in sound condition and can be used. Defective tools shall be removed from the site.





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#### **14.2. Using the Wrong Tools**

The weight, size and type of tool should be selected to suit the job being carried out. Using pliers or wrenches as hammers, using screw drivers as pinch or chisels, using double end spanners in place of ring spanners, using pipe wrenches as spanners are a few examples of using wrong tools.

#### **14.3. Using Tools in Poor Condition**

Tools provided with wooden handle should always be used with the handles intact. The handles should be tightened with wedges whenever necessary. Split or broken handles should be replaced immediately. Pipes or rods shall not be used as handles.

Sharp tools improve accuracy and are safer than dull tools. Accumulated dirt or grease should be wiped off immediately to avoid slippage. Shovel and pick handles should be free from splinters, splits and cracks. Insulated and non-conducting tools should be tested frequently for their electrical resistance. Mushroomed chisel is a serious source of hazard.

#### **14.4. Using Tools in Wrong Ways**

Wrenches should always be placed on nuts with the jaw opening facing the direction in which the wrench is to be rotated. Wrenches should not be pushed but be pulled.

Chisels should be held with steady but relaxed grip. Chisels being struck by other should be held by tongs or other holding devices. Always chip away from yourself and protect others by screening. Use goggles while chipping.

While using screwdriver, the object should not be held in hand or thigh.

Blades of hacksaw should always point forward and the entire length of the blade should be using in the forward cutting stroke. The stroke should be steady and firm to avoid jumping of blade.

#### **14.5. Keeping Tools in Work Places**


Hand tools should not be allowed to lie on workbenches, scaffolding, etc. where from they can be tipped down. They should be stored properly after the work is over. Sharp tools like screwdriver, etc. Should not be kept in pockets. Hand tools shall not be held in hand while climbing up or down through a ladder. Tools should never be thrown up or down.

#### **14.6. Jacks**

Select jacks heavy enough to raise and hold the load safely. Jacks should rest on firm level foundation, adequate to support the load. Jack of same capacity and type should be used while using number of jacks. Simultaneously be sure that the jack does not tip and

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is in line with the vertical movement of load. Wooden block should be given over the jack also to avoid metal to metal contact. Load must rest on firm packing before releasing the jack or before allowing persons to work below the raised load.

Inspect frequently and use only the proper grade and clean oil. It is advisable to shore up any load that must remain in a raised position for any length of time.

#### **14.7. Portable Electric Tools**

- Maintenance of electric tools should be systematic.
- Safety guards provided in the tools should not be tampered with.
- Gloves, safety shoes, goggles, etc. should be worn by the operator wherever necessary.
- Only experienced and authorized personnel should be permitted to operate power tools.
- For all electric power tools, a running earth must be maintained, and the supply cable should be handled very carefully.
- Electric supply should be disconnected before attempting any repairs or servicing. Even a change of wheel in the grinding machine requires the supply to be disconnected.

#### **14.8. Drilling Machine**

- A prick punch or pilot hole should always be provided to guide the drill bit.
- Suitable drill bit should be selected for the material being drilled.
- If bit is long enough to pass through the object, care should be taken to avoid damage or injury on the far side.
- If the object is small, it should be secured to prevent spinning.
- Care should be taken to prevent sleeves and other clothing from being wound around drill.


#### **14.9. Portable Grinders**

- HOOD GUARD provided in the machine should be maintained in place always.
- Wheels of proper rpm rating should be used. Date of expiry of wheels should always be checked before mounting. If in doubt, a tap test may be conducted to check for minor cracks and the machine be allowed to run under no load in a safe place for some time.
- The grinding wheel shall be stored and handled properly. It shall never be allowed to be dropped and stored in damp places.
- Mounting blotter should be used when provided in the machine the spindle nut should not be over tightened.
- Only experienced and skilled grinders shall be engaged.

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- The grinding machine shall not be allowed to be kept on the ground when the wheel is in rotation.

#### 14.10. Pneumatic Tools

- Air hoses of pneumatic tools should be protected against whipping. They should also be protected against damage by vehicles.
- The airline should be depressurized before opening any joint.
- Compressed air should not be directed against self or others. It should not be used for removing dirt from the clothes, etc.
- Air hoses taken over head or vertically should be sufficiently supported.

#### 15. ELECTRICAL FACILITIES:

Major hazards and associated risks: -


- Electric shock, Burn injuries
- Fire / explosion
- Working on site and offices requires electricity for operating equipment and area lightings etc. Providing electricity often requires temporary arrangement which is more hazardous.
- Temporary electrical facilities to be provided with following minimum standards:
- All temporary distribution boxes must be robust and provided with rain protection & main switch to supply/cutoff power of DB.
- Each DB must have earthing of metallic parts, 30mA ELCB, rubber mat and lockable to avoid unauthorized working.
- Only authorized persons should be allowed to work with electricity.
- Display danger sign and provide physical barrier to prevent entry of unauthorized persons in electrical facility.
- Put numbering on each DB and inspect them periodically for safe and sound condition.
- Maintain minimum inventory of temporary boards with industrial cable and plug tops, power tools / machines required for their job.

Before start of works, the SPPL / subcontractor shall ascertain that all sources of electricity e.g. cables / wires / machines (underground / above ground) etc. are identified and isolated suitably to prevent mishap due to possible interference with planed activity in proposed working area.

The SPPL / subcontractor should ensure that all electrical installations at the construction work comply with the requirements of local electricity acts/rules & site rules.

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The SPPL / subcontractor shall take all adequate measures to prevent any worker from coming into physical contact with any electrical equipment or apparatus, machines or live electrical circuits which may cause electrical hazards during the construction work. The subcontractor shall provide the sufficient ELCBs / RCCBs for all the portable equipment, electrical switchboards, distribution panel etc. to prevent electrical shocks.

The SPPL / subcontractor should ensure use of single/double insulated hand tools or low voltage i.e. 110 volts hand tools.

The SPPL / subcontractor should also ensure that all temporary electrical installations at the construction works are provided with **Earth Leakage Circuit Breakers**.

#### **16. OVERHEAD ELECTRICAL POWER LINES:**

Wooden goal post shall be erected under all overhead lines by keeping safe clearance distance subjected to the lines for avoiding any contacts by moving machinery. Safe clearance distance shall be confirmed by local electricity rules / authority.

#### **17. HEAVY EQUIPMENT (Cranes, Excavators, Hydra, Bulldozers, etc.):**

The SPPL / subcontractor shall provide heavy construction equipment in good condition, suitable for safe operation. All safety features shall be operating as fitted by the manufacturers e.g. reversing alarms, seat belts, limit switches etc.

- A valid vehicle fitness certificate/ operator license as per local legislation shall be produced by the subcontractor.

#### **18. SCAFFOLDING:**

For any work that cannot be done from ground level or from part of any permanent structure or from other available means of support, soundly constructed scaffoldings of adequate strength shall be used as a safe means of access. A scaffold or its components should be designed to support 4 times the maximum intended load. During erection and dismantling, neither the scaffolding components nor tools shall never be allowed to be thrown up or down. Slippery conditions on scaffolds must be eliminated as soon as they occur.

##### **18.1. Wooden Scaffoldings**


As far as possible, wooden scaffolding shall be avoided. However, when it is unavoidable following precautions shall be taken.

- Vertical poles of scaffoldings should not be more than two meters apart.
- Diagonal bracings should be provided at the level of each joint. The joints in scaffoldings being the weakest points should be inspected regularly and maintained

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in proper condition. Diagonal bracings should be sufficient to prevent buckling of the scaffoldings due to wind pressure or side thrust.

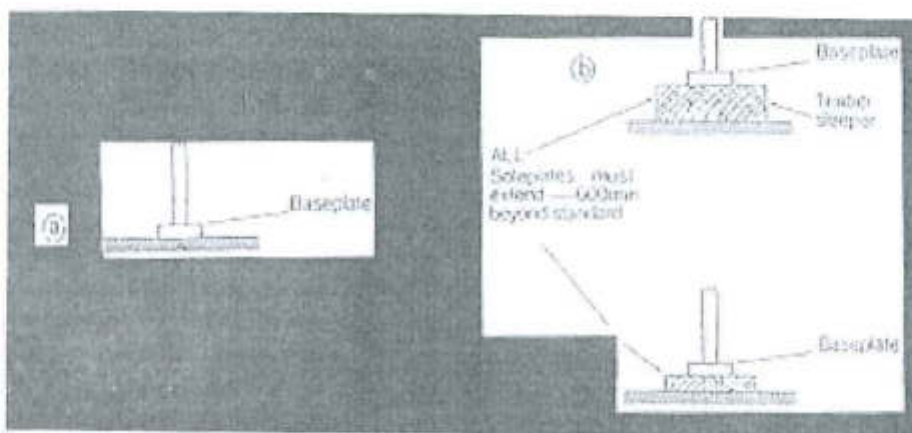
- No welding or gas cutting work shall be carried out in above or near wooden scaffoldings. In addition, suitable firefighting provision (preferably water hose) shall be made available.
- A shuttering supervisor exclusively shall be placed to check, monitor and ensure that no failure occurs while pouring concrete.

### 18.2. Hanging Scaffolding / Swing Scaffolding / Continuous Scaffolding


- Chain, ropes or other lifting materials used for the suspension of scaffolding must be of adequate strength and of suitable tested quality. In any case, the rope shall not be less than 20 mm dia. The chain or rope used for suspension scaffold should be properly fastened to safe anchorage points and not to hand railing, etc.
- In continuous scaffolding, more than 2 persons should not stand. The scaffold must be inspected and tested every day before use.
- The working platform shall be sufficiently wide and provided with handrails of about 1 Meter height with one top rail, mid rail and toe board
- If the platform is long and provided with two lifting arrangements, lowering/ lifting of the scaffolding should be done simultaneously at both the ends. A safety rope shall be provided in addition to the main supporting rope.
- A tag tie should always be used to control the movement of the scaffolding.

### 18.3. Steel Scaffolding

- Before starting the scaffolding erection, the surface on which it has to be erected must be made firm and level.
- Once the surface is ready, sole plates have to be kept. It can be a timber sleeper or steel plate. Sole plates should be long enough to hold at-least two vertical pipes and should extend 600 mm beyond the vertical pipes. Sole plates may be avoided in case if the scaffold is erected on a firm ground. (Ref Fig. 16.3 (i)).

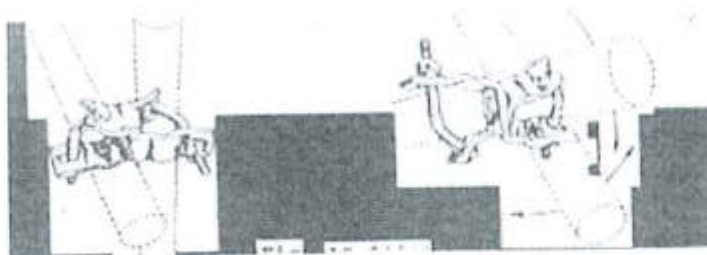


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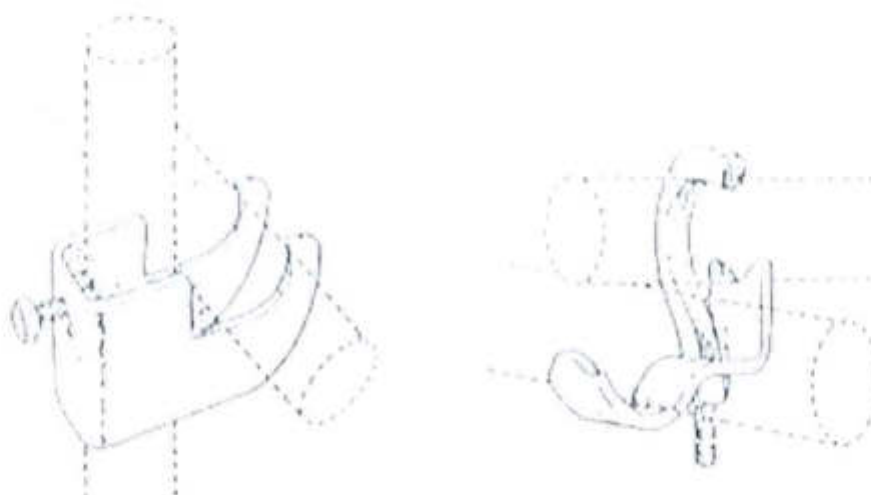
**Fig. 16.3 (i)**

- However, base plates are a must, irrespective of where the scaffolding is erected. It should be 200 x 200 x 10 mm steel plate. Sole plates and base plates support the entire load of the scaffolding. They distribute the load and prevent the scaffold from sinking.
- Vertical members should not be kept more than 3 M apart.
- Right angle coupler and swivel coupler used in the erection of scaffolding are tested for 1.2 tonnes without slipping (Fig. 16.3(ii)).



**Fig. 16.3 (ii)**

- Single bolt coupler can take only a load of 508 kgs without slipping. The putlog coupler can take only 129 kgs without slipping (Fig. 16.3(iii)).
- Joint pin connects the pipes internally. This can be used only to connect vertical pipes (Fig. 16.3(iv)).
- Sleeve couplers are fixed on the outside of two tubes to connect them. This can be used to connect vertical, horizontal and slanting pipes.




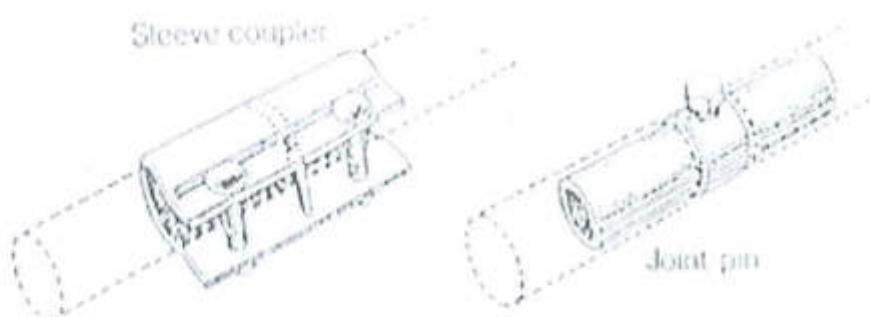
**Fig. 16.3 (iii)**

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**Fig. 16.3 (iv)**


- DO NOT USE PIPES WHICH are (a) split along their length, (b) bent or kinked, (c) thin at the ends, (d) heavily pitted and (e) having badly cut or ragged ends.
- Do not use corroded or deformed couplers and make sure that the threads are in good condition.
- Allowable maximum span between support for:
  - a) 40 mm thick plank is 1.5 M and
  - b) 50 mm thick plank is 2.6 M.
  - c) Wooden jallies is 1.0 M.
  - d) Steel jallies is 1.5 M.
- The Overhang of a scaffold plank should be at least 50 mm but not more than 4 times the thickness of board.
- Knots or knot holes in the scaffolding board should not exceed 50 mm in diameter across the edge. The board must not be split even partway. The grain should be reasonably straight.
- Dropping or throwing materials from the top and from bottom to top should not be entertained. A rope shall be used for that purpose.

#### **18.4 Common Faults in Scaffolding**

- Supporting of boards inadequate and therefore liable to tilt.
- Absence of toe-boards and guard rails where necessary.
- Faulty alterations made without approval.
- Erected on uneven ground.
- Supported by scaffold lashings instead of wire ropes.
- Couplers misused; use of putlog coupler where load bearing coupler to be used.
- Absence of ties where necessary.
- Foundations insecure.
- False supports, for example, drums, ladders, piles of brick etc.
- Outdated and damaged couplers.
- Lack of bracings.

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- Defective boards, large knots, splits etc.
- Inadequate access.
- Not wide enough - three planks is normally the minimum.
- Gangways obstructed.

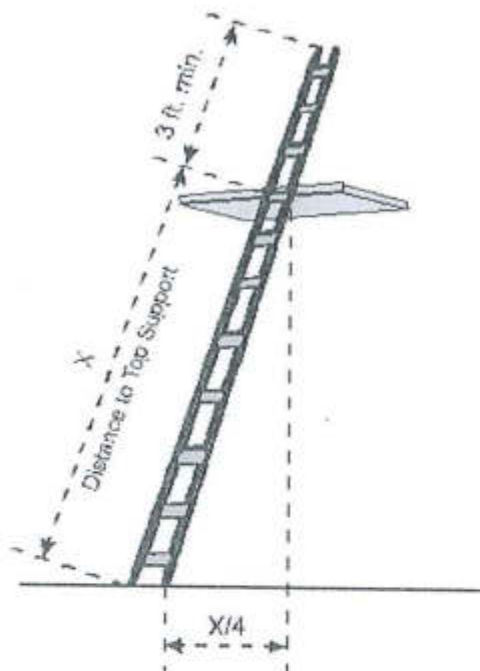
## 19. LADDERS:

The following practices should be observed when placing ladders:

- Place a ladder so that the horizontal distance from the base to the vertical plane of the support is approximately one fourth the ladder length between supports. For example, place a 4 M ladder so that the bottom is 1 M away from the object against which the top is leaning.
- Do not use ladder in a horizontal position as runways or as scaffolds. Single and extension ladder is designed for use in a nearly vertical position and not be used in horizontal position.
- Never place a ladder in front of a door that opens towards the ladder unless the door is locked, blocked or guarded.
- Place the ladder feet on a substantial, firm and level base, and not on any other objects, like barrels, wooden boxes etc.
- When using a ladder for access to high places, securely lash or otherwise fasten the ladder to prevent its slipping.
- Secure both bottom and top to prevent displacement when using a ladder for access to a scaffold.
- Extend the ladder side rails at least 1 meter above the top landing.
- Do not use a metal ladder close to live electric wiring or any operational piping like acid, gas, etc. which could be damaged.
- While ascending or descending, the user shall face the ladder, use both hands and place his feet near the ends of the rungs rather than the middle. Be sure the shoes are not greasy, muddy or slippery before ascending or descending.
- Extension ladder should be sufficiently propped.



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- All ladders of vertical height more than 10 meters shall be provided with an intermediate landing with guard rail, mid rail and toe board.
- No portable single ladder should be over 6 meters in length.
- Ladders should not be hung from brackets, as it tends to pull out the rungs.


- Landing - Tie-up the ladder with this.
- Aisle - Do not place ladders blocking this.
- Doors - Do not keep ladders against this.
- Descend - Do not ascend or descend with some materials in the hands.
- Elec. Equip. - Do not use metal ladders to work in this.
- Rungs - Do not have makeshift methods, in case this breaks.

## 20. DEMOLITION:

- Before any demolition work is commenced and also during progress of work the following safety precautions are to be taken:
- A definite demolition procedure shall be worked out after studying the entire structure and followed strictly throughout the demolition work.

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- All the roads and open areas adjacent to the work site shall be protected and caution Boards / Danger sign in local language, Hindi English shall be displayed at prominent places. Unauthorized entry to the building under demolition shall be effectively controlled.
- No electric cables or apparatus, which is liable to be a source of danger, shall remain electrically charged. Water and gas connections, if any, have to be removed, but a separate water source must be available nearby for quenching operations.
- Glass panels of doors and windows are to be removed first.
- When only a portion of a structure is to be demolished adequate props should be provided to prevent damage to the remaining portion due to shock and vibrations. Shoring of other buildings may be necessary when the demolition operation exposes or breaches and adjoining wall.
- Debris shall not allow to be thrown from heights. Remove all debris promptly, using chutes or through internal holes. Try to minimize production of dust, by watering.
- Permit no employee to work below others.
- Safety appliances like safety belt, goggles, foot protection, gloves, etc. should be used, wherever necessary.
- Use only proper and tested tackles while lowering heavy materials.
- The cages, hoists, tackles should not be overloaded.
- Before demolishing buildings with over hangs, chajjas, etc. they should be properly supported and demolished first before demolishing superstructure of the buildings.
- The work should be carried out under strict supervision of a responsible supervisor. Only one man who is well experienced should give signal.
- All practical steps shall be taken to prevent danger to persons employed from risk of fire or explosion. No floor, roof or other part of the building shall be so overloaded with debris or materials as to render it unsafe.
- While breaking roof slabs, workmen should not be allowed to sit on the same floor. A separate platform with independent supports shall be used for the demolition purpose.
- Walls should not be left in an unstable condition where they may be toppled by wind or other force. Walls may need temporary support unless designed to be free standing.

## 21. PROTECTION FROM EXCESSIVE NOISE:

The SPPL / subcontractor shall take adequate measures to protect the workers against the harmful effect of excessive noise. The noise should not exceed the limit prescribed under the local regulation.

- Provide engineering controls and PPE's to reduce noise as far as practically possible.



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## 22. PLANT & EQUIPMENT

### 22.1. General

In this section of "Plant & Equipment" the accident preventive measures to be followed for all Diesel/Petrol engines and Light/Heavy Vehicles, in general, have been covered in two separate sub-sections. These procedures and practices are applicable for all plants and equipment, which have engines or are treated as vehicles.

The specific safety measures for any particular plant or equipment has been further elaborated and detailed in the relevant equipment items subsequently.


### 22.2. Hydraulic Excavators / Power Shovels

- Trained and authorized persons should operate.
- Warning boards should be displayed where excavation is going on. Put barricades around the excavated area. "KEEP AWAY" from the "SWING AREA"
- Before starting movement of the machine check the inside, outside and down side of the machine.
- Never grab joysticks or other control levers while getting on/off the machine.
- During operation, do not read, drink or eat. Do not divert your attention away from the attachment / control board
- Never swing the load over persons.
- Never allow anyone to ride in the machine.
- Never try to operate the machine except from the seat of the operator as the machine may go out of control.
- Do not load a dumper / truck unless the driver is in a safe location.
- Working in the vicinity of electrical lines, contact the electrical department before beginning excavation.
- Treat all power lines as energized even when it is known that the power is shut off and the line is grounded.
- Always maintain more than the minimum specified clearance between the machine and the power lines, employ a qualified or experienced signalman, if required.
- Slow down the operation cycles when operating in the vicinity of power lines.
- Remember death can occur in case of an accident caused due to electric shock from the energized power line.
- Never exceed the lifting capacity of the machine.
- Keep the machine away from the edge of an excavation. Avoid cutting under the machine.
- Operating on a slope is risky.
- Heavy items to be lifted by a hydraulic excavator should be hung from the designated lifting point. Never exceed the specified lifting values as shown in the chart. Failure of the bucket/ sling can occur even if the wire ropes used for the boom suspension as well as for the shovel / bucket shall be of the specified diameter.

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- Always use the proper equipment for the job to be undertaken.
- While moving on a road, travel with the headlights on even in the day light. While taking a turn allow for boom overhand and other structural clearance if any. Watch for boom clearance while travelling.
- Be careful while parking the machine. Do not park the machine where there is a possibility of the ground caving-in or at low-lying areas where the rainwater might accumulate.
- The attachment is held in position by the trapped hydraulic oil in a cylinder or a motor when the machine is not working (Hydrostatic locking). If there is any leakage of hydraulic oil, the attachment might come down suddenly endangering anyone or anything who/which may be below the attachment. Make sure that attachment is firmly resting on the ground.
- Power shovels / Excavators shall be so operated as not to endanger their stability.
- Power shovels that are equipped with unit for deep digging shall either be so designed that the bucket teeth should not come nearer the under-carriage more than 40 cm or be provided with reliable stop that prevents the bucket to come nearer than the specified distance.
- The boom shall not be pulled tight against the emergency stops while supporting a load.
- The bucket or grab of the shovel shall be pulled out of the bank as soon as it is full. When not in use, the bucket shall be kept resting on stable ground and shall not be left hanging.
- The bucket or grab of a power shovel shall be fixed to restrict movement while it is being repaired.
- While operating near edge of excavations or embankment substantial space shall be provided to prevent it from approaching a dangerous position and the sides of the excavation shall be adequately shored. Heavy equipment such as excavating machinery and road traffic shall be kept back from the excavated sides at a safe distance.
- The height of benches in overburden shall not be more than the height of the boom of the machine used for digging excavation of removal.

### 22.3. Tippers / Dumpers

- No unauthorized persons should operate the vehicle.
- Tipping system should be used only after positioning the vehicle for unloading (Tilt cylinder lever should not be tampered with).
- Rear view mirrors should be provided on both the sides of the cabin for reversing, loading or unloading of the vehicle.
- All tippers/ dumpers should be equipped with reverse horn.





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#### 22.4. Water Tankers (Truck Mounted Type)

- No unauthorized person should operate the vehicle.
- Rear view mirrors should be provided on the cabin on both the sides for reversing the vehicle.
- The vehicle should be placed on a firm ground for filling or emptying the tank.

#### 22.5. Tractors

- No unauthorized persons should operate the vehicle.
- Tilting and lifting should be done only when required.
- Vehicles should be used for towing, levelling or ploughing purposes only.
- Workers should not be allowed to travel on a tractor.

#### 22.6. Vibratory Compactors

- A trained operator should be allowed to run the machine.
- If the compactor is electrically operated, the wiring/ cables should be properly laid so that movement of the machine is not restricted.
- Electrically operated compactor must be earthed properly.

#### 22.7. Vibratory Rollers / Road Rollers

- A trained/ Authorized person should operate the machine.
- Caution boards should be displayed at the site of work.
- In the vicinity of the weak structures, vibration should be minimized and to bed own with precautions.
- Vibration should not be continued while the roller is not in motion.

#### 22.8. Tar Boiler


- Only trained person should be allowed to operate the equipment.
- Burner and the connections should be checked against blockade/ leakage.
- Equipment should be anchored properly before loading and firing.
- Fuel tank should always be kept at a distance from boiler.
- Never use petrol with diesel for burner firing.
- Exhaust pipes should be checked / inspected against blockade.
- Keep your hands and face away from the inspection hole while burner is in operation / started firing.

#### 22.9. Pavement Breakers / Concrete Drills

- Safety goggles should be worn by the operator while working.

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- All the pneumatic hose connections should be checked to detect any leakage, before starting the machine/tools.
- Whips to be provided with all compressed air hoses.
- Damaged hoses should be replaced immediately.

#### **22.10. Pneumatic Compressor**

- Compressor should be checked against any crack in the air receiver and pipe connection.
- Safety valves should be checked periodically for their effective functioning at the specified / set pressure.
- Pressure gauges should be checked regularly.
- Compressor should not be installed / placed near excavation pits / blasting area.
- Air hose ends should not be kept free to avoid whipping.
- No one should use compressed air to clean his dress or body. It should not be directed on others; no horseplay is allowed with compressed air.
- Supply of compressed air to pneumatic tools should be controlled by valves and connected with oil lubricator.
- Goggles should be used while the air compressor tools are in operation.

#### **22.11. Concrete Batching and Mixing Plant**

- Skip, weigh batcher and drum should be clearly visible to the operator in the cabin.
- Trained persons only should operate the plant.
- Weighing attachment should not be tampered with / nothing should fall on it.
- Mixing drum should be cleaned after completion of each and every delivery.
- Workmen should be kept away from the area of operation of scrapper unit.
- Plant should have proper earthing.
- Periodic inspections of wire ropes should be done.
- Overloading of the scrapper/ skip unit and drum should be avoided.
- Any unwarranted mechanical noise should be carefully probed into for corrective action.
- All operators and laborer for cement filling should use dust masks and helmets.


#### **22.12. Transit Mixer**

- Only trained/ valid license holding person should be allowed to operate the equipment.
- Rear view mirrors should be provided for reversing the vehicle.
- Mixing drum should be cleaned regularly.
- Inspection covers of the drum should be bolted properly.
- Water and air connections should be checked before operation.

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### 22.13. Mixers

- All gears, chains and rollers of concrete mixer should be adequately guarded to prevent damage / danger.
- Concrete mixer hopper shall be protected by side railing to prevent workers from passing under them. Operators shall make sure before lowering the skip that the operational space is absolutely clear.
- Wire rope used for hopper hoisting has to be checked thoroughly and periodically.
- Hopper hoist and anchoring brake should be checked for proper functioning.
- Be sure that motor fan guard is secured.
- Be sure that wiring is properly connected and insulated.

### 22.14. Concrete Pump

- Only the trained persons should operate the equipment.
- The pipes, bends and the snap couplings should be checked against leakages/cracks.
- O-Ring with the proper size only should be used between the joints / connections.
- The equipment should be greased periodically.
- Slurry should be passed before pumping the concrete.
- Elephant hose should be held in position with the help of rope while discharging concrete.
- Electrical connections and earthing of the equipment should be properly done.
- Proper anchoring should be done between piping and equipment.

### 22.15. Concrete Vibrators

- Vibrating unit shall be completely enclosed and the belt transmitting power to the unit to be adequately guarded.
- Electrically operated compaction vibrators shall be totally enclosed and be protected against overloads by suitable overload relays and shall be effectively earthed.
- Be sure that the sufficient length of cable is provided to the vibrator.
- Ensure electric starters are fixed firmly on the stand.
- While needle is inserted in the vibrator, be sure that needle load is firmly locked.
- Be sure to lubricate inner core of needle.

### 22.16. Overhead Hazards


Overhead protection shall be provided at any location where there is a hazard of falling objects. This shall particularly be observed around any scaffolding and in excavation.

Goalposts (wooden) shall be erected under all overhead power lines with minimum safe clearance to prevent the arms or jibs of crane/plant from approaching such lines.

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## 22.17. Cranes

All cranes must be tested and certified by competent authority and SWL of the crane shall be written on the crane. The capacity of the crane should be ascertained by user before use.

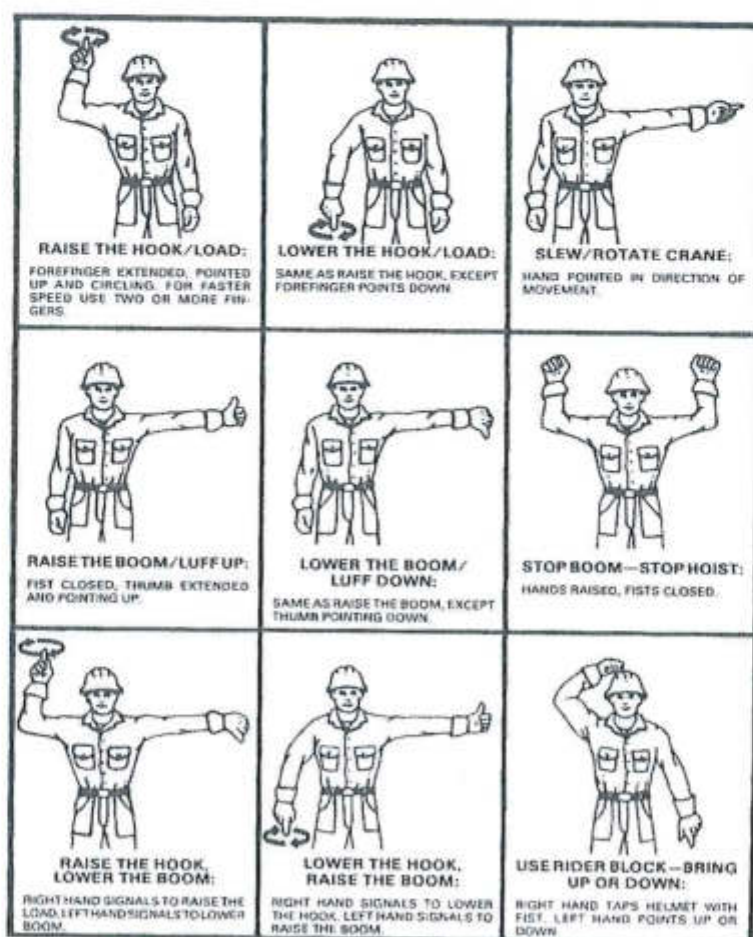
- Crane should never be overloaded.
- Crane should be operated by authorized person.
- Mobile cranes should be parked on hard soil or strong base. They should not be placed near the edge of the pit or excavation.
- Crane should be tested at least once in a year by competent person or according to local legislation requirement.
- Safe working load of any mobile crane depends on:
  - Operator's skill
  - Condition of the ground
  - Boom length
  - Radius of rotation and inclination of boom to the vertical while lifting the load
  - Out rigger blocked / free
- The safe working load is generally tabulated in the load chart of the crane. Sometimes cranes are de-rated due to the defects in welding, bend in angle, bracings and condition of clutch brake.
- Remember that the capacity of a crane is the total load hung from the hook including weight of hook, block, ropes, slings etc.
- Standard signaling code properly understood by the operator and trained signaller should be used. The crane operator shall respond to signals only from the appointed signaller but shall obey 'stop' signal at any time no matter who gives it.
- Tag lines should be used while hoisting heavy and bulky materials.
- The brake, boom, hook, wire rope pulley and rope anchoring should be checked periodically by a maintenance person to ensure safe operation of a crane.
- The load being lifted should not touch the boom.
- The boom or any part of the crane should not come near any live electric line/ service line.
- Swinging of load should be done smoothly.
- Proper quality of packing should be used, and the outrigger should rest tightly on the packing placed on support.
- Nobody should stand below the boom or load.
- The operator should be positioned at high level to see the hook and load throughout the hoisting, swinging and unloading operation.
- During storm, the hook block should be anchored firmly and swing lock to be released.
- When an extended boom is used on the crane, the operator must use extreme care in lowering the load to the ground. An extended boom should never be lowered to

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one side of the chassis as the stability of the crane is usually reduced at that position.

- During shifting the crane has to be crawled on a heavy timber mat in case soil does not have adequate bearing capacity.
- Any make shift methods to maximize utilization of crane such as blocking with timber or adding counter-weight, should not be permitted.
- In idle condition the crane operator should remove load from the hook and raise the hook block to a maximum height.
- The crane operator should keep the cabin deck free from any oil, mud and grease.
- Operator should always keep the windshield clear in order to have clear vision.
- Ensure at least two full winding of ropes always on the rope drum. After a boom extension, the hooks shall be lowered to the required lowest point to ensure that at least two dead coils remain on the drum and to the highest point to check that the drum capacity will not be exceeded.





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#### 22.18. Mobile Cranes

- Following precautions have to be taken while using tyre mounted mobile cranes in addition to the given above.
- When traveling up a gradient, the load shall be derrick out and when travelling down a gradient, the load shall be derrick into the minimum radius, and this position shall be corrected on reaching level ground. Otherwise, constant watch on the radius should be maintained while travelling on uneven surfaces.
- The mobile crane shall be fitted with suitable horn, headlights, and side lamps, rear and stoplights and flashing direction indicator.
- A cantilever type jib of crane when travelling without load should be lowered to a horizontal position.
- The pneumatic tires shall be maintained at the correct pressure at all times.

#### 22.19. Chain Block/ Pull Lift


- Chain blocks of proper lifting capacity supported by Test Certificate should be used for lifting known loads.
- Chain block must be checked and tested periodically. It should be lubricated before every use.
- No cannibalizing should be done on chain block.
- Chain block should be tested against slip by suspending safe load.
- It should operate freely and the chain should not come out of pulleys.
- The anchorage should be strong and rigid.
- They should be checked for cracks, excessive wearing, elongation, etc. Hook opened out should not be used.
- No chain block / puller which has been tampered, should be used unless it is thoroughly checked and tested by competent person.
- Chain block / pulley must be checked if stored for longer time, by subjecting to shock load to observe slipping of load, jamming of links etc.

#### 22.20. Winches

- Safe working load with gearing arrangements should be marked on the winch and tested regularly by competent person.
- Winch should not be overloaded.
- It should be placed on a firm base and properly anchored.
- The brake, ratchet arrangement, gear and pinion including the meshing, wire rope and its clamping arrangements and direction of receiving rope drum / tie rods should be checked before using the winch.
- Ratchet arrangement should be kept in position while hoisting a load.
- Tie rod should be adjusted not to allow drum movement causing clutch arrangement to slip.





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#### **22.21. Bar Bending and Cutting Machines**

- Only trained persons should be allowed to operate the equipment.
- Equipment should be grounded / earthed properly.
- Equipment should be placed on sound foundations for fixing properly.
- Bars used for cutting or bending should be of designated size as per manufacturer's catalogue of the machine.

#### **22.22. D.G. Sets**

- No unauthorized person should operate.
- Equipment should be mounted on foundation or on levelled ground with anti-vibrator pads.
- Equipment should be grounded / earthed properly as required.
- Ventilation should be proper. The exhaust piping should have less bends and no restrictions. Make and emission of DG sets shall be maintained as per the local standards.
- Safety devices should be checked / inspected before use / operation.

### **23. HOUSE KEEPING:**

The SPPL / subcontractor shall maintain his work areas, site office and storage are clean and tidy.


- All cables shall be routed safely.
- Material storage at store or at erection site shall be done systematically at identified places only. In no condition the gangways, stairs or other work front can be disturbed by improper storage.
- After completion of work or end of day the subcontractor shall remove the surplus materials, scrap or debris generated during construction.

#### **a) Stacking of materials:**

The SPPL / subcontractor shall ensure, at a construction site that:

- All construction materials are stored or stacked in a safe and orderly manner to avoid obstruction of any vehicle movement, pedestrian etc.
- Material piles are stored or stacked in such a manner as to ensure stability
- Material or equipment is not stored upon any floor or platform in such quantity as to exceed its safe carrying capacity.



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- Material or equipment is not stored or placed so close to any edge of a floor or platform as to endanger the safety of persons below or working in the vicinity.

#### **b) Stacking of cement bags, pipes and other material:**

The SPPL / subcontractor shall ensure, at a construction site that:

- A stack pile is not more than ten bags in height unless such stack pile is stacked in a suitable enclosure or otherwise adequately supported.
- While removing bags from the stack pile, the stability of such stack pile is ensured.
- Bags containing cement or lime are stored in dry places.
- The material like bricks, tiles or blocks are stored on a firm ground.
- Reinforcing steel is stored according to its shape, size and length, stack of reinforcing steel is kept as low as possible.
- No pipe is stored on rack or in stack where such pipe is likely to fall by rolling.
- The material or article are not stacked to such a height and in such a manner as would render the pile of such stack unstable and cause hazards to the workers or others.

#### **24. DRINKING WATER:**

The SPPL / subcontractor shall make in every place where construction work is in progress, effective arrangements to provide and maintain at suitable points conveniently situated for all person employed therein, a sufficient supply of wholesome drinking water.


#### **25. RIGHT TO STOP WORK:**

The SPPL Managers / Safety Officers /Engineers shall have the right at his sole discretion to stop the work, if in his opinion the work is being carried out in such a way that it may cause accidents and endanger the safety of the persons and / or property, and / or equipment. In such cases, the subcontractor shall be informed in writing about the nature of hazards and possible injury/ accident and he shall comply to remove shortcomings promptly. After taking all corrective measures subcontractor shall inform to the concerned authority for verification then only he can resume the stopped activity.

The subcontractor shall not be entitled for any damage/compensation for stoppage of work due to safety reasons and the period of such stoppage of work shall not be taken as an extension of time for completion of the facilities.






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## 26. FAIR CULTURE

Fair Culture in H&S could be defined as a balanced approach in workplace which has three main pillars:

### 1. Encourage positive behavior:

Positive behaviors and ideas must be appreciated, motivated and recognized.

Therefore, employees leading with exemplary behavior, contributing feedback on safety and sharing good practices / innovative ideas must be recognized and rewarded.

### 2. Improve sharing:

Fair Culture policy allows errors and mistakes to be fearlessly reported and should be used as an opportunity for improvement. Safety culture where more sharing takes place is better culture because it's an open culture. In this case you not only identify the causes which are responsible for injuries / losses but also share them to alert others and prevent similar incidents to happen.

### 3. Do not tolerate the unacceptable behavior:


The third pillar of fair culture policy is "strict action against willful violations". To reprimand willful violations is part of service rule book of employees as per which willful violation are punishable to the level of responsibility of violator. This can even lead to termination of employment contract. Any breach of rule, violation of established procedure or norms is unacceptable to the organization.

## 27. STATUTORY PROVISION:

The SPPL / subcontractor shall comply with applicable Acts / Rules e.g. THE BUILDING AND OTHER CONSTRUCTION WORKERS (regulation of employment and conditions of service) ACT & RULES. & WORKMEN'S COMPENSATION ACT 1923.





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## 28. PROCEDURE FOR COMMUNICATION OF SERIOUS INCIDENTS:

Following events to be considered as serious incidents:

- Accident resulting in fatalities or a life-threatening situation
- Serious injury
- Significant damage to property or the environment
- Significant security or safety issues
- Significant risk of liability to SPPL
- Major negative media impact
- Damage to the image of SPPL

Sl. No.	Communication	Responsibility
Communication at site level:		
1	Immediate communication to Site Manager / Safety officer and concerned subcontractor	Concerned Supervisor
2	Communication to clients	Site Manager
3	Communication with Hospitals/ Ambulance Room	Supervisor / Site Manager
4	Communication to local emergency services e.g. fire brigade etc.	Safety Officer / Supervisor
5	Communication to Project Director	Site / Project Manager
Communication to HO level:		
1	Communication to HSE manager	Project Manager / Director
2	Communication to CEO	HSE Manager / Project Director
3	Communication to local authorities and response agency	Project Director through client
4	Designated person for media contacts	Project director through client
5	Communication with families of the affected person if required	Project director through Client




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## 29. EMERGENCY CONTACT NUMBERS

To be displayed in all site offices and work sites

SL	NAME OFFICE / AUTHORITY	CONTACT NO
IN CASE YOU SEE ANY DANGEROUS SITUATION OR ACCIDENT IN WORKSITE PLEASE INFORM TO:		
A	HSE OFFICER	78997 35202
B	PROJECT IN CHARGE	99000 21077
NUMBER OF AUTHORITIES FOR HELP IN CASE OF SERIOUS ACCIDENT		
1. NEAR BY POLICE STATIONS (Different Locations)		
A	Control Room	100
B	Police Station – Near Head Post Office	08251 - 230555
C		
2. NEAR BY HOSPITAL (Different Locations)		
A	Puttur City Hospital	08251 – 237782
B	Ambulance	108
3. NEAR BY BLOODBANK		
A	Rotary Campco Blood Bank, Puttur	08252 – 234242, +91 - 9449215502
4. NEAR BY AMBULANCE SERVICE		
A	Control Room	102
B	Ambulance	108
5. FIRE BRIGADE		
A	Control Room	101
B	Fire Station	08251 - 232101

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### 30. HSE TRAININGS:

All employees to be inducted by concern manager / HSE manager before visiting site.

All employees including subcontractor employees to be inducted for site specific hazards and associated risks and safety rules to be observed during site work. Minimum hour training will be mandatory for Communicating HSE rules related to site. However, other specific topics e.g. Road Safety, Driving Safety, Safety in excavation work, first aid etc. can be giving in separate sessions to separate target groups as per the training needs identified.

HSE manager should keep record of all such trainings.

## TRAINING ATTENDANCE SHEET

### TRAINING PROGRAMME:

DATE:

TIME:

CONDUCTED BY:

### Topic Covered:

- ☐ **Basic Trainings:** Induction to HSE mgmt., Project Familiarization, Construction Orientation, Environmental Awareness, Water, Air, Land Pollution, First Aid, Driving Safety/Road Transport, Hazard Spotting, PPE, Safe Working Practices, Manual Handling, Risk Assessment, Emergency Preparedness, Basic Fire Fighting, Permit to Work, Safe Handling of Chemicals
- ☐ **Skilled Workers: Basic Training +** Signs & Signals, Falls & Falling Objects, Electrical Hazards, Hand Tool Safety, Machinery Maintenance & Equipment Check, Spill Containment and Response.


### I ACKNOWLEDGE THAT I HAVE UNDERSTOOD THE ABOVE-MENTIONED TOPICS

S/N	NAME	COMPANY / DEPTT.	DESIGNATION	SIGNATURE
1.				
2.				
3.				
4.				
5.				

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### 31. MINIMUM STANDARDS FOR LABOR CAMPS:

Following minimum standards for labor camp to be maintained at site.

	Control H&S Risks and Environmental Impact	CLLC-01
	MONTHLY CHECKLIST FOR LABOUR CAMPS	Rev. 1-Apr.2018
<b>Contract:</b>		
<b>Subcontractor:</b>		
Meaning of compliance levels: 0 = Unacceptable, 1 = Major corrections needed, 2 = Minor corrections needed, 3 = No corrective action needed		
	COMPLIANCE %	0.0
<b>Sl</b>	<b>Check Points to ensure minimum safety, security &amp; welfare standards at labour camp</b>	<b>Compliance Level (0,1,2,3)</b>
<b>1</b>	<b>General:</b>	
<b>i</b>	Isolation from active work site	
<b>ii</b>	Entry control, security & circulation	
<b>iii</b>	Cleanliness of common areas	
<b>iv</b>	Display of Life Saving Rules, Do's & Don'ts and emergency contact details	
<b>2</b>	<b>Living areas</b>	
<b>i</b>	Robust construction, space allotted (16ft x 12ft for 6 workmen, 192/6=32)	
<b>ii</b>	Individual mattress, bunk bed etc. facilities	
<b>iii</b>	Air circulation / fans / coolers	
<b>iv</b>	Cleanliness of living rooms	
<b>3</b>	<b>Housekeeping</b>	
<b>i</b>	Deployment of dedicated team for housekeeping	
<b>ii</b>	Availability of bins / skips in living and common areas	
<b>iii</b>	Disposal of waste on daily basis / Waste Mgmt.	
<b>iv</b>	Storage conditions - food stuffs and other items	
<b>4</b>	<b>Lightings</b>	
<b>i</b>	Dedicated feeder / panel / DB with ELCB for labour camp	
<b>ii</b>	Area lighting and lighting in living rooms	

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iii	Condition of electrical cables & appliances		
iv	Periodic inspection by electrical engg. & H&S officer		
<b>5</b>	<b>Water &amp; Sanitation</b>		
i	Maintaining drinking water facility in safe and clean condition (storage provision and availability of drinking water 20L/workmen)		
ii	Maintaining potable water facility for bathing (covered), washing of cloths etc. (Storage provision and availability of 50L/workmen)		
iii	Maintaining toilets in clean conditions (1 toilet for every 15 workmen / women separately)		
iv	Safe disposal of waste water & general cleanliness of area		
<b>6</b>	<b>Cooking &amp; Canteen Facility</b>		
i	Maintain kitchen area in safe & clean condition		
ii	Cooking of food inside living rooms is prohibited		
iii	Maintain a reasonable eating space and canteen facility		
iv	Maintain arrangements for prevention and controls of fire		
<b>7</b>	<b>Health</b>		
i	Is there 6 monthly medical checkup camps		
ii	Does the doctor examines on communicable diseases?		
iii	Does the facility have arrangements for first and tieup with hospitals for nearby hospital for emergency medical cases.		
iv	Does there arrangements for insects, snakes etc. repellents		
<b>8</b>	<b>Other points</b>		
i	Common recreation facility at camp - Volleyball court / Carrom / Yoga		
ii	Weekly meetings between labour camp in charge and members (1 out of 25)		
iii	Maintaining following mandatory registers for record of: - workmen living in camp as per allotted living room number - Weekly / monthly control of camp - complain / suggestion register - health check-up records to avoid contagious etc. diseases		

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	- record of kids with a dedicated care taker - fire extinguishers inspection record		
iv	Monthly joint inspection by labour camp in charge, H&S Manager, facility manager of subcontractor and SUEZ project manager / his representative		
	Signatures:		
	Labour Camp Sup.	Facility Mgr (Sub)	
	H&S Manager	Project Mgr.	





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## **32. SITE VEHICLES:**

### **Instructions for Drivers:**

Drivers must have valid driving license, training and adequate experience. Following are vital aspects of good driving!

#### **a. AWARENESS**

- Know your vehicle
- Know the road conditions
- Mentally prepare yourself & avoid frustration
- Ensure statutory vehicle documents are available with you.

#### **b. ANTICIPATION**

- Plan for unexpected/others' unsafe acts
- Adjust speed for road condition/construction
- Observe surroundings e.g. schools, parks, walkways, etc.
- Always wear your seat belt before starting your car for your own safety. Also ask persons accompanying you to wear seat belt.
- Signal your intention to change lanes/turn
- Always obey & respect traffic signals.
- Jumping red light signal endangers your safety as well as safety of other road users
- Always adhere to the prescribed speed limits while driving.
- Slow down while approaching roundabouts, road crossing, speed breakers etc. and negotiate them safely.
- Don't indulge in zig-zag driving, wrong overtaking, improper lane changing etc.
- Don't mix drinking & driving.
- Drunken driving can prove fatal.
- Do not drive if you are under medication.

#### **c. DRIVING AT NIGHT IS MORE DIFFICULT THAN DAY:**


- Your Headlight illuminate only a portion of road.
- Have your headlights properly aimed. Misaimed headlights blind other drivers and reduce your ability to see the road.
- SLOW DOWN WHEN DRIVING AT NIGHT !!!!
- Keep safe distance.

#### **d. BACKING / REVERSING RULES:**

As far as possible avoid reversing; if vehicle must reverse then Signal the reverse light. Avoid reversing over long distance.

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- If possible, get someone as reversing assistant; ask the person to stand at safe & visible place.
- Always look over your shoulders & check mirrors all time
- Keep one foot on brake Pedal
- Reverse Slowly
- Be careful of small children who may wander behind your vehicle.
- Follow and respect Traffic Signs.

### Vehicle Inspection Checklist:

Vehicle must be inspected monthly with reference to the following checklist and compliance must be ensured.

		<b>SUEZ PROJECTS PVT. LTD.</b>										<small>Doc: SPPL/HSE/ M-01 Rev.: 0 Date: APR - 2018.</small>									
VEHICLE INSPECTION CHECKLIST																					
SN	VEHICLE REG. NUMBER	DATE	MIRRORS	HEAD LIGHTS	INDICATORS		REVERSE LIGHT	BRAKE LIGHT	HORN	SEAT BELT		FIRST AID BOX	FIRE EXTINGUISHER	VEHICLE DOCUMENTS				TYRE CONDITION	BRAKES	DRIVER'S NAME / SIGNATURE	REMARKS
					FRONT	REAR				FRONT	REAR			DRIVER LICENSE/ VALID UP TO	INSURANCE VALID UPTO	REGISTRATION CERTIFICATE	FITNESS CERTIFICATE				



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### 33. INSTRUCTIONS FOR VISITORS:

- All cars to be parked in the designated parking area
- Firearms, weapon and consumption of alcohol is forbidden inside the work site.
- Be accompanied with company representative during site visit and follow his instructions during your visit.
- Please follow all safety instructions, signs and signals posted at site.
- Please be aware of hazards on site e.g. Traffic on the road, temporary accesses, deep tanks, excavated areas, Temporary electrical wires, tools, sharp objects, overhead hazards etc.
- Please be cautious, check the traffic on both the sides and then cross the road only when it is safe to do so.
- Keep away from work in progress and barricaded areas.
- Visitors are not allowed to climb any temporarily erected structure, enter electrical, chemical, chlorine, ATEX facility or any deep tanks / excavated areas without specific authorization of SPPL site manager.
- Specific risks related to this site will be communicated to you preferably on hazard map.
- Walk; don't run except in case of emergency.
- Don't touch any tools, equipment or objects without permission
- First aid kit is available at various locations in site & office.
- Please use bins for disposal of waste.
- Do not assume, if in doubt please ask.
- Please ask for **Risk Information Report (RIR)** forms, available in this site office. SPPL gives you (all stakeholders) right & opportunity.

To remove yourself from danger and notify potential risk or unsafe conditions you might encounter during your site visit.

To contribute your suggestions for improvement.


#### **Instructions to be followed in case of emergency**

- Emergency situation may arise due to any potential risk present on site.
- In case of emergency, assemble at nearest assembly point (in front of office / main gate)
- Seek help from company representative with you and wait for instructions of site manager.
- You can also call company site emergency coordinators on following numbers.

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HSE Manager / Project Manager

PLEASE COOPERATE WITH US; WE WANT YOU TO REACH HOME SAFELY

I assure you that I have understood all the above instructions given to me by SPPL representative and I will follow them during my site visit.



VISITOR'S NAME:

DATE & TIME:

SIGNATURE:



	Manage Environmental Aspects	Doc: SUEZ-EMP-01 Jun 2019 / Rev.: 1
	Environment Management Plan	

<h2 style="margin: 0;">Suez Project Private Limited</h2> <h2 style="margin: 0;">Environment Management Plan</h2>					
<p>Project: Construction of Works and Services for Operation and Management of 24X7 Water Supply System for Puttur Town , Contract Package No 02PTR01</p>					
		Amruth Yedugani	Vishal Pattanshetti	Pramod Kumar B.K	For Approval
Rev.	Date	Prepared By	Checked By	Validated By	Submission Purpose
00					

		Manage Environmental Aspects	Doc: SUEZ-EMP-01 Jun 2019 / Rev.: 1	
		Environment Management Plan		
1.7	Storage of materials	Identification of site for temporary use of land for construction sites /storage of construction materials, will be done with client consent. Good practices will be adopted for disposal of construction waste & it will be done in such manner that it is not posing hazard to environment.	Pre-construction & construction phase	SUEZ & Client
1.8	Construction of	All arrangements to be made for sanitation &	During the	SUEZ

S. No	Potential Environmental Impacts	Mitigation Measures	Time Frame / Contract Stages	Responsible Agencies
	Labour camps	welfare facility to ensure sound health & hygiene measures during construction and maintenance of labour camp. Construction and maintenance of labour camp to be done without damaging any flora/fauna or giving any considerable negative impact to the environment. The sewage system & garbage removal for the camp must be planned.	construction	
1.9	Pollution from Construction Wastes	All precautionary measures shall be taken to prevent the wastewater generated during construction (e.g. during the testing of pipeline) from entering into streams, water bodies or the irrigation system. All waste arising from the project is to be disposed off in the manner that is acceptable by the client. It must be ensured that all liquid wastes disposed off from the sites is not polluting the soil.	During Construction and post-construction	SUEZ
1.10	Disposal of construction debris and excavated materials.	Sites for debris disposal shall be identified and should be finalized in consultation with client prior to start of the earthworks; taking into account the following a) The dumping does not impact natural drainage courses b) No endangered / rare flora is impacted by such dumping c) Should be located in non-residential areas located in the downwind side d) Avoid disposal on productive land.  Minimize the construction debris by balancing the cut and fill requirements.	Pre-construction and Construction	SUEZ





S. No	Potential Environmental Impacts	Mitigation Measures	Time Frame / Contract Stages	Responsible Agencies
	top soil	completion of work, where the pipelines run, including open lands and agricultural lands, if any.	construction	
1.13	Dust Pollution near settlements	<ul style="list-style-type: none"> <li>i) All earthworks will be protected in manner acceptable to the client to minimize generation of dust.</li> <li>ii) Construction material shall be covered or stored in such a manner so as to avoid being affected by wind direction.</li> <li>iii) Unpaved haul road up to site office / plant site to be watered periodically to reduce dust pollution.</li> </ul>	During construction	SUEZ
1.14	Noise from vehicles, plants and equipment	<ul style="list-style-type: none"> <li>i) Servicing of all construction vehicles and machinery will be done regularly and during routine servicing operations, the effectiveness of exhaust silencers will be checked and if found defective will be replaced.</li> <li>ii) Maintenance of vehicles, equipment and machinery shall be regular and up to the satisfaction to keep noise levels at the minimum.</li> <li>iii) All potential high noise yielding machines shall meet MOEF guidelines and their preventive maintenance shall be done as per the approve plan.</li> </ul>	During construction & Operation and maintenance phase	SUEZ
1.15	Clearing of construction camps and restoration	<ul style="list-style-type: none"> <li>i) Site restoration plans shall be agreed by client after the construction work is over, the plan is to be implemented prior to demobilization.</li> <li>ii) On completion of the works, all temporary structures will be cleared away, all rubbish cleared, excreta or other disposal pits or trenches filled in and effectively sealed off and the site left clean and tidy, at expenses as may be agreed by contract.</li> </ul>	After completion of the project	SUEZ
1.16	Pollution from Fuel and Lubricants	<ul style="list-style-type: none"> <li>i) It shall be ensured that all construction vehicle parking location, fuel/lubricants storage sites, vehicle, machinery and equipment maintenance / refueling sites will be located far from rivers and irrigation canal/ponds.</li> <li>ii) All location and lay-out plans of such sites shall be submitted to client as per contract.</li> <li>iii) It shall be ensured that all vehicle/machinery and equipment operation, maintenance and refueling will be carried out in such a fashion that spillage of fuels and lubricants does not contaminate the ground.</li> <li>iv) Arrangement for collection, storing and disposal of oily wastes to the pre-identified disposal sites shall be done as approved by the client. All spills and collected petroleum</li> </ul>	Construction and operation & maintenance phase	SUEZ

	Manage Environmental Aspects	Doc: SUEZ-EMP-01 Jun 2019 / Rev.: 1
	Environment Management Plan	

## 2.Environmental Enhancement and Special Issues

S. No.	Environmental enhancement and special issues		Implementing Agency	Location
2.1	Flora and Chance found Fauna	<p>All reasonable precaution shall be taken to prevent workmen or any other persons from removing and damaging any flora (plant/vegetation) and fauna (animal) including fishing in any water body and hunting of any animal.</p> <p>If any wild animal is found near the construction site at any point of time, the contractor will immediately upon discovery thereof acquaint the client and carry out the client's instructions for dealing with the same.</p> <p>This must be reported to the near by forest office by / through the client (range office or divisional office) and appropriate steps/ measures shall be taken, if required in consultation with the forest officials.</p>	Project / Plant area	SUEZ & Client
2.2	Chance Found Archaeological Property	<p>All fossils, coins, articles of value of antiquity, structures and other remains or things of geological or archaeological interest discovered on the site shall be the property of the Government and shall be dealt with as per provisions of the relevant legislation.</p> <p>Reasonable precautions shall be taken to prevent workmen or any other persons from removing and damaging any such article or thing. He will, immediately upon</p>	Project / Plant area	SUEZ & Client



## 2. Environmental Monitoring Plan

To monitor the extent of environmental impact for proposed project, the periodic monitoring of the ambient environmental quality will be done. The monitoring requirement for the different environmental components is presented in table below:

<b>Traffic management:</b>	
Traffic management plan and implementation	
<b>Spoil Management:</b>	
Spoil mgmt. plan and its implementation	
<b>Air Quality Monitoring</b>	
O&M Phase	Operation & Maintenance period (as agreed)
Parameter	SPM, SO <sub>2</sub> , NO <sub>x</sub> , CO and Pb
Sampling Method	Use method specified by CPCB for analysis
Standards	Air (Prevention and Control of Pollution) Rules, CPCB, 1994
Frequency	Once before start of O&M phase & or as agreed by client
Duration	As per rule / procedure
Location	DG Sets.
Implementation	Contractor through approved monitoring agencies
Supervision	Implementing agency
<b>Water quality Monitoring</b>	
O&M phase	Operation & Maintenance period (as agreed)
Parameter	As agreed by client / as per applicable standards
Sampling Method	Grab sample collected from source and analysis as per Standard Methods for Examination of water and Waste water
Standards	Indian standards for Inland Surface Water (IS; 2296, 1982) / for Drinking water (IS; 10500,1991) or as per contract specifications.
Frequency	Twice a year (pre-monsoon and post monsoon seasons) / As agreed by client.
Duration	Grab sampling
Location	Treated water reservoir / raw water sump.
Implementation	Contractor through approved monitoring agencies
Supervision	Implementing agency
Noise	Operation & Maintenance period (as agreed)
Frequency	Once in a year.
Duration	Reading to be taken at 15 seconds interval for 15 minutes every hour and then averaged
Location	Blower, Centrifuge & pump houses
Measures	In case of noise levels causing disturbance to the receptors, management measures as suggested in the EMP shall be carried out.



## HEALTH SAFETY & ENVIRONMENT MANAGEMENT PLAN

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## 1. OBJECTIVES

- To determine broad parameters of HSE management at site.
- Establish & define aim of command for resolution of all hazard prevention issues,
- Define individual hazard prevention & safety promotion responsibility at the level of the construction team.
- Identify highly hazardous operations within the scope of work and specify integrated preventive measures to mitigate the same.
- To ensure compliance with relevant applicable legislation.
- Continued HSE performance improvement by directing focus on the key areas for improvement in a consistent manner.

## 2. Commitments and Motivation

DRSITPL is fully committed to this Health, Safety and Environmental Policy and Standards and will provide motivation through:

- Planning all work in a safe manner prior to executing the tasks and conducting risk assessments for non-routine and hazardous activities.
- Providing a safe facility, equipment, personal protective equipment and safe working procedures.
- Providing suitable training, supervision, information and instruction to all personnel engaged in Project activities.
- Accepting and being accountable for the responsibility of accidents and incidents in the workplace.
- Introducing systems to encourage active involvement of the management workforce and the local community in providing suggestions and proposals for improvements in the HSE performance.
- Providing active support to the workforce by way of specialist advice in safety and quality areas.
- Assessing the risks in the workplace with subsequent communication to the workforce.
- Maintaining an active record of all incidents for continual evaluation/analysis of the Project safety refinance so that ways and means for improvement can be developed and implemented. A continuous effort, driven by Project Management involvement, will be made throughout all phases of Project activities to motivate the workforce to take an active part in use issues and activities.

### 2.1 Visibility

The management will provide strong demonstrable visible leadership and commitments towards HSE by personal example and action. The Management will participate in HSE Meetings, conduct site Inspections and HSE Audits, to encourage a positive attitude towards HSE.

SI No	TASK	ACTION BY	COMPLIANC
1	Project HSE Review Meeting: (Review performance against HSE plans, HSE Objectives & targets and any HSE issues)	Project Manager	Minimum Frequency 1 month
2	Project HSE Committee Inspection	HSE Committee Members	Minimum Frequency 1 month
3.	HSE Review	Section Heads	During HO representative's Site Visit

4	(Motivation) Giving Safety Certificates, with token gift to the "Best safety conscious personnel" of the month to recognize good HSE		Every Quarter
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## 2.2 Proactive in Target Setting

The Site management demonstrates pro-activeness in target setting by:

No	TASK	ACTION BY	COMPLIANCE TARGET
1	Jointly developing and discussing improvement targets and indicators for each location with Site Engineer & HSE Engineer. (Eg. Training of Workmen Coverage. Inspection Compliance etc.)		Every Quarter
2	Jointly review the Incidence rate of First Aid Case and set a target for reduction.		Every Quarter
3.	Management involvement in Accident review and target setting.	AVP/ HSE Engineer	As Required/ Monthly

## 2.3 Company Culture

The management seeks to create and sustain a Company culture in which employees share a commitment to HSE.

SI No	TASK	ACTION BY	COMPLIANCE TARGET
1	Putting HSE as the "First agenda" of all review meetings at Headquarters & project sites	Avp/ PM	All time
2	Empowerment to Stop Work Employees are empowered to stop work when the situation warrants immediate action in view of imminent danger to life / property / environment. Project Managers must appreciate and reward those employees whose prompt	ALL	All time





## 2.4 Involvement of Senior Management

Senior management demonstrates its involvement in HSE issues through.

No	TASK	ACTION BY	COMPLIANCE TARGET
1	Review Project HSE Performance and HSE plan implementation in consultation with Project Manager & HSE Engineer.	Zonal Head	Half yearly
2	Ensure adequate professional HSE support is available for effectively implementing the HSE Plan, fulfilling EHS targets and attaining HSE objectives.	HSE Engineer	Project Duration
3	Ensure sufficient support and resources are available to meet HSE targets (Eg. Infrastructure vehicle, safety steward ,	AVP/ PM	project Duration
4	Imparting necessary HSE training for the Staff & workmen of the project.	AVP/ PM	As required

### HSE Rules

In order to formulate the necessary standards to be used in the HSE policy, ten basic HSE rules are considered to be the foundation for such standards that have been established to achieve Project objectives. The ten basic rules are:

DRSITPL. will comply, as a minimum, with national and international laws and applicable local regulations and rules throughout its operations and activities.

These Health, Safety and Environmental Policy and Standards are to be clearly defined and made known at all levels of the Project. Responsibilities and accountabilities for the associated application are to be identified and assigned in writing.

— sThroughout Project 's activities and operations, the risks to health, personnel, As and environment are to be identified and the means by which they are to be avoided are to be defined.

All subcontractors must be evaluated for their ability to conform to the Project 's health, safety and-environmental requirements that must be -clearly stated in the contract. All contract award recommendations must address this issue.

4. All operations with potentially critical effect on health, safety and environment are to be covered by procedures that are reviewed and updated on a regular basis.

5. Training and competency programs are to be formalized and implemented to ensure that personnel are prepared for the tasks required of them; with particular attention being given to safety and environmentally critical posts.

6. Emergency procedures covering communications and actions in case of **medical** accident and environmental emergencies are to be maintained and tested.

7. All accidents, including near misses, are to be reported, analyzed and remedial actions taken to avoid re-occurrence.

8. At Project 's operations and activities are to be assessed by inspection and audits.

9. Each area of operation will establish objectives and improvement plans based on incident analyses, audit results and risk analyses in order to raise the level of HSE performance.

## HSE POLICY

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All staff and employees shall be made aware of the existence of this policy by discussing in HSE meetings, displaying at site offices, notice boards, workmen camp, canteen some conspicuous locations.

### HEALTH SAFETY & ENVIRONMENT POLICY

We affirm our commitment to our objectives of conserving the environment and providing a safe and healthy work place for our employees and Workers.

The objectives of the HS&E Policy shall be achieved by:

- Incorporating HSE consideration in all business decisions,
- Operations while also ensuring compliance to legal and contractual requirements
- Identifying and controlling HSE risks apart from imparting structured training for employees and workers
- Employing contractors who aspire to adopt DRSITPL's HSE standards in their work
- Encouraging communication, consultation and collaboration with all employees and workers for promoting a positive HSE culture
- HSE Philosophy

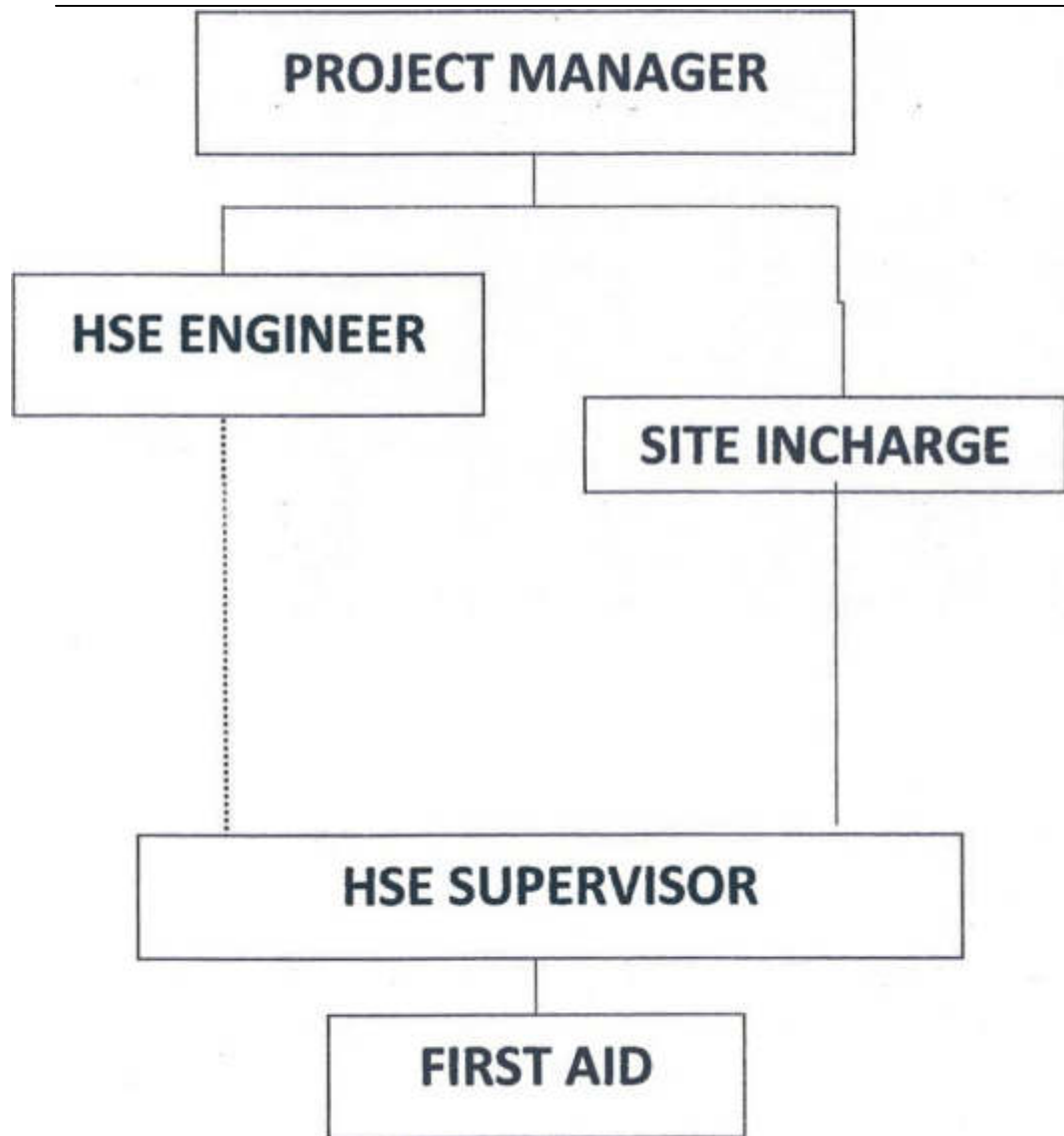
All adverse environmental impacts and accidents are preventable

No task is so important that the risk of injury to people or damage to environment is justifiable

We shall collectively uphold the philosophy and work safely in an environment friendly manner. We shall be responsible for integrating and implementing best practices while we strive towards continual improvement in our HSE performance

## HSE ORGANISATION

### 4.1 Organization Chart



### RESPONSIBILITIES

HSE Management is a line responsibility requiring active participation of all levels of management and supervision.

Individual HSE roles and responsibilities, along with task and target shall be distributed to the individuals for action, as described below.



1	Responsible for completion of the project with total implementation of the company's HSE policy requirement, HSE Management System & requirements of this plan and comply with the relevant statutory rules and regulations.	project Duration
2	<p>Responsible to ensure that all staff &amp; workmen are competent to perform their tasks safely in compliance with Drs Infratech Pvt. Ltd HSE Management System and this plan requirement. He shall do so by:</p> <p>Ensuring the screening of workmen is effectively implemented by the time office &amp; site execution engineers. HSE Induction provided for all staff &amp; workmen before deployment by HSE Engineer.</p> <p>Ensure regular monitoring and organize continuous HSE in-house trainings.</p> <p>Establishing adequate control measures for the employee's fitness in order to avoid fatigue, stress, extended working etc.</p>	Project Duration
3	Ensure sufficient resources are available at site. He shall ensure through:	Project Duration

#### 5.1 Project Manager

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	<p>Reviewing HSE Plan implementation and discuss any outstanding issues in Project HSE Committee Meeting.</p> <p>Investigating non-compliance and non-implemented items.</p>	
4	Site HSE Inspection and HSE Plan implementation monitoring	Project Duration
5	Investigate all high potential incidents and noncompliance and ensure immediate remedial action to stop recurrence.	AS & When notified

Si No	TASK	TARGET
1	Disseminate and Communicate HSE Policy, HSE Management System requirements to site personnel.	project Duration
2	Provide necessary advice, information and support in the effective implementation of the HSE Management System requirements and the project HSE plan.	Project Duration

3	Updating the HSE Plan to the requirements of the activities being carried out when there is a revision.	Project Duration
4	Plan and conduct Internal HSE training programs, initiate drive to promote HSE awareness and performance	Project Duration
5	Carry out HSE inspection of Work Area, P&M Equipment & Machineries, etc. as per the IMS requirement.	As per Monthly Activity Plan
6	Creating HSE awareness through TBT talks.	Every day
7	Advising line management in preparing HSE Risk Assessment for the new activities.	Project Duration

8	Conduct investigation of all incidents/ dangerous occurrences & Recommend appropriate corrective measures.	When reported
9	Convene HSE Committee meeting & minute the proceedings for circulation & follow-up action.	Min Frequency Once in a month
10	Advice & co-ordinate for implementation of Work Permit Systems (WPS).	Whenever work requiring WPS is executed
11	Plan procurement of PPE & safety devices and inspect before use as per laid down norms.	Project Duration
12	Report to HSE Engineer on all matters pertaining to status of HSE and promotional program at site level.	Regular basis
13	Facilitate screening of workmen and conduct HSE induction.	Project Duration
14	Monitoring administration of First Aid.	Project Duration

15	Conduct Fire Drill, Procure, inspect and arrange to maintain Fire Extinguishers.	AS scheduled in the monthly
16	Organize campaigns, competitions & other special emphasis program to promote HSE in the workplace.	As and when required
17	Register Customer complaints and take corrective action.	Project Duration
18	Record, analyse and cascade lateral learning points from First Aid Cases, Near Miss Cases & Accidents to all project personnel and analyse the trends & effectiveness.	Monthly
19	Maintain all HSE related documents Update HSE training records	Continues

## 5.2HSE Engineer

### 5.3 Section I Area In-Charges

No	TASK	TARGET
1	Ensure that all the workmen engaged under him are selected through the screening system & have undergone site HSE Induction before assigning any task at site.	Project duration
2	Ensuring compliance of Drs Infratech Pvt. Ltd. basic HSE rules and applicable specifications by	project duration
	Taking prompt action of site inspection and hazard findings.	
	Closing all the points identified in inspection reports	
	Ensure HSE Risk Assessment is done for all the jobs under him.	
3	Ensure that all near miss cases / Reportable LTI / Dangerous Occurrence / Fatality are reported promptly.	AS & when notified
4	Participate regularly in HSE meetings.	As schedule



#### 5.4 All Employees

Si No	TASK	TARGET
1	Report all unsafe acts and condition to the immediate supervisor.	Continuous
2	Start work only when conditions are safe and stop work when it is unsafe.	Continuous
3	Operate equipment only when authorized and prescribed manner. (If applicable)	Continuous
4	Report any injury or accident immediately.	Continuous

#### 5.5 Site Engineers

SI No	TASK	COMPLIANCE TARGET
1	Understanding the HSE requirements of the Project from this Plan, HSE Management Systems, HSE Manual & following the same in execution of the work	Continuous
2	Give Pep talk to the workmen under him	Daily
3	Ensuring the workmen under him wear the necessary personal protective equipment respective to the job	Continuous
4	Eliminating all unsafe conditions in their work area	Continuous
5	Keeping the work area neat & clean	Continuous
	Know the critical activities of his job based on the HSE Risk Assessment and ensure implementation of the control measures.	project Duration
7	Participating with the HSEO Officer or the committee Members in the Project HSE Inspection	As per schedule
8	To follow all work permit system as per client requirements Or Drs Infratech Pvt. Ltd. Management System before starting of similar work	As and when required

9	To report all near miss cases / reportable I-TI /dangerous occurrences/ fatality to HSE Engineer immediately verbally & submitting the preliminary accident report within 24 hours.	As and when required
10	Informing the Concerned Authority as per the emergency response plan.	As and when required

#### 5.6 Project HSE Committee Members

TASK	COMPLIANCE TARGET	VERIFICATION DOCUMENT
To discuss and decide the ways and means of	Once in a week	MOM - HSE Committee Meeting
To analyze all the activities of the forth coming Period and identify the possible hazards and Finalizing the precaution to be taken.		
To monitor the HSE Performance of the Project and suggesting improvements whenever needed.		

#### 5.7 Sub-contractors

All Subcontractors/ Vendor/ Supplier/ Third Party performing services at the Project site shall be subject to this plan requirement.

TASK	COMPLIANCE TARGET
Shall understand the HSE code of conduct for subcontractors and sign the same as a token of acceptance before starting the activity.	Before starting the activity
Subcontractor, his Supervisor and his workmen shall adhere all the laid down HSE rules & Regulations while working at site, follow the instruction / advice of Site engineer & HSEO from time to time.	Continuous

### 6. PROJECT HSE COMMITTEE

This section shall give the details of the Project HSE Committee.

- HSE committee having all the section heads as members under the chairmanship

of Project Manager.

- HSE committee meets under the chairmanship of PH/PM at least once in a Month in order to bring out solutions to the problems related to HSE.
- Minutes of meeting are recorded and circulated to all the concerned for follow up.

## 7. HSE RISK ASSESMENT (HIRA)

### 7.1 Purpose

To assess the risk of the activities to be executed, rate the risk levels as per the risk assessment matrix, and identify the control measures so as to bring the risk level to AL-ARP.

### 7.2 Matrix for Group Risk Assessment

		5					
Fatal		5	10	15	20	25	(5 x 5)
Hospitalization Case		4	8	12		20	
Lost Time Case		3	6	9	12	15	
Medical treatment case		2	4	6	8	10	
First Aid Treatment			2	3		5	
		1	2	3	4	5	
		Probability Rating					

Risk Level = Probability x Impact Rating							Inevitable
Legend						o	



Risk Level from 1 to 4		Low Risk			
Risk Level from 5 to 12		Medium Risk			
Risk Level from 15 to 25		High Risk			

### 7.3 Severity of hazard (Impact)

Severity is the degree or extent of injury or harm caused by the hazards, or as a result of an accident. Severity of hazard is classified as per the table given below.

Impact Descriptions		
(The highest category will always be used)		
VALUE	Result of Hazard to Personnel	Result of Hazard to Assets I Progress
5	Single or multiple Fatality	Catastrophic Damages, Critical Delay
4	Serious Injury requiring hospitalisation	Major Damages, Serious Delay
3	Lost Time Accident	Serious Damage, Moderate Delay
2	Injury requiring Medical Treatment but not Lost Time	Moderate Damage, Minor Delay
1	First Aid treatment only	Minor Damage, No Delay

### 7.4 Likelihood of occurrence (Probability)

Likelihood of occurrence of an accident or incident or ill health is classified as per the table given below.

Probability Descriptions		
(The highest category will always be used)		
VALUE	Status	Description
5	Inevitable	Happens regularly on this site
4	Most Likely	Known to have occurred on this site in the past
3	Likely	Known to occur on other sites

2	Unlikely	Known to occur in the industry
1	Most Unlikely	Never known before

## **8. LIST OF APPLICABLE LEGAL & OTHER REQUIREMENT**

- Indian electricity Rule -1956
- Environment Protection Act -2003 and applicable central, state, local along with interested party requirement.
- e Air rules - The Air (Prevention and Control of Pollution) Act 1981 as amended from time to time and Central Pollution Control Board (CPCB) 1994.
- , Water Quality Standards by CPCB / IS 10500:1991
- Noise Standards by CPCB

## **9. GENERAL REQUIREMENTS ON SAFETY, HEALTH, WELFARE**

### **9.1 First aid facilities**

- Approved first aid kit shall be kept at site offices in the charge Time Officer and also at the work places in the site in the charge of the subcontractor Supervisor to ensure the availability during ail working hours.
- Adequate numbers of other staff members shall be trained in first aid duties including resuscitation to take account of numbers of site workers located on the permanent site and mobile site operations.
- Vehicles shall be kept available at the site offices and the remote workplaces to take
- The injured or sick workmen to the nearby designated hospital for jrmporting medical treatment.

### **9.2 Overhead hazards**

- Overhead protection shall be provided at any location where there is a hazard of falling objects. This shall particularly be observed around any scaffolding and in excavations.
- In places, where frequent movement of plants is required beneath the overhead lines, Height Barriers (Goalposts) shall be erected to prevent the arms or jibs of plant from approaching such lines.

### **9.3 Excavations**

- Pipeline trenches and other excavations shall be barricaded. Where human movement is relatively less, an earthen bund shall be provided around the trenches and the excavations for preventing fall of persons.
- Where ever the local people need to cross the trenches, there cross platforms with guardrails should be provided.
- Trenches or excavation walls shall be slopped and the excavated earth shall be dumped so as to prevent collapse of excavation.
- At nights warning illuminating light shaft be provided at road crossings to warn vehicle drivers about the presence of excavation.
- 9.4 Drowning hazards

- Where the work involves filling tanks with water leaving an open surface, the area shall be barricaded for preventing fall of persons inside water. It shall be ensured

that the workmen involved in such works know swimming and rescue themselves if they fall inside water.

#### 9.5 Slipping hazards

- Passageway, or a scaffold, platform or other elevated working surface shall not be in slippery condition. Oil, grease, water and other substances causing slippery footing shall be removed, sanded or covered to provide safe footing.

#### 9.6 Tripping hazards

- All passageways, platforms and other places of work shall be kept free from accumulations of dirt and debris and from other obstructions that may cause tripping. Sharp projections shall be removed or covered.

#### 9.7 Access to workplace

- Temporary stairways, ramps or runways shall be provided as the means of access to working levels above or below ground except where the nature or progress of the work prevents their installation, in which case ladders or other safe means shall be provided.

#### 9.8 Dust and gases

- Dust and gases shall be controlled by ventilation or otherwise so as to prevent concentrations tending to injure health or obstruct vision or from exceeding safe levels.



## 9.9 Hazardous and corrosive substances

- All alkalis, acids, gases and other hazardous and corrosive substances shall be so stored and used so as not to endanger employees in accordance with national and state regulations. Suitable protective equipment for the use of such substances shall be provided. Clean water shall be kept readily available for washing off any spillage of any corrosive substance on the employees

## 9.10 Eye and Ear

### protection

- Suitable eye protection equipment shall be provided for and shall be used by employees while engaged in welding or cutting operations or in chipping, cutting or grinding any material from which particles may fly, or while engaged in any other operation which may endanger the eyes.
- Ear protectors shall be made available for employees when operating noisy machinery like jack hammer, Diesel Generator etc.

## 9.11 Work in confined spaces

- Where work is required to take place in a confined space, defined as an enclosed space or excavation with limited access and where there is no natural ventilation, adequate ventilation for workers carrying out work inside a confined space, pipeline or amber or other enclosed areas shall be ensured by using blowers or other suitable means.

## 9.12 Personal protective equipment (PPE)

- 1 Every site worker and visitor shall be provided with a full set of personal protective equipment for use at all times including safety helmet, steel toecapped boots, gloves and other specific work-related clothing offering ear and eye protection. All site workers and visitors shall be required to wear PPE while working or visiting the Site.
2. The construction site shall be barricade at all time in a day with adequate markings, flags, Reflectors etc. for safety of general traffic movement, workers and pedestrians.
  - Contractor will provide all necessary safety appliances such as safety goggles, helmets, safety belts, ear plugs, mask etc. to workers and staff.
  - Protective footwear and protective goggles to all workers employed on mixing asphalt materials, cements, and time mortars, concrete etc.
  - Welder's protective eye-shields to workers engaged in welding works.
  - Protective goggles and clothing to workers engaged in stone breaking activities and workers will be seated at sufficiently safe intervals.
  - Earplugs to workers exposed to loud noise, and workers working in crushing, compaction, or concrete missing operation.
  - Adequate safety measures for workers during handling of materials at site are taken up.
  - The DRSITPL will comply with all regulations regarding safe scaffolding, ladders, working platforms, gangway, stairwells, excavations, trenches and safe means of entry and egress.
- 4 The DRSITPL will not employ any person below the age of 18 years for any work and no women will be employed on the work of painting with products containing lead in any form.
5. Every employee required to work in water, wet concrete or other wet footing shall be provided with suitable safety, water proof boots. Every employee required to use or handle alkaline, acid or other corrosive substances shall be provided with appropriate PPE.
6. All portable power driven abrasive wheels and grinders shall be equipped with guards above the base plate which completely protects the operator from contact.

## 9.13 Public vehicular traffic

- Whenever any work is being performed over, on, or in proximity to a highway or any other place where public vehicular traffic may cause danger to men at work, the working area shall be barricaded as to direct traffic away from it or the traffic shall be specially controlled by persons designated for that purpose.

#### 9.14 Site traffic

- All vehicles used at the worksite must be roadworthy and registered with the appropriate authority.
- 

#### 9.15 Stability of Structure

- No section of the plant or other structure or part of a structure shall be left unguarded in such condition that it may fall, collapse or be weakened due to wind pressure or vibration.

#### 9.16 Storage of materials and equipment

- All materials shall be stored or stacked in a safe and orderly manner so as not to obstruct any passageway or place of work. Material piles shall be stored or stacked in such a manner as to ensure stability

#### 9.17 Disposal of debris

- Debris shall be handled and disposed of by a method which will not endanger persons or environment and surroundings. Debris shall not be allowed to accumulate so as to constitute a hazard.

#### 9.18 Ladders and access platforms

- Every ladder, step-ladder and access platform shall be of good construction, sound material and adequate strength for the purpose of which it is used. Ladders and access platforms shall not stand on loose bricks or other loose packing, but shall have a levelled and firm footing. Ladders of over 2m in height shall be securely tied to the structure it is propped against.

LTm

#### 9.19 Working at height

- All site workers who work at height shall be provided with appropriate PPE including helmet, safety harness, safety shoes etc to prevent an accident by slipping or falling.

#### 9.20 Alcohols and Drug Prohibition, Smoking Restriction

No Alcoholic beverages or illegal drugs are permitted on worksite. The contractor shall ensure that personnel is made aware of and fully comply with this prohibition

No Smoking takes place in the non-smoking areas

Safety at work is not jeopardized by any kind of narcotics and drugs, which may include some medical drugs, affecting the sense

#### 9.21 Positioning of machinery

- No person shall be permitted to position or operate machinery in a manner likely to endanger him or others.

#### 9.22 Fixed and mobile cranes

- Fixed and mobile cranes shall be so constructed, positioned and operated as to be stable. No crane shall be loaded beyond the safe working load except by an approved person or an inspector for the purpose of testing such machine.
- Every crane including all blocks, shackles, sheaves, wire ropes and the various devices on the mast and jib shall be thoroughly inspected by an approved person at intervals not exceeding 12 months. Cranes shall be inspected before being first

erected or operated on the job or after any major repair. Inspection and repair of crane jib shall be made only when the jib is lowered and adequately supported.

- Outriggers and counter-weights shall be provided and used as specified by the manufacturer of the crane or by an approved person. Counter-weights shall be properly placed and secured.
- • Levelling jacks or other suitable means shall be provided and used with outriggers of truck-mounted mobile cranes. Firm and uniform footing shall be provided for cranes. When such a footing is not otherwise supplied it shall be provided by substantial timber, or other structural members sufficient to distribute the load so as not to exceed the safe bearing capacity of the underlying material.
- • Every power-operated crane shall be provided with efficient brake or brakes or other locking devices which will prevent the fall of the load when suspended and by which the load can be effectively controlled whilst being lowered. Hand or foot - operated bakes shall be provided with a substantial locking device to lock the brake in engagement.
- • No load-bearing part of any crane shall be replaced by another part, and no such machine shall be modified by the addition thereto or removal there from of any load bearing part, unless the replacement or modification shall be certified by either the manufacturer or the approved person who tested the crane.
- A capacity chart shall be provided for every crane. Chart shall be posted and Maintained in a place clearly visible to the operator and shall set forth the safe loads for various lengths of job at various jib angles and radial distances. Where outriggers are provided such loads shall be set forth with and without the use of outriggers.
- A crane shall not lift any load that exceeds the corresponding safe working load specified by its capacity art. Every crane having a jib shall be provided with an accurate indicator which st-nn,s, clearly to the operator, the radius of the jib and the safe working load corresponding to that radius at all times and gives warning signal when the radius is unsafe.
- Before hoisting any load at a new job site, the jib shall be operated to its maximum height. Crane cabs shall be locked when the operator is not present and no unauthorized person shall enter the cab or remain immediately adjacent to any crane in operation. If locking of a crane cab is impracticable, the operating mechanism shall be locked as to prevent the crane from being operated by an unauthorized person.
- No crane shall be operated in such a location that any part of the crane or of its load in any position of jib or swing may come within 3m of live power line.
- All the lifting equipment used at site shall have a valid certificate form competent authority at the time of usage.
- All crane operatives should be authorized to operate the particular type of fixed or mobile crane. Valid certificates will be available for inspection by the Engineer. All signalmen will be formally trained to undertake their duties and refresher training will be given at an appropriate frequency agreed by the Engineer.

#### 9.23 Attachment of loads (Lifting Tools & Tackles)

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- Where a sling is employed to hoist long-length material, a lifting beam Shali be used to space the sling legs for proper balance, When load is suspended at two or more points with slings, the eyes of the lifting legs of the slings shall be shackled together and this shackle or the eyes of the lifting legs may be shackled directly on the hoisting block or balance beam.
  - The eyes may be placed on the lifting hook without shackles if the hook is of the safety type. Each container or receptacle used for raising or lowering filter media or other loose material of any kind shall be so enclosed, constructed or designed as to prevent the accidental fall of such material. Crane loads shall be raised vertically so as to avoid swinging during hoisting.

- No crane, excepting pick and carry crane, shall travel with a suspended load. During travel without loads, crane's falls shall be secured or placed so as to prevent accident or damage by swinging.

## 10. WORK PERMITS & LIAISON CLIENT

The following permit system will be operated at site

Si No	Description of the Critical Activity	Issuing Authority
1	Industrial Radiography	Project In charge & Site HSE Engineer in co-ordination with Site {n charge of the Radiographic Agency. { With approval of CONCERNED AUTHORITY}
2	Blasting Operations	Project In charge & HSE Engineer { With approval of Statutory Authorities through CONCERNED AUTHORITY}
3	Excavation clearance Permit	Section In charge, Electrical and Mechanical In charge, & Site HSE Engineer
4	Confined work Permit	Project in charge, HSE Engineer

### 10.2 Liaison with Client

Liaison with CONCERNED AUTHORITY shall be carried out at early stage of the project;

- (1) Preconstruction stage
- (2) Design and construct stage
- (3) Operation & Maintenance stage
  - (1) Preconstruction

We will liaise with Client during the pre-construction stages with regards to all matters, so as to fulfil all project requirements. We will propose an action plan in detail, the methodology to be adopted during pre-construction stages like site ey, collection of data in detail, and joint site inspection with RWS & SD.

We will liaise with Client in obtaining the statutory permission from various applicable authorities ---

- a) Gram Panchayat,
- b) Electricity Dept
- c) Telecom
- d) Police
- e) Area MLA / Corporator / Councillor
- f) Labour Commissioner
- g) Tax Authorities
- h) Division Office
- i) National Highway
- j) Public Works Dept.
- k) Any other Departments.



With due permission from client we shall also consult all concerned personnel of various Depts./ Organisation as mentioned above with relevant action plan, methodology, drawings/sketches etc, and any other details as required by the appropriate department/organisation for granting of permission / Right of Way for execution of the works. Also with the permission and assistance from CONCERNED AUTHORITY we will ensure that clearances and permits required from the above relevant organisation are in place by providing early understanding of the project, the impact and benefits. This will ensure the necessary support is obtained without delay and the progress of the contract is not hampered.

We will also meet the concerned CLIENT personnel for the area under execution and liaise with them in checking of the action plan as per requirements of the Project.

#### (2) Design & Construct

We will liaise with CONCERNED AUTHORITY and submit detailed working methods & We will integrate all our establishment activities with the routine operational activities of Concerned Authority. There will be increased involvement and liaising with the CONCERNED AUTHORITY operational staff, who are having knowledge and experience of operating network and its components in a particular area during the design and construct stage. The Project Director will ensure that there is well managed communication link with CONCERNED AUTHORITY Divisional Operational staff with respect to work carried out under the Contract and CONCERNED AUTHORITY routine operational work. This will avoid any interference between O&M activities of CONCERNED AUTHORITY divisional staff and our team carrying out investigation and leakage activities. Also acknowledging that we will have more operational responsibilities during this time we will ensure that we have a system of reporting and liaison to ensure that the customer service levels are maintained.

We will be in constant touch with the concerned CONCERNED AUTHORITY maintenance personnel with regards to hours of water supply for particular area network for repairs, replacement etc., so as to minimising any affect to the consumers.

In co-ordination with CONCERNED AUTHORITY we will interact with Police Dept. and other local Govt. bodies from time to time and ensure that all works are carried out smoothly without affecting the road users complying with due safety regulations and acts as prescribed by the statutory bodies.

We will give awareness about our construction activities to public through Information sign boards & Caution boards

#### (3) Operation & Maintenance

We will adopt the same level of contact and communication with CONCERNED AUTHORITY during the 1 year of operation and maintenance period.

## 11. CHECKS & REPORTS

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Following checklists & reports to be used

- Site HSE inspection report

#### Electrical safety inspection checklist

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- Vehicle & earth moving equipment inspection checklist
- Safety norm violation memo
- Performance for screening of workmen
- Minutes of HSE meetings & Follow-ups.
- TBT talks.
- Office Inspection report
- Workmen Camp Inspection report. • Fire Extinguishers Report
- Incident Investigation checklist
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## 12. STATISTICS & REPORTS

- Monthly activity plan
- Monthly Project HSE statistics
- Preliminary accident report
- Incident investigation report
- Dangerous occurrence investigation report
- HSE Evaluation of subcontractor
- Analysis of first aid cases

## 13 Emergency Response Pla

## 14 LIST OF JOB SPECIFIC PPE TO BE USED IN THE SITE

### a. Introduction

PPE will be issued to all personnel as per agreement conditions. All safety equipment and PPE shall conform to recognized standards and legislations etc.

The Tahal Consulting Engineers Limited will provide all necessary safety appliances such as safety goggles, helmets, safety belts, ear plugs, mask etc. to workers and staff.

- Protective footwear and protective goggles to all works employed on mixing asphalt materials, cement, and time mortars, concrete etc.
- Welder's protective eye-shields to workers engaged in welding works.
- Protective goggles and clothing to workers engaged in stone breaking activities and workers will be seated at sufficiently safe intervals.
- Earplugs to workers exposed to loud noise, and workers working in crushing, compaction, or concrete mixing operation.
- The Drs Infratech Pvt.Ltd. will comply all regulations regarding safe scaffolding, ladders, working platforms, gangway, stairwells, excavations, trenches and safe means of entry and egress.

### b. General Procedures

It is the responsibility of the user to take good care of the PPE issued to him. Damage to PPE, intentional or otherwise, will be dealt with accordingly.

PPE must be wearing properly in accordance to its use.

### d. Head Protection

- Approved type hard hats must be wore at all times by personnel while working at sites.
- Hard hats must be fitted with a chinstrap always, when working in high winds, or when working at a very elevated position.

A hard hat protects the head against blows, jolts, falling objects, welding slag and high temperatures. They are fabricated from a durable material, and no alteration may be made to approve type hard hat. 'Damaged hat must be replaced immediately

- Hats not to be painted. Metal Hats are prohibited.

### D. Eye and Face Protection

- Protective filters, goggles, safety spectacles and full face visors, complying with the appropriate standard must be worn to give protection to the eyes and face against chemicals, welding arcs, and sparks, flying particles, injurious light rays and similar hazards.

- Dark glasses will not be permitted during dark hours unless working on or within brightly illuminated areas.
- Face shields or goggles are to be worn within areas where grinding, grit blasting, chemical handling, machining, compressed air cleaning, cutting, etc. is taking place.

#### E. Hand Protection

- All gloves must be kept dry particularly when used in welding or handling live electric wires to avoid electric shock.
- All gloves must be in good condition, fit properly and free of grease, oil and dirt Accumulations. They should be regularly inspected for cut, abrasions, cracks, etc.
- For the protection of hands numerous types of glove are available. The kind of gloves used will depend upon the material or equipment being handled. Supervisors should advise on the type of glove required.
- Electric hazards require special natural rubber gloves of high insulation standards with working voltage clearly marked on each glove.

#### Foot Protection

- Approved safety boots to comply with appropriate standards is compulsory. Safety boots that is, with steel toe plate in step, must be worn by all personnel. In case of slushy areas and while working with concrete gumboot should be used.

#### G. Leg Protection

- Trousers must not be tucked into the cuff of the boots as this will allow material to be channelled into the boot particularly sparks or hot slugs during welding or cutting.

#### H. Hearing Protection

- Where it is not possible to reduce the noise levels to permissible noise exposure levels or duration of exposures is long, ear protective device will be provided and used.
- Ear muffs or earplugs will be issued and used on individual basis.
- The earplugs must fit tightly in the ear canal and must be inserted with hands free of dirt or grease. Individual user must clean them regularly.
- In high noise level areas, a notice "WEAR EAR PROTECTION" must be exhibited.

#### I. Safety Harness

- Safety harness must be worn and hooked up when working on elevated platforms more than 6 feet above ground.

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#### 15. TRAINING 15.1. Training Matrix

#### 16. COMMUNICATION & REPORTING

Cascading any HSE messages down the line is vital for the success of any HSE Management System and to ensure that all personnel are aware of HSE issues the following technique shall be adopted.

No	TASK	ACTION BY	COMPLIANCE TARGET	VERIFICATION DOCUMENT
1	HSE NOTICE BOARD	HSE Engineer	Weekly update starting from Mobilization and Daily	HSE Notice Board
	HSE Notice board will be fixed at site office and other conspicuous locations for cascading HSE messages such as HSE Notices, Safety Alerts, Posters and accident evaluation etc., shall be regularly updated.			
	Install and maintain HSE performance board showing Safety statistics i.e. days without LTI etc			
2	PROMOTION Monthly Incentive Safe Man of the month shall be selected on the basis of HSE performance evaluation and will be given a certificate of commendation along with a token gift.	PM / HSE Engineer	Monthly	Incentive record      Scheme

## 17. ENVIRONMENT PLAN

### 17.1 Environmental Responsibilities

Zonal Head is responsible and accountable for the environment management plan and its planning and the entire project team is responsible for the success.

Company Environmental Specialists is consulted on specific expert advice. The Project Manager, the project team including the Environmental Control Manager for the specific work and the environmental specialists (within Tahal and external) identifies the contractual or Tahal environmental requirements for the project. This team identifies the environmental impacts, assesses the significance of the risks for each identified environmental impact and the mitigation measures

### 17.2 Identify Environmental Requirements

The Zonal Head with the works team will understand and identify the environmental requirements of the work/project as define by the contract, scope of work (both design & construction) and any other external bodies' requirements. Depending on the requirements, Tahal's responsibility may be for both projectrelated environmental impacts caused by Tahal during the execution of our project activities (office and site) and/or the environmental impacts due to the construction and operation of any