

<b>Mazagon Dock Shipbuilders Limited</b>		<b>Title: Safety Instruction for Sub-Contractor</b>		
Doc. No.	Issue No	Issue Date	Revision No	Revision Date
SB-Works/Safety/01	01	03.08.2022	01	22.11.2023

### **1. Scope of Work:**

- a. To develop consciousness and to create an awareness amongst the sub-contractor and their employees/workman regarding the general procedures and practices for safe conduct of their work at all times.
- b. This brings out procedures, standard practices etc. and would serve as the reference material to all Sub-Contractors.
- c. This document is only for providing guidance to the sub-contractors and does not replace the safety rules detailed in Factory Acts 1948 and Maharashtra Factory Rule 1963 as amended till date.

### **2. General Safety Guidelines:**

- 2.1 The Contractor shall ensure that his employees/workmen subject themselves to medical examinations required under the law and keep a record of the same. (As per the "Factory Acts 1948" and the Maharashtra Factory Rules 1963 as amended till date).
- 2.2 Workers and supervisors engaged in the work shall be competent and undergone Safety training by MDL Safety section before deployment on job inside the MDL.
- 2.3 Contractor should go through MDL safety manual and follow the safety procedures wherever applicable.
- 2.4 The contractor must observe all safety precautions in connection with the work performed by him. No job should be undertaken where question of safety remains unanswered.
- 2.5 The Contractor shall not permit any employee/workmen to enter the work area under the influence of alcohol.
- 2.6 Smoking is strictly prohibited.
- 2.7 Fishing is not permitted in the yard.
- 2.8 Report promptly any situation affecting the safety of any person.
- 2.9 All stairways, Platforms and Walkways must be kept clean at all the times.
- 2.10 Make proper use of all safety devices and guards provided.
- 2.11 All employees shall wear personal protective equipment as appropriate while working.
- 2.12 The workmen of the contractor must wear fire retardant boiler suit/overall while working in MDL premises. The Sub-contractor shall be required to provide their workmen with Boiler suits of suitable colour with name of the contractor on the boiler suits in prominent letters.
- 2.13 The contractor should ensure that First Aid boxes are provided at the work place.
- 2.14 Do not leave tools/items on the floor or where they can fall on people below.
- 2.15 On completion of work in any location, the contractor must ensure that the place is left in a clean state and all scrap is disposed to nearby appropriate scrap bins.



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2.16 All storage container must be clearly marked indicating the nature of contents.

2.17 No one except Driver (Operator) is allowed to ride/drive Jumbo/forklift/Powered trolleys/Crane etc.

2.18 The contractor should ensure that adequate fire extinguishing arrangements are provided.

2.19 Action by person noticing Fire:

- Attempt to extinguish the fire with available fire-fighting equipment nearby.

- Operate fire alarm system or inform to fire station.

1.20 In order to ensure safety in all hazardous jobs such as excavation, work at height, fragile roof, work in confined spaces, on-board welding and gas cutting, electrical works etc., safety permit should be taken from authorize person.

### 3. Personnel Protective Equipment and other Safety Accessories:

All the contractors' employees shall wear the PPE's and other safety accessories relevant to the work. All safety equipment/accessories should confirm to the relevant Indian or International Standards e.g. ISI, BS, DIN, EN-ISO, ANSI and CE. The PPE matrix is as detailed below:

Sl. No.	Description of Activity	PPE's & Other essential Safety accessories to be used
1	Welding/Gouging	Boiler Suit, Helmet, Hand Gloves, Leg Guard, Face Shield with glass, Leather Aprons, Leather Sleeves, Skull Cap, Safety Shoe, Mask, ear plug etc.
2	Gas Cutting/Gas Welding	Boiler Suit, Helmet, Hand Gloves, Leg Guard, Cutting Goggle with glass, Leather Aprons, Skull Cap, Safety Shoe, Spark Light, ear plug, Tip Cleaner, Mask, Flash back arrestor etc.
3	Blasting & Painting	Boiler Suit, Helmet, Hand Gloves, Goggle, Leather Sleeves, Safety Shoes, Respiratory Mask, Apron, Ear Plug etc.
4	Manual Lifting	Boiler Suit, Helmet, Hand Gloves, Safety Shoe etc.
5	Working at Height	Boiler Suit, Helmet, Hand Gloves, Safety Shoe, Full Body Safety Harness etc.
6	Working on Fragile Roof	Helmet, Hand Gloves, Safety Shoe, Full Body Safety Harness, Scrawling

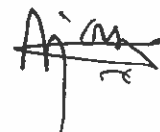
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Sl. No.	Description of Activity	PPE's & Other essential Safety accessories to be used
		Board, Duck Ladder, Lifeline system etc.
7	Working in Confined Spaces	Boiler Suit, Helmet, Hand Gloves, Safety Shoe, Respiratory Mask, Portable light, ear plug, Multi Gas Detector, Fume extractors etc.
8	Material Movement/Lifting/Turning	Boiler Suit, Helmet, Hand Gloves, Safety Shoe, Slings/Tackles/Shackles, Mask etc.
9	Grinding	Boiler Suit, Helmet, Hand Gloves, Face Shield, Skull Cap, Safety Shoe, Mask, Ear Plug etc.
10	Machining	Boiler Suit, Helmet, Hand Gloves, Face Shield/Google, Safety Shoe, Mask, Ear Plug etc.
11	Civil Construction	Boiler Suit, Helmet, Hand Gloves, Safety Shoe, Gum boots, Mask, Ear Plug etc.

#### 4. Safety Guidelines:

##### 4.1 Safety during Cutting & Welding:

- 4.1.1 Electrode Welding Holders, Gas Cutting Torches, Pressure Gauges, Welding Cables, Gouging torches, Gas Cutting Hoses etc. shall be of good quality confirming to relevant IS or EN standards with the relevant IS or EN stamping.
- 4.1.2 All welding and cutting operations must be carried out by qualified personnel while working inside the yard.
- 4.1.3 Welding machine should be properly earthed and secured.
- 4.1.4 Portable oven used on job should run with 110V power supply only.
- 4.1.5 Flash back arrestors shall be used for both on the cylinder/pipeline end as well as the cutting torch end. The flash back arrestor shall confirm to the relevant IS or EN standards with the relevant IS or EN stamping.
- 4.1.6 The Cylinders shall be kept upright during use and transportation. All industrial gas cylinders shall have Cylinder Cap/Guard for protection.
- 4.1.7 All Industrial gas cylinders shall be properly secured during use and storage.
- 4.1.8 When the cylinders are not in use, the valves must be closed. Prior to fitting the regulator, the valve should be opened slightly to blow away any dust or grit from the valve.
- 4.1.9 Metal wires shall not be used for connecting gas hoses with gas cutting torches, pressure gauges/regulators and for joining gas hoses with connectors.



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- 4.1.10 The firm must ensure that the welding cables and gas hoses are well maintained and replaced if required.
- 4.1.11 All welding cables shall be fully insulated and periodically check for cuts and any damages.
- 4.1.12 Only Spark lights shall be used to ignite flame while using gas cutting/welding torches.
- 4.1.13 All cutting equipment should be removed/shifted from compartments and confined spaces to open decks during breaks and at end of shift.
- 4.1.14 Gas hoses shall be disconnected from the manifold/cylinder after stoppage of work on the day.
- 4.1.15 All welding and cutting operations carried on in confined spaces shall be adequately ventilated to prevent the accumulation of toxic materials or possible oxygen deficiency.

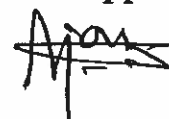
#### **4.2 Safety while Material Handling/Lifting and Turning:**

- 4.2.1 All lifting slings/tackles/shackles shall be tested and certified with competent Authorities and shall be visually checked periodically for fitness for use.
- 4.2.2 All lifting equipment must be tested once in a year.
- 4.2.3 Use correct lifting hooks, ensure they are load tested.
- 4.2.4 Avoid manual handling operations as far as possible to minimize the risk of injury.
- 4.2.5 Position the lifting hook over the load as to prevent the load swinging when it is raised.
- 4.2.6 Ensure only competent persons are allowed to operate cranes.
- 4.2.7 Crane operators must only take Instruction from designated rigger.
- 4.2.8 Crane should not be left unattended unless all loads have been removed.
- 4.2.9 Leather gloves should be worn when working with sharp materials or when handling rigging equipment.
- 4.2.10 Crane/Rigging equipment shall not be loaded in excess of its recommended safe working load.
- 4.2.11 All employees shall be kept clear of loads about to be lifted and of suspended loads. No employee shall be allowed under a suspended load.
- 4.2.12 The proper methods of securing the load, attaching the load to the hook, lifting the load, handling of the load during the movement of the load and lowering and placement of load should be used.

#### **4.3 Safety while working on height:**

Working at height means working on 1.8 meters or above height (i.e. working on platform, stage, scaffolding).

- 4.3.1 Before starting work ensure that the supervisor is available at site and he has got the work permit issued by the authorised person.
- 4.3.2 Use a sufficient supply of sound staging material and appliances for the construction of scaffolding.

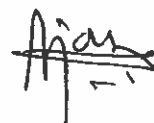


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- 4.3.3 All planks and other materials intended to be used for staging shall be carefully examined before being taken into use.
- 4.3.4 The Contractor shall ensure the use of sufficiently strong scaffolding with sufficiently strong hand railings during the execution of the job.
- 4.3.5 The Contractor shall ensure the use of scaffoldings at construction site by his personnel working at height, fabricated as per standard drawing for scaffolding. If the scaffolding as per the standard drawing is not found suitable at site, the Contractor shall make necessary modification to strengthen the same.
- 4.3.6 All planks forming staging shall be securely fastened to prevent them from slipping.
- 4.3.7 All staging to be used in connection with the operation shall be inspected before use, and thereafter at regular intervals.
- 4.3.8 There should not be any gaps in the working platform.
- 4.3.9 Stages suspended by ropes or chains shall be secured as far as possible to prevent them from swinging.
- 4.3.10 Hand rails with mid rails at one meter and half meter height should be ensured for the working platform.
- 4.3.11 Access ladders shall be provided to reach the working platform.
- 4.3.12 All ladders must be provided with non-skid shoes.
- 4.3.13 Regular inspection of scaffolding and staging are to be carried out.
- 4.3.14 While working on such job every workman must wear Full Body Safety Harness.
- 4.3.15 For any civil engineering job, the Contractor will provide adequate support before casting or any superstructure and provide approach, scaffolding etc., in such a manner that is safe, easy for movement of men, women and materials.

#### **4.4 Hand Tools and Power Tools:**

- 4.4.1 Tools shall be manufactured from the best materials by reputed tool companies with confirming to and stamped by the relevant Indian or International Standards e.g. IS, DIN, EN-ISO, ANSI and CE.
- 4.4.2 All power hand tool like grinder, weld flux remover etc. used onboard or inside the workshop must be run on either 110V power supply or by compressed air.
- 4.4.3 All compressed air hose must have standard hose coupling for fittings.
- 4.4.4 Compressed air tools, while under pressure, must not be left unattended.
- 4.4.5 All connections to air tools shall be made secure before turning on air pressure.
- 4.4.6 When working at elevated location, all tools should be placed in tool box to prevent loose tools being dropped from the heights.



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- 4.4.7 Wooden shaft must be of correct size and securely fixed to the hammer head with fitting wedges. The face of hammers should be kept clean and in good condition (Not mushroomed).
- 4.4.8 A file must be used with proper handle fitting and to maintain files when clogged with filings clean out the teeth with a file card or fine wire brush.
- 4.4.9 When using a screwdriver, make sure that the blade fits the slot in the screw properly. Too large or too small a blade will damage the screw and not work efficiently.
- 4.4.10 Select the correct hacksaws blades to carried out work and blade should always be correctly tensioned in the frame. After use when the hacksaw is to be stored, the tension on the blade should be released.
- 4.4.11 Always select a spanner which exactly fits the nut or bolt head, never use packing pieces to make the spanner fit. Piece of pipe or similar device must not be placed over the end of spanners as extensions to increase the torque.
- 4.4.12 All electrical hand tools shall be of double insulated and fiber body type.
- 4.4.13 The RPM of grinding machine should be lower than the RPM of the grinding disk/wheel.
- 4.4.14 Do not use a portable power tool (such as saw, grinder and drill) unless its dangerous parts have been effectively guarded.
- 4.4.15 Electrical tools shall not be used where there is hazard of flammable vapours, gases, or dusts without a valid Hot Work Permit.
- 4.4.16 Do not use compressed air/Oxygen to clean off overalls or clothing.

## **5. Electrical Safety:**

- 5.1 The Contractor shall engage qualified, experienced and competent electricians and other electrical personnel while working on electrical lines (which may be High Tension, Medium Tension and Low Tension electrical lines) for safe execution of Contract.
- 5.2 The electricians and other electrical personnel must possess requisite certificate issued from competent authority.
- 5.3 The Contractor shall ensure proper earthing of all electrical equipment/machinery prior to start of the machine.
- 5.4 The Contractor shall also ensure daily examination of the earthing of equipment/machinery prior to start of the job in order to avoid electrical hazards.
- 5.5 The Contractor shall ensure use of proper cable (may be welding cable or power cable or control cable). The joints of the cables shall be perfectly insulated.
- 5.6 The Contractor shall also ensure the use of proper plugs & sockets.
- 5.7 Use of rubber hand gloves during monsoon season is very essential.
- 5.8 Repair and routine maintenance of electrical equipment shall be carried out by trained and qualified electricians.



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5.9 In case of Electrical work contract, the contractor shall have valid electrical License issued by PWD or any Govt. organization or shall have a valid MOU with the licensed contractor.

5.10 For onboard work, only 110V AC supply will be provided.

## **6. Safety while Working on Fragile Roof and Pitched Roof:**

6.1 Do not step on any sheet without obtaining proper safety training.

6.2 Before starting work (i.e. before climbing on the access ladder) ensure that the supervisor is available at site and he has got the work permit issued by the authorised person.

6.3 Intimation shall be given to shop In-charge along with height permit, before going to roof of workshop.

6.4 Use suitable and sufficient access ladders, cat ladders, crawling boards, duck ladders etc. and fix them properly on the roof.

6.5 Use Full Body Safety Harness and anchor them properly with the anchorage points on the roof or to the lifeline available on roof or fall protection device.

6.6 Never step directly on any part of the roof. Always walk or step only on the ladders.

6.7 It is not safe anytime to walk on purlins. Do avoid it. Do not run on roof.

6.8 It is necessary to walk on ladders (and not on roof directly) while transporting these sheets on roof.

6.9 While working on the roof, ensure that no loose items are dropped down.

6.10 Always use suitable and strong ropes for taking sheets from ground to the roof.

6.11 Never leave any loose items (tools, cut sheets, broken sheets) on the roof after the work is over.

6.12 Never use any electrical equipment without proper earthing.

6.13 Ensure sufficient illumination while you are working on the fragile roof.

## **7. Safety while working in Confined Spaces:**

7.1 Before starting work ensure that the supervisor is available at site and he has got the work permit issued by the authorised person.

7.2 Prepare adequate emergency arrangements before the work starts.

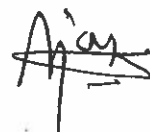
7.3 Testing the air is necessary to check before starting the work that it is free from both toxic and flammable gas/vapours and that it is fit to breathe. Testing should be carried out by a competent person using a suitable gas detector which is correctly calibrated.

7.4 Proper ventilation arrangement should be made before starting the work.

7.5 Adequate light arrangement should available.

7.6 Use only 24 V power supply while working in confined space.

7.7 When work is being carried out in a confined space, another person should be assigned to outside the confined space to maintain communication with the worker inside. Sufficient number of rescue personnel should also be made available outside the confined space. These persons need to be properly



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trained in rescues, physically fit and readily available to carry out rescue tasks, and capable of using any rescue tools.

### **8. Safety while Blasting and Painting Operations:**

- 8.1 Suitable blasting suits and hoods with coolant tube shall be used while carrying out blasting operations.
- 8.2 Immediate removal of spillage. Good housekeeping standards must be maintained at all times.
- 8.3 The contractor shall ensure that paint handed over to it for usage is safely stored in a suitable container.
- 8.4 Never allow Naked flames - matches - cigarettes -in the same area where paint is being applied or stored.
- 8.5 Airless spray must always be earthed as static electricity can develop within the system and be the cause of explosion.
- 8.6 All couplings must be of a close fit, especially on high pressure equipment. Replace damaged hoses.
- 8.7 The contractor shall ensure that its personnel have minimum contact of paint with skin.
- 8.8 Hand Gloves, Safety Shoes and eye protection must always be worn during work.
- 8.9 Usage of a suitable barrier cream on exposed skin must be considered.
- 8.10 Air fed hood/mask or respirator in confined spaces must be used.
- 8.11 Safe access and adequate lighting must be ensured.
- 8.12 Blasting proof, light and portable lamps shall be provided for the blasting operations inside of tanks and compartments.
- 8.13 The area where blasting or painting is being carried out must be provided with proper, visible safety barriers or signs.
- 8.14 Tarpaulins and other coverings should be used to cover dry dock channels / pump pits, compressor house, nearby electrical installation, machines and equipment which may otherwise be affected by blasting or painting operations.
- 8.15 Cleaning of the slipway, dry-dock, surrounding areas, machines and equipments, etc. of dust immediately after blasting has taken place.
- 8.16 Removal of spent/excess and reusable grits and empty paint drums.

### **9. Safety at Civil Construction Sites**

- 9.1 The rock blaster should be a qualified and competent person for carrying out blasting work.
- 9.2 Before blasting, sufficient warning should be given to enable the people working in the area to get off the danger zone at least 10 minutes before the blasting starts.
- 9.3 Care should be taken that the blasting point is free of detonating gas, inflammable objects, sparking or damage wiring system, stray currents.
- 9.4 Underground utilities (such as water pipelines, sewers, gas mains, electrical conduit system) should be located and protected, wherever necessary, before the start of excavation.





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- 9.5 Measures should be taken to prevent persons who are not engaged in excavation work, from approaching excavation areas by placing warning signals, barricades etc. near the site of the excavation.
- 9.6 Excavated material should not be dumped within 1.5 m of the edges or half of the depth of the trench whichever is more.
- 9.7 Shoring (supporting the sides of the trench) and/or proper slopes to the trench walls should be provided.
- 9.8 Ladder access at suitable intervals with proper support in the trench should be provided and ladder should extend above the ground level.
- 9.9 Dewatering provisions should be considered while excavating a trench near a water body.
- 9.10 Temporary electrical connections provided in the trench area should be in compliance to the requirements of the Indian Electricity Act, Rules and Regulations.
- 9.11 Proper barricading of trenches with warning signals should be provided.
- 9.12 At all approaches and exits of the sites of excavations, danger and warning signals should be placed.
- 9.13 Excavation area should be adequately lighted for night work.
- 9.14 Test for oxygen level inside the shaft before start of work every day.
- 9.15 Effective communication system between the ground staff & the persons working in the shaft should always be there to ensure safe working environment.
- 9.16 The excavated material should be dumped sufficiently away from the edge of the excavated pit to avoid the excavated material slipping and falling into the pit.
- 9.17 Guard rails should be fitted to the working platform and should be secured to prevent their outward movement. The platform should be strong enough to bear the loads of workmen & materials.
- 9.18 Persons should not be allowed to work under the scaffold and if at all it is necessary to carry out work, then safety net should be provided to arrest the fall of materials & tools.
- 9.19 Safe access should be provided to the structures under erection.
- 9.20 Structures/ platforms should not have openings uncovered/unbarricaded.
- 9.21 Working under the structure should be prevented and if at all it is necessary to carry out work, then safety net should be used to arrest the fall of materials & tools.
- 9.22 In order to avoid the workers from being in contact with the moving parts of machinery such as conveyors, screens etc. machine guarding should be provided.
- 9.23 Health hazard from cement dust or wet cement should be controlled by avoiding engagement of workers in dusty areas and ensuring usage of PPEs especially filter respirators, goggles, gloves and boots.
- 9.24 When workmen are working/cleaning the inside of the drum of mixer, the power of mixer should be switched off and "Do not operate" tag should be provided.
- 9.25 Every opening in the floor of a building should be provided with suitable fencing/railing of one-meter height on all exposed sides with toe guard of 15 cm vertical height. Where barricades cannot be installed, safety net should be installed close to the level at which there is a danger of a fall.
- 9.26 All temporary wiring should be installed and supervised by a competent electrician.
- 9.27 Adequate protection should be provided for all electrical wiring laid on floor which may be crossed over by construction machinery or by the workmen.



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- 9.28 Suitable warning signs should remain displayed at conspicuous places to alert the workers of the potential dangers and to protect them from the risks of electrical accidents.
- 9.29 All necessary rescue equipment such as life buoys and life jackets should be provided and kept available for use at any time while working in and around water bodies.
- 9.30 Dispose all wastes, and unwanted materials must be disposed of at a designated place.
- 9.31 Do not leave planks with nails on passageways.

