

**ENVIRONMENTAL, HEALTH AND SAFETY MANAGEMENT SYSTEM**

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## **1 PURPOSE**

- 1.1 To establish a safe work procedure for working in a confined space so as to protect the workers from incident.

## **2 SCOPE**

- 2.1 This procedure is applicable to all confined space activities in the workshop / workplace.

## **3 RESPONSIBILITIES**

- 3.1 The designated Person In-Charge (PIC) shall ensure that the confined space is safe for work before any work start. He / She will then allow the workers to proceed with the work.
- 3.2 Confined Space Assessor (CSA) shall check and ensure that no work is carried out or is in progress without the prior permission of the PIC.
- 3.3 Contractors / Suppliers shall ensure that the workmen put on the proper Personal Protective Equipment (PPE) during work.

## **4 PROCEDURE**

### **4.1 General**

- a) The Contractor shall as a minimum comply with CP 84: Code of Practice for entry into and safe working in confined space.
- b) Hazards can be encountered where work is carried out in excavation, tanks, vessels, pipes, or other confined spaces as defined in CP 84. For this reason, contractors are required to produce a risk assessment and method statement (Vessel Entry Plan) detailing work methodology, ventilation plan, rescue plan by a MOM qualified confined space assessor.
- c) The Vessel Entry Plan must allow for intermittent entry for supervisors, inspectors and safety people in addition to the minimum number of workers. This is to allow for proper supervision and oversight of confined space activities.
- d) The following processes are especially dangerous when carried out in confined spaces:-
  - Paint spraying
  - Extensive preheating (naked flame)
  - Welding

- Arc air gouging
  - Use of cleaning fluids (solvents)
  - Grit blasting
- e) The dangers involved include:
- Asphyxiation
  - Fire & Explosion
  - Oxygen enrichment or deficiency
  - Dust & fumes
  - Noise & Vibrations
  - Slips & Falls
  - Mechanical hazards

Note: Many items of equipment will have been filled with nitrogen to prevent corrosion during shipping – The Contractor shall display warning signs in the appropriate languages) to warn of the hazards.

- f) The Contractor shall not enter or commence work in any excavation tank, vessel, pipe or chamber or other enclosed space, until a valid permit to work has been issued. Where Contractor operations may result in a dangerous atmosphere arising during the work activity the permit to work issuing authority must be made aware of this before permit issue.
- g) No new activity shall be introduced into a confined space without the permission and signed approval of the permit to work issuing authority.
- h) Whilst work is ongoing within a confined space, the Contractor is required to provide a trained standby / watchman.
- i) No persons are allowed to work in confined space unless he has successfully attended MOM training for Safety Orientation Course (Manhole), at the level relating to his position eg. worker, supervisor, gas tester.
- j) Hand held portable electrical lighting for use in confined spaces must not exceed 24 volts (and explosion proof where applicable). Fixed

lighting systems can be designed and installed using 110V centre tapped supply.

- k) Powered hand tools used in confined spaces should, where possible, be air operated.
- l) No persons shall be allowed to work in confined space unless a Manhole Supervisor is present.

#### 4.2 Hot Work Around Confined Space

- a) Gas and oxygen tests shall be continuously monitored in line with the activity. Tests should be conducted whenever the confined space has been vacated for any length of time prior to re-entry e.g. lunch breaks tea breaks etc, before re-entry.
- b) Whenever potential hazard of generation of toxic, flammable, gases exits from nearby hotworks or exhaust, gas test shall be continuous, throughout duration of works inside confined space.
- c) Whenever gas cutting is carried out inside confined space:
  - 1. Gas cylinders shall not be brought into confined space.
  - 2. Gas cutting apparatus shall be removed from confined space during meal and tea breaks and at the end of every day.
- d) Whenever welding is carried out inside confined space:
  - The above paragraph will apply and/or
    - Welding machine shall be positively grounded and shall be located outside the confined space.
    - Whenever there are gouging activities to be taken place, breathing apparatus (B.A) is to be used. No person is permitted to use B.A unless suitably trained and qualified in its use. As an alternative force vent plates must be used and a ventilation plan prepared.
    - Fire fighting equipment (e.g. fire extinguisher, fire hose etc.) shall be placed inside the confined space or at the entrance of the confined space whichever is more practical.
    - If entry can only be achieved from the top and this is, or becomes the only means of egress, a life line attached to the users body harness must be used.

#### 4.3 Pre Entry Requirement

- a) A valid PTW must be in place.
- b) Gas test to be conducted to assess level of toxic, flammable gases, vapours and oxygen content; this is only to be done by a qualified confined space safety assessor.
- c) Ventilation to be turned off for 15 minutes before gas testing is conducted in order to ensure that any residual Hazardous gas/vapour settles is captured.
- d) If necessary, ventilate/steam purge till toxic, flammable, gases and vapours are removed from the space.
- e) Repeat gas test to prove that “gas-free” condition is achieved.
- f) Before any employee enters a confined space, the internal atmosphere will be tested with a properly functioning direct-reading instrument for the conditions listed in the following table, in the order given:

| <b>Condition to Be Tested</b> | <b>Acceptable Parameters</b>            |
|-------------------------------|---|
| Oxygen content                | not <20% or >23% O2 (Typical 20.5%-21%) |
| Flammable gases and vapours   | < 10% of the LEL                        |
| Hydrogen Sulphide             | < 10ppm                                 |
| Carbon Monoxide               | < 25 ppm                                |
| Benzene                       | < 0.5 ppm                               |
| Hydrocarbons                  | < 100 ppm                               |

- g) Provide continuous airflow (force ventilation/ extraction as necessary).
- h) Positively close or disconnect all parts that may introduce gases or fluids into confined space using the lockout procedures.
- i) Gas monitoring and test equipment shall be bump tested before use. This is a test that ensures correct operation of the monitoring equipment when it is measure against a calibrated measure of gas. In addition, gas meters / monitors shall be calibrated monthly.
- j) Maintain an updated blind list and lock out / tag out register attached for any connectivity to electrical installations.
- k) Ensure that stand-by personnel adequate, in number are assigned and are stationed outside the entry and exit points throughout duration of activities inside the confined space.
- l) Said stand-by personnel shall be fully briefed, understand and able to demonstrable knowledge of actions to be taken in case of emergency.

- m) Every person entering the confined space shall register his name on the entry log provided near entry point.

#### 4.4 Entry Log

- a) An entry log shall be placed next to the entry point and will be continuously updated.
- b) The nominated stand-by man will ensure that anyone entering the confined space registers themselves by recording on the log:
  - 1. Time of entry
  - 2. On exiting, each person shall record the time on the log.
  - 3. The stand-by man shall be aware of the number of personnel inside the confined space at all times.
  - 4. The Contractor supervisor is to ensure that the log is removed at the end of each shift but not before he/she is satisfied that the confined space is empty of personnel.
  - 5. The entry log is to be changed for the start of each new shift.

#### 4.5 Confined Space Exit

- a) Any confined space shall be immediately evacuated in the event of:
  - 1. Any injury to persons inside
  - 2. Thunderstorms, Lightning or flooding
  - 3. Extreme heat
  - 4. Presence of gas or vapour is detected
  - 5. If an individual experiences any discomfort or displays signs of claustrophobia (cold sweat, panic, sudden fear etc.)
  - 6. if directed to do so by any WSH representative or line supervision
  - 7. When unattended, the entrance and exit points of any confined space shall be closed or secured and the relevant signboards erected

#### 4.6 Detection of Hazardous Atmosphere after Entry

- a) The attendant and the entry supervisor should follow these steps if a hazardous atmosphere is detected after entry operations have begun:
- Initiate evacuation of the space Hole watch
  - Account for all entrants and withdraw permit Hole watch
  - Prevent anyone from re-entering the space until Steps 4 and 5 are completed Hole watch
  - Evaluate the space to determine how the hazardous atmosphere developed CSE Assessor
  - Conduct additional risk assessment with a view to implement engineering or additional controls to bring the atmosphere within acceptable parameter OMC WSH Superintendent

#### 4.7 Testing Equipment

- a) Atmospheric monitoring Instruments shall be of sufficient sensitivity and fitted with the appropriate sensors for the potential hazardous contaminants identified in the risk assessments, to ensure hazardous atmospheres that may exist or arise are detected.
- b) Calibration checks will be performed by the owner of the equipment, i.e. OMC or Contractor, in accordance with the manufacturer's recommendations.
- c) Instrumentation shall be intrinsically safe.

#### 4.8 Equipment Related to Confined Space Entry

- a) The risk assessment, conducted by the Contractor for the confined space shall consider the requirement for intrinsically safe tools and equipment based on the hazards identified.
- b) Where the existence of dangerous air contamination, high temperature and/or oxygen deficiency is determined, forced air or exhaust ventilation will be implemented to eliminate hazardous atmospheres before employees enter the confined space.
- c) The Contractor shall provide a ventilation plan to the OMC WSH Supervisor as an attachment to the JSA for the scope of work. The plan shall have OMC approval.
- d) Forced air will be directed so as to ventilate the immediate areas where employees are present. Additionally, ventilation will continue while employees are in the confined space and until all employees have exited the space.
- e) The air supply will be from a clean source and will not increase the hazards in the space.

#### 4.9 Communication System



- a) Communication devices shall be intrinsically safe for use in confined spaces. Mobile phones will not be permitted to be used in a confined space under any circumstances.
- b) An effective, continuous means of communication between authorized system entrants and the attendant is required for each confined space entry.
- c) Communication system and emergency alarm mechanisms are required to be tested prior to the start of work activity/shift for confined spaces by the Contractor Confined Space Supervisor and the designated confined space watch person.
- d) The Contractor shall identify in the JSA the unique emergency evacuation alarm mechanism or communication protocol for the confined space, and shall communicate this to all workers at the toolbox meeting daily.
- e) Communication equipment may consist of radios, portable phones, video equipment, etc. An alternate means of communication (e.g., hand signals, whistles, bells) shall be identified in the JSA where required, and must be communicated to all entrants prior to entry and be in place in case the primary communication system fails.
- f) The Contractor entry supervisor will determine the type of communication equipment required for the entry operation and shall ensure the communications equipment is available and fully operational.

#### 4.10 Temporary Lighting Equipment

- a) 24 Volt temporary lighting for use in confined space areas must be identified in the JSA where required and shall be supplied by the Contractor as necessary to ensure an adequate degree of illumination.
- b) The Contractor Entry Supervisor shall ensure that intrinsically safe portable hand held lighting is available and on stand by where lighting is required in a confined space, for both the workers and the designated confined space watch person.
- c) All Earth Leakage Circuit Breakers (ELCB's) shall be located outside the confined space and leads shall be routed through separate penetrations wherever possible to allow unimpeded access and egress through the designated entry point.

#### 4.11 Hand and Power Tools

- a) All confined space entries will be evaluated using the OMC JSA process for specific hazards relating to hand/power tool usage. The

use of the low-voltage (12 V) or ELCB -equipped electrical tools may be required. Additionally, any air-powered tool used within a confined space will be powered by Grade-D breathing air or its equivalent (i.e., compressor equipped with a CO monitor / high temp alarm).

- b) All Earth Leakage Circuit Breakers (ELCB's) shall be located outside the confined space and leads shall be routed through separate penetrations wherever possible to allow unimpeded access and egress through the designated entry point.

#### 4.12 Barriers and Signage

- a) The Contractor will select the barriers, shields, railings, or temporary covers that are appropriate for site-specific conditions. These devices will guard the opening of a confined space to prevent an accidental fall through the opening and to protect the authorized entrants from foreign objects entering the space.
- b) Appropriate signs shall be posted by the Contractor to ensure adequate warning of the existence and location of the confined space and the hazards contained therein.
- c) Signs should bear a warning stating the following:

|  |
|--|
| <p><b><u>DANGER</u></b><br/><b><u>DO NOT ENTER WITHOUT</u></b><br/><b><u>CONFINED SPACE ENTRY PERMIT</u></b></p> |
|--|

- d) Signs shall be in English, and the predominant local languages of the workers working in and around the Confined space. Signage should also contain symbols that clearly indicate the Confined Space hazard or RESTRICTED ENTRY to ensure clear communication to all personnel of varying literary levels. Sign colours shall be in accordance with SS 508 Graphical Symbols Part 1 and Part 3.

#### 4.13 Non-Entry Rescue and Emergency Equipment

- a) The following equipment will be available for non-entry rescues:
  - 8. Full body harness with retrieval line attached at the centre of the entrant's back or above the entrant's head
  - 9. Wristlets, which may be used in lieu of the chest or body harness if:
    - Use of a harness is infeasible

- Use of a harness creates a greater hazard
  - Use of wristlets is the safest and most effective rescue alternative
- b) Mechanical device for lifting (e.g., Tripod) positioned outside the space in such a manner that rescue can begin as soon as the rescuer becomes aware that a rescue is necessary. The retrieval line from the entrant's harness will be attached to the mechanical device before entry operations begin. A mechanical device will be available to retrieve personnel from vertical-type permit spaces more than 1.5 meters deep.

#### 4.14 Other Equipment

- a) Ladders, scaffolding or work platforms, and shoring devices that conform to the OMC operation specifications will be used or installed by the Contractor as necessary to provide safe conditions for the authorised entrants. All equipment introduced into the Confined space shall be subject to risk assessment through the JSA process, e.g. non conductive ladders.

#### 4.15 Heat Stress

- a) Where the ambient temperature is 38 degrees Celsius or greater, the OMC WSH Supervisor shall consult with the OMC WSH Manager to gain approval for entry.

#### 4.16 Non-Entry Rescue

- a) Non-entry rescues shall only be performed by those Contractor employees fully trained in non entry rescue.

#### 4.17 Coordination with Offsite Rescue Services

- a) Before the start of work activities at any operations, the OMC WSH Supervisor will ensure the following availability and extent of services:
- Backup arrangements
  - Anticipated Response time
  - Emergency phone numbers and personnel contacts
  - Availability of standby services for complicated entries

- The opportunity to participate in selected periodic emergency drill
- b) The Contractor safety supervisor will provide the OMC WSH Supervisor with the following as a minimum
- Full disclosure of the hazards they may confront if called on to perform entry rescue
  - Access to all permit spaces from which rescue may be necessary
  - Copies of the appropriate JSA and MSDS for the scope of work.
  - Number of personnel in the confined space

#### 4.18 Requirements for Applications of Painting and Coating

- a) Contractor shall ensure that any painting and coating works inside a confined space are constantly monitored for atmospheric gases.
- b) If the LEL level raise above 2%, work shall cease until the ventilation clears the area and the LEL returns to 0%. Additional extraction / ventilation may be used.
- c) All Air movers must be guarded and shall be used whilst works progress.

#### 4.19 Confined Space within a Confined Space

- a) A confined space within a confined space shall be treated as two separate confined spaces.
- b) A confined space within a confined space shall be reflected in the rescue plan with any additional control necessary to control a rescue e.g. additional testing requirements.
- c) Alarm activation / gas test failure in either confined space shall result in total evacuation until such time as it can be determined what the cause is and any additional measures that are to be taken.
- d) Testing shall be done and deemed safe at the first confined space before entering and testing the confined space within a confined space.
- e) Wherever possible, no person shall enter any confined space to conduct testing.

- f) Additional ventilation shall be installed to ensure adequate ventilation and air flow in the secondary confined space.
- g) Rescue of persons in the secondary confined space shall only be conducted using SCBA.

## **5 RECORDS**

- 5.1 PTW – Entry Into Confined Space

## **6 ATTACHMENTS**

- 6.1 NIL

## **7 REFERENCES**

- 7.1 NIL