

OFFSHORE ENGINEERING SERVICES

SAFETY MANUAL

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1. **SAFETY DEPARTMENT**

1.1 **SAFETY AT WORK IS DEFINED AS**

Working without causing: -

- Damage / harm to the people working and near by
- Damage to plant or equipment
- Loss of production
- Damage to environment

Responsibilities of the key persons in the Safety Department are as follows:

1.2 **SAFETY MANAGER_:**

Safety manager is a suitable qualified person appointed by the management of OES.

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RESPONSIBILITIES:

Advising management and employees on all aspects of Safety management of Loss Prevention.

Consult and co-ordinate within the departments, manager, engineers and other employees to ensure a high level of safety.

Maintain with external organisations concerned with safety, including industrial safety groups, and maintain smooth working relationships with both level and National Government Securities and updating the latest technology.

In particular the Safety Manager should:

Ensure that correct and up-to-date records are kept with regard to:

Accidents which occur on OES facilities (both personal injury accidents and accidents which cause damage to plant or equipment).

Incidents, which may have caused accidents and loss of time.

Ensure that weekly safety meetings are held in accordance with OES requirements. Agenda to be in time with the current Safety topics and the records of such meetings are maintained.

Give advice on accident prevention to the concerned manager, engineers and workers as required.

1.3 SITE SAFETY OFFICER:

Reports directly to the Safety manager. Responsible for assisting and advising on all matters of safety.

RESPONSIBILITIES:

Monitor the effectiveness of company's safety policy on the site and other company location, and ensure safety rules are adhered accordingly by the personnel.

Advise all personnel the safety measures and requirements on matters concerning their health and safety covering following.

- Safe operation and working with Machinery and Equipment.
- Hazardous working:

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- While welding/cutting and other hot working
- At height / or scaffolding
- With Electrical Equipment's
- Hydro testing
- Girt blasting and painting
- Working with x-ray equipments and Radioactive process etc.
- Fire prevention and fire fighting
- Fire Aid Treatment
- Accident reporting

They will ensure that remedial action is taken whenever they observe, or informed or, defective workmanship or working methods.

1.4 **SITE MANAGER AND SUPERVISOR MUST ENSURE:**

That they themselves are fully aware of the company Safety Policy and the relevant legislation and guidance notes.

That the personnel for whom they are responsible have been adequately trained in the use of all machinery and equipment and are fully aware of the potential hazards associated with such equipments.

That adequate supervision is provided at all times for the personnel within their control.

For any critical or high-risk activity a detailed work instruction or work execution procedure is prepared and provided, and shall include safety counter measure to be taken.

The potential safety hazards are reported and rectified immediately.

That good house keeping is maintained at all time within their area of control.

That all the equipments on site belonging to the Company or Contractor or hired are safe and in good working condition.

That all the equipments are equipped with required safety devices and has been subjected to all necessary tests.

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That periodic test, inspection and maintenance are carried out.

That all personnel at site wear requisite safety clothing, helmets, shoes, eye protection etc.

That all equipment defects, which are brought to their notice, are promptly attended.

That all personnel within their control know that actions they should take in the event of a fire or other major incidents and know the whereabouts of the relevant safety equipments such as Fire Extinguishers, Fire Aid Boxes, Safety Showers, Eye Baths etc.

1.5 **INSTRUCTION TO THE EMPLOYEES OF OES_:**

When working on site/office OES employees are required to: -

- i) Conduct themselves in a safe and responsible manner at all times.
- ii) Study all Safety notices.
- iii) Wear correct Safety and protective clothing.
- iv) Do not undertake any duty without using the prescribed Safety equipment.
- v) Observe all the operational and Safety signs, symbols and notices.
- vi) Report to the Safety officer / Site in-charge / Office in-charge /Engineers without delay, any accident or potential hazard that comes to their attention.
- vii) Report any accident or incident, which they witness, or are involved in, to their immediate Supervisor so that remedial action may be taken.

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1.6 TRAINING TO THE EMPLOYEES OF OES

Each employee will be trained/briefed so that he may:

- Be familiarise himself with the site layout and be aware of the main escape route at all times.
- Be able to recognise the sound and meaning of the General Site/ Offshore alarms.
- Know the actions, which must be taken in the event of General Site alarms being sounded.
- Know the location and use of all emergency equipment including:
 - Fire Extinguishers
 - Fire alarm points
 - Escape routeThat the following are taken care at all times on site by all personnel.

2. PLANNING FOR SAFE WORKING

2.1 INDIVIDUAL SAFETY PROTECTION EQUIPMENT

The Supervisors must issue each employee with necessary protective clothing. The Supervisors must ensure that protective clothing are kept relatively clean by the employee.

Overall made from Synthetic material shall not be worn by personnel.

The wearing of safety shoes is compulsory on site at all times

The wearing of gloves is recommended for protection against chemical, physical and biological hazards.

Cotton hand gloves should be worn while Rigging.

Leather hand gloves should be worn while welding, cutting and burning.

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Special high insulation BS-647 hand gloves to be worn by electricians, while working on HV/LV lines.

The wearing of eye/face protection is compulsory while grinding, welding and cutting etc., where flying sparks/objects may cause damage to the eyes.

Wearing of safety goggles is compulsory for the following type of works:

- Chipping, Hammering and shearing at any location.
- Assisting sand/grit blasting operation
- Cutting and Burning (tinted)

Wearing of complete blasting hood with air supply is compulsory for Sand/Grit blasting

Safety Glasses for general work activities shall be worn, by all personnel at site including visitors.

Wearing of disposable earmuffs is compulsory for protection of ears against noise, whenever high noise levels are generated.

2.2 ELECTRICAL INSTALLATION / MAINTENCE

Electricians or duly assigned Sub-contractors are the only personnel authorized to work on, repair or modify electrical installations and equipments.

Electric cables shall be properly insulated and earthed to conform to safety requirements and must be surveyed regularly by Electricians for replacement as and when necessary.

Attention is brought to the face that every accessible high voltage cable/equipment must be properly fenced and labeled.

When work is being carried out on high voltage cables, locking devices shall be switches and controls to prevent the unauthorized or accidental passage of current. Only VML authorized Electrician can switch on high

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voltage installations or part of installations under the responsibility of VML.

Electricians shall not wear Aluminum Helmets.

Electric power supply cables lying above ground shall be adequately protected so as not to be liable to damage.

2.3 PLANT EQUIPMENT

The plant equipment shall be driven/operated and maintained only by experienced and qualified personnel.

Safety guards shall be provided for the rotating part of the equipment.

The plant equipment must be maintained in good working condition by carrying out routine maintenance as recommended by manufacturer.

The concerned person and the site manager/site supervisor shall be informed immediately of any malfunction of any of the machines, by the operator.

Equipments shall be stopped while refueling, or lubricating the moving parts. Moving or heated parts of the equipment shall not be worked on when the equipment is running.

2.4 CRANES

The cranes shall have the latest test certificate and be operated only by qualified personnel.

The following precautions are taken while operating a crane.

- Carry out routine daily checks.
- The correct capacity chart is used and crane is never overloaded.
- The machine should not be swung unless the area in front of and behind the machine is clear

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- The machine is not left unattended, while the engine is in motion.
- The machine is not left without an operator while the load is suspended.
- Loads are never carried over people.
- Loads are taken smoothly and never dragged or pulled sideways. Swinging shall be done slowly.

The cranes shall be re-tested by an independent approved examination authority after all major alteration or repairs.

Crane is not operated near any overhead power line, unless it is very essential. The power shall be switched off for the duration of the lifting operation.

No hoisting, lowering, swinging or traveling is done, while somebody is on the load or hook.

The Cranes shall be fitted with following safety devices:

- Safe load indicator giving warning to driver as the safe load limit approaches.
- A device giving clear audible warning when the crane is reversing, tracking or slowing.

Maintenance of cranes must be carried out regularly and special care shall be taken during the following checks:

- Condition of wire ropes and pendants
- Spooling of wire ropes on drums.
- Condition of brakes and all safety equipments.

After works are completed, cranes shall be shut- down and left in following condition:

- Bogies of tower cranes are locked or chocked to the rails and boom is left in the “free swing” position.

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- Mobile cranes shall be boomed down to 45 with swing brakes applied. Load must be removed from hook & hook must be raised to the highest operating position.

No personnel other than authorized operators shall ride on moving cranes, forklift or any other plant equipment.

2.5 SCAFFOLDING AND WORKS AT HEIGHT

Scaffolding shall be erected for working above assigned safe height in accordance with the good fabrication practice and safety regulations.

Beyond assigned safe height, they must be fitted with adequate hand-railing, ladders and toe boards.

The scaffolding shall be braced and secured for stability.

The wooden boards, which are used for making scaffolding, must have minimum assigned thickness and tied/secured firmly to the scaffolding.

Tool belts, tool bags or safety belt must be used. All type of portable and hand tools must be attached.

Scaffolding must be designed, erected, altered and dismantled only are experienced workmen under the direction of a competent supervisor.

Each and every scaffold erected, regardless of duration of use, shall comply with the requirements stated.

Scaffolding shall be designed to cater for the build up of loads during blasting operations. To prevent excessive build up of spent shot, boards shall be regularly swept and/or boards, including toe boards

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shall be so positioned to allow spent shot to cascade down off the boards

2.6 LIFTING EQUIPMENT AND SLINGS

All sling, shackles, chain falls, tiffors, come-alongs, used for lifting operations must be checked and only used if in good working condition.

Any handling / lifting shall be made by experienced riggers under the supervision of a foreman.

Damaged and deformed slings shall not be used and must be replaced with new slings.

Selection of sling must be made in accordance with the weight to be lifted and angle of slings.

To avoid damage, the slings shall be properly maintained and stored in a safe location.

Adequate care must be taken while slinging to avoid damages to the slings or to prevent from any slippage of the sling when there is no pad eye.

2.7 GAS CYLINDERS

Gas cylinders shall be kept clean, stored away from organic substances, rubbish, (wood, and cloth) and direct sunlight.

Gas cylinders should be stored in a dry and well-ventilated place. Flammable substances shall not be stored with gas cylinders. Oxygen cylinders shall be stored separately from cylinders containing flammable gases.

Gas cylinders shall be securely fixed to avoid falling over. Also, the protective cap must be placed in position after the use.

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While in use the cylinders shall be kept vertical preferably on rack cylinders shall be stored in the upright position.

It is required to purge the cylinder before fitting the pressure gauge.

Hoses not in good condition shall not be used. Care shall be taken to see that the hoses should not be coiled around the cylinder or the body of the person who is using it.

Empty cylinders shall be stored separately and kept in vertical position.

It is forbidden:

- To handle cylinders by their valves.
- To carry the liquefied gas cylinders with the valve open.
- To use a leaking cylinder.
- To check a leakage with a flame(only soap water can be used)
- To copper connection on acetylene gas.
- To manipulate the torch flame near or against cylinders
- Gas cylinders must be colour coded as shown below

Oxygen : Black

Acetylene : Maroon

Nitrogen : Grey + black cap having black stripe
& Clearly marked "NITROGEN" in black

Compressed air : Grey

Medical oxygen : White

Propane : Red

Argon : Blue

All cylinders must be marked clearly to show the type of gas contained therein.

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2.8 PAINT & FLAMMABLE MATERIALS

Flammable materials, particularly paint shall be used only under the supervision of the paint supervisor.

Only approved solvent shall be used for cleaning tools and equipments. The cleaning is to be done in ventilated area or outside, under the supervision of a supervisor.

Paint and solvent shall be used or mixed outside or in a well-ventilated area.

Smoking or usage of flame is forbidden in and around the places where flammable materials are used and stored.

2.9 GRINDING MACHINES AND ABRASIVE WHEELS

The following safety precautions shall be observed when using grinding machines or abrasive wheels:

All personnel using grinding machines and abrasive wheels shall be given appropriate training.

Correct size and type of abrasive wheels shall be fitted by experienced personnel on to the machine.

The maximum permissible peripheral speed of an abrasive wheel must never be exceeded.

Grinding wheels must always be handled with care. Often wheel breakage can be attributed to careless handling and storage. Grinding wheels must be inspected carefully before use to determine if they have been damaged during their transportation.

The following general rules must be observed for portable grinding machines:

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- Inspect the disc for any defects.
- Check that safety guards are correctly fitted and secured firmly.

- Check that the wheel has the correct speed rating.
- Ensure that correct spacers are in use, where applicable.
- While changing discs/power brushes, power shall be isolated or plug removed from the socket.

The following general rules must be observed for bench grinders:

- Commence using the entire wheel only after the wheel reaches its normal running speed.
- Apply the work-piece to the grinding wheel slowly and do not excessive pressure.
- Keep the workplace properly secured and use a holder for small pieces.
- Keep the workplace rest adjusted as closely as practical to the wheel.
- Do not strike the wheel, or use the side of the wheel for grinding, unless it is so designed.
- Switch off and wait till the wheel has stopped before making adjustment.
- Power supply shall be isolated before any adjustments are made, especially on high speed grinding wheels.

2.10 GRIT AND SHOT BLASTING

The abrasive material used in the grit and shot blasting and the particles generated by this process are a serious health hazard to the operator of the equipment and to the other persons in the area.

Warning notice shall be displayed around the work area and the area shall be fenced off.

The grit or other substances to be used in blasting shall not include any free silica.

The atmosphere within 60meters of the blasting operations must be free from flammable gas.

Personnel protection equipments as listed below shall be worn by the operator.

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- safety shoes / boots
- chrome leather or ribbed PVC heavy duty gauntlets
- aprons
- full blasting hood with air supply
- Ear defenders.

The following safety precautions must be taken by the operator:

- The nozzle of the equipment shall be fitted with a “shut off” control of the dead man type
- The nozzle, hose, compressor and workplace shall be electrically earthed (grounded), to prevent a static electrical charge from developing.
- When blasting is being performed in a confined space, the exit man-way is to be kept clear at all times. Second man shall be kept as standby at exit to the confined space.
- The air intake to the blasting equipment must be in an area free from combustible or harmful vapours.
- No blasting shall be performed on plant or equipment, which is under pressure.
- The compressor shall always be manned during the period of its operation.

2.11 COMPRESSED AIR

Before any pneumatic equipment is installed or pneumatic tools prepared for use, the manufacturer’s instruction shall be read and fully understood.

Pneumatic tools and equipments shall not be used for any purpose other than that for which they are designed. Non-standard attachments and accessories shall not be used.

The compressed air supply must be regulated to the correct pressure, adequately filtered, dried, and where necessary lubricated.

The source of air supply must be easily accessible. All pneumatically operated equipment (tool, hoists etc) must be disconnected from the air

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supply before changing attachments (tool bits abrasive wheels etc.) or before carrying out any adjustments or dismantling.

Safety goggles or breathing masks shall be worn where grit or dust may be produced or disturbed. Ear protectors shall be worn where the work generates high noise levels.

Under no circumstances, compressed air should be directed at any part of a person's body.

Precautions must be taken to prevent clothing, hair, rags etc. from becoming entangled with moving parts.

Maintenance of pneumatically operated equipments shall be carried out at regular intervals by competent persons. Tools shall neither be modified nor labels and descriptions defaced/removed.

Safety mechanisms shall not be interfered with or immobilised.

Only hoses and couplings of the recommended sizes and rating shall be used. All couplings shall be wired to prevent their parting. Leaking hoses shall be removed from work area.

2.12 CUTTING AND WELDING WORKS

Welder must wear overalls and boots to protect them from flying sparks.

Welders shall wear full-face shield while carrying out welding.

Welding objects should be properly earthed by cable lugs or clamps.

Welding cable shall be regularly checked against cuts or damage to the insulation.

Electrode holders shall be of an approved standard.

Whenever welding or cutting is to be performed, fire extinguishers must be positioned in the vicinity of the welding/cutting area with easy accessibility.

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All combustible materials in the vicinity of the welding operation must be removed, or if not possible, covered by flame resistant materials.

The work area must be kept clean and any wooden floors in the area covered with flameproof mats, oil trays etc. must be thoroughly cleaned.

Flame resistant screens must be erected around the work area to prevent sparks from flying outside the immediate working area while in hot work/hazardous areas

Torches must be lit outside before being passed into a confined space.

Hose lines shall not cross traffic lanes or walk ways. If this is unavoidable ramps or channels must protect them.

Special care must be taken when handling acetylene cylinders.

The torches and regulators used shall be fitted with “flash back” arrestors.

Ignition of torches must be made using the “gas lighters” which are supplied for this purpose.

2.13 RADIOACTIVE ISOTOPES

Radiography Procedures shall encompass isotope storage, handling, transport, exposure and actions in case of emergency.

Procedures shall satisfy statutory, client and company requirements.

All personnel operating isotope projection equipment and/or X-ray generating equipment shall be trained, classified workers, monitored for radiation exposure under an acceptable scheme administered by an approved body.

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Adequate barriers, warning signs and lights shall be deployed to de-mark restricted access areas during radiography.

Isotopes shall be stored in a secured storage pit or container. A secured fence shall enclose this. The dose rate at this boundary fence shall not exceed 7.5 micro seivert per hour.

Once removed from the secured storage, pit or container no isotope shall be left unattended by the classified worker.

Radioactive substances shall be kept in specially designed containers with adequate shielding, shutters and locks.

2.14 PRESSURE TESTING

The area around any hydrostatic or pneumatic test location shall be barriered and warning signs shall be erected. No unauthorised personnel shall enter the test area.

High volume components / equipments shall not be air pressurised.

Pressure tests shall be conducted only by qualified and experienced personnel.

The test shack shall be kept at a safe distance from the components under pressure test.

2.15 FIRE PREVENTION AND EMERGENCY RESPONSE PROCEDURE

Fire extinguishers must be regularly maintained and must be kept in sight and within easy reach. Fire hydrants shall be kept clear of any obstruction and shall be clearly marked fire hoses shall be maintained in good condition.

Safety officer shall give special training to personnel, regarding the operation of these safety equipments.

Areas storing flammable material shall be properly marked as restricted areas.

Signs showing the appropriate colour code/use of fire extinguishers shall be erected in work areas/offices.

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An immediate, verbal report shall be made to site manager in the event of:

- Any fatal injury
 - Any serious injury
 - Any damage to plant , equipments & materials
 - Any damage to client / construction plant, equipment or materials.
- Immediate verbal report shall be followed by an investigation. The report will detail:
- circumstances following the accident or incident
 - Collective action taken
 - Recommended action to prevent a recurrence

4. ACCIDENT & INCIDENT INVESTIGATING & REPORTING

3.1 REPORT FORM:

The following report form will be used for the reporting and investigation of accidents and incidents:

- Personal Accident, Injury & Investigation Report
- Property Damage / Loss Report
- Barge Damage Report
- Fire Incident Report form
- Safety Meeting Report.

3.2 SITE SAFETY MEETINGS:

Safety Meetings must be held by site manager on site at regular intervals. The meeting must be chaired by the site manager on his nominated representative.

Subject for reporting discussing include:

- Safety record on the site
- Relevant accident / incident and lessons learned.
- Ideas to improve safety unsafe condition .

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Minutes of each meeting must be kept and reports prepared and forwarded for review and action . The information to be informed to everyone by pasting on notice board or similar .

3.3 SPECIAL INSTRUCTIONS

New short-term contract workers visiting the site to conduct work on a casual basis must be given training in safety procedures and the use of safety equipments.

Typically this training should cover :

- An explanation the site layout, with particular emphasis on areas where entry may be restricted or prohibited.
- An explanation of the expected response in the event of a General Site Alarm.
- The use of personnel protective equipments.
- The use of portable fires fighting equipments and the expected response if a fire is discovered.

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- Prior to Hot work permit it should be ensured that the Firewater hose, Safety Equipments like DCP Cylinder, CO2 cylinder are near working location.
- Booth should be prepared.
- Hot work permit should be taken prior to start the Hot work such as Grinding, Gas cutting & welding.
- Toxic & Hydrocarbon Gas to be checked.
- Each person working on platform should know their Mustering Point.
- Before Start the hot work surrounding area should be cleaned.
- Availability of proper protective gears should be ensured.
- The presence of fire & Safety personnel should be ensured during the Hot Work.