

# Occupational Safety & Health Specifications & Bill of Quantities



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## **OCCUPATIONAL SAFETY AND HEALTH SPECIFICATIONS**

### **1. SAFETY AND HEALTH MANAGEMENT SYSTEM**

#### **1.1. Safety and Health Plan**

1.1.1. The Contractor shall implement and maintain at all times a Safety and Health Management System for the purpose of ensuring the safety and protecting the health of every person within the worksite, whether or not the person is at work or is an employee of the Contractor. The Contractor shall:

- (a) Prepare and submit **two (2) sets** of Safety and Health Plan to Supervising Officer before the project commences and update it to the Supervising Officer throughout the construction works. A copy of the updated Safety and Health Plan shall be kept at site.
- (b) Safety and Health Plan Content
  - i) Description of project
    - Project description and programme details including any key dates.
    - Details of client, designers, Contractor and other consultants.
    - Extent and location of existing records and plans that is relevant to safety and health on site, including information about existing structures when appropriate.
  - ii) Management of the work (site project organisation structure)
    - Management structure and responsibilities.
    - Safety and health goals for the project and arrangements for monitoring and review of safety and health performance i.e. safety policy, site safety plan, safety and health committee, safety manual and procedures, risk assessment plan, emergency respond plan and arrangements for controlling significant site safety and health risk at workplace.
  - iii) Arrangements for;
    - Regular liaison between parties on site.
    - Consultation with the workforce.
    - The exchange of design information between the client, designers, consultants and Contractors on site.
    - Handling design changes during the project.
    - The exchange of safety and health information between Contractors.
    - Site security.
    - Site induction.
    - Onsite training.
    - Welfare facilities and first aid.

- The reporting and investigation of accidents and incidents including near misses.
  - The production and approval of risk assessment and written systems of work.
  - Site rules (including drug and alcohol policy).
  - Fire and emergency procedures.
- iv) Arrangements for controlling significant site risks
- Safety risk including:
    - Delivery and removal of materials (including waste) and work equipment taking account of any risk to the public, for example during access to or egress from the site;
    - Dealing with services – water, electricity and gas, including overhead power lines and temporary electrical installations;
    - Accommodating adjacent land use;
    - Stability of structures whilst carrying out construction work, including temporary structures and existing unstable structures;
    - Preventing falls;
    - Work with or near fragile materials;
    - Control of lifting operations;
    - The maintenance of plant and equipment;
    - Work on excavations and work where there are poor ground conditions;
    - Work on wells, underground earthworks and tunnels;
    - Work on or near water where there is a risk of drowning;
    - Work involving diving;
    - Work in a caisson or compressed air working;
    - Work involving explosives;
    - Traffic management (includes routes and segregation of vehicles and pedestrian);
    - Storage of materials (particularly hazardous materials) and work equipment;
    - **Any other significant risks.**
- 1.1.2. Appoint a third party workplace safety and health auditor to audit the Safety and Health Management System of the worksite at least once every 6 months if the building operation or works of engineering construction to be carried out in a worksite is **\$30 million or more**;
- 1.1.3. Where the contract sum of the building operation or works of engineering construction to be carried out in a worksite is less than \$30 million, the Contractor shall:

- (a) Conduct a review of the Safety and Health Management System of worksite at least once every 6 months;
- (b) Appoint a workplace safety and health auditor to audit the Safety and Health Management System of the worksite if directed by Public Works Department.

#### 1.1.4. ELEMENTS OF SAFETY AND HEALTH MANAGEMENT SYSTEM

- (a) Safety Policy, including all allocation and delegation of responsibility for safety.
- (b) Safe work practices.
- (c) Safety training.
- (d) Group meetings.
- (e) Incident investigation and analysis.
- (f) In-house safety rules and regulations.
- (g) Safety promotion.
- (h) System for the evaluation, selection and control of Contractors and sub-Contractors.
- (i) Safety inspections.
- (j) Maintenance regime.
- (k) Risk assessment (hazard identification, risk assessment and risk control).
- (l) Control of movement and use of hazardous chemicals.
- (m) Occupational health programmes.
- (n) Emergency preparedness.

### 1.2. Workplace Safety and Health Committee

- 1.2.1. The Contractor shall appoint and establish a workplace safety and health committee which comprise representatives of employees and employer of the workplace in which there are **fifty or more persons** employed at the place of work.
- 1.2.2. The Contractor shall consult the safety and health committee with a view to the making and maintenance of arrangements which will enable him and his employees to co-operate effectively in promoting and developing measures to ensure the safety and health at the place of work of the employees, and in checking the effectiveness of such measures.
- 1.2.3. Functions of safety and health committee:
  - (a) To keep under review circumstances in the workplace which affect or may affect the safety and health of persons in the workplace;
  - (b) To promote co-operation between the employer and the employees in achieving and maintaining safe and healthy working conditions;
  - (c) To carry out inspections of the scene of any accident or dangerous occurrence in the interests of the safety and health of the employees.
- 1.2.4. The Contractor shall convene such site co-ordination meeting to ensure the safety, health and welfare of persons at work in the worksite and ensure that every meeting is attended by every person (project manager, supervisor, an engineer, a workplace safety

and health coordinator or a workplace safety and health officer including employees) who is involved in any work or process being co-ordinate in the worksite and any other person who oversees any work or process.

### **1.3. Design of Plant and Temporary Structures**

- 1.3.1. The designs and manufacturing of any plant and temporary structures must be designed and constructed so as to be safe and without risks to health when properly used.
- 1.3.2. The Contractor shall make necessary arrangement for the following plant and temporary structure to be designed and endorsed by a competent person or professional engineer as PWD requirements:
  - (a) Formwork and support system;
  - (b) Scaffolding;
  - (c) Catch platform;
  - (d) Construction rubbish/debris disposal chute;
  - (e) Runways and ramp used by vehicles;
  - (f) Support for stability of structure where adjoining area to be excavated or piled;
  - (g) Loading platform;
  - (h) Material and passenger hoist;
  - (i) Gondola;
  - (j) Tower crane foundation;
- 1.3.3. The Contractor shall submit the copy of the endorsed design to Public Works Department or authorised department before any work related to such plant or structure commences.
- 1.3.4. The Contractor shall arrange for the carrying out such testing and inspection as maybe necessary for the performance of the duty imposed on him by paragraph 1.3.1.
- 1.3.5. The Contractor shall take necessary steps to secure that there will be available in the connection with the use of the plant at work, adequate information about the use for which it is designed and has tested, and about any condition necessary to ensure that, when put to that use; it will be safe without risks to health.
- 1.3.6. So far as is practicable ensure that any person who erects or installs any plant for use by persons at work, that nothing about the way in which it is erected or installed makes it unsafe or risk to health when properly used.

### **1.4. Workplace Safety and Health Officer**

- 1.4.1. The Contractor (Class III, Class IV, Class V and Class VI) shall appoint a full-time competent person to act as a workplace safety and health officer (WSHO) at worksite in the duration of the construction period.
- 1.4.2. The WSHO shall possess such qualification, more than 2 years' practical experiences relevant to the work to be performed and ~~or~~ have received such training that related to occupational safety and health at workplace.

- 1.4.3. The WSHO shall perform his / her duties to ensure occupational safety and health at workplace.

#### **1.5. Workplace Safety and Health Co-ordinator**

- 1.5.1. The Contractor shall appoint a full-time competent person to act as a workplace safety and health co-ordinator (WSHC) at worksite in the duration of the construction period if the contract sum is less than \$10 million.
- 1.5.2. The WSHC shall possess such qualification, at least 2 years' practical experience relevant to the work to be performed and ~~or~~ have received such training that related to safety and health occupational at workplace.
- 1.5.3. The WSHC shall perform his / her duties to ensure occupational safety and health at workplace.

#### **1.6. Medical Check-up**

- 1.6.1. The Contractor shall carry out medical check-up on employees for those who are involved in following activities:
- (a) Tower crane operation;
  - (b) Confines spaces;
  - (c) Tunnelling operation;
  - (d) Any other activities as specified by S.O.

#### **1.7. Personal Protective Equipment**

- 1.7.1. The Contractor shall provide and maintain the appropriate personal protective equipment to all employees and visitors within the construction period.
- 1.7.2. All personal protective equipment shall be safe design and construction for the works to be performed.
- 1.7.3. The personal protective equipment are as follows:
- (a) Eye and face protection
    - i) The Contractor shall provide the employees with eye and face protection equipment when machines or operations present potential eye or face injury from physical, chemical or radiation agents.
    - ii) Employees whose vision requires the use of corrective lenses in spectacles shall be protected by goggles or spectacles.
    - iii) The selection of face and eye protection for the hazards and operations shall meet the specifications contained in the accepted international Standards.
  - (b) Fall protection – harnesses (full body harness) with lanyards (double lanyards) for employees where is a risk for a person falling from height of more than 2 meters.
  - (c) Foot protection - safety-toe footwear for employees shall meet the requirements and approved specifications as international standard.



- (d) Hand protection – suitable hand glove to protect hand and finger injuries from physical or chemical.
- (e) Head protection – to protect any possible danger of head injury from impact, or from falling or flying objects, or electrical shock and burns.
- (f) Hearing protection – wherever it is not feasible to reduce the noise levels or duration of exposures during their works, the employees shall wear the ear protective devices.
- (g) Respiratory protection
  - i) A respiratory shall be provided to each worker when such equipment is necessary to protect the health of such worker.
  - ii) The Contractor shall provide the respirators which are applicable and suitable for the purpose intended. The Contractor shall maintain such respirator in good and efficient working condition.
- (h) Protective clothing – provide to protect from extremities.
- (i) Protection against radiant energy
  - i) Selection of proper shade numbers of filter lenses or plates used in welding shall meet those specified by the acceptable international Standard for welding filter.
- (j) Laser protection
  - i) Employees whose occupation or assignment requires exposure to laser beams shall be furnished with suitable laser safety goggles meeting the accepted international Standard which will protect for the specific wavelength of the laser and be of optical density adequate for the energy involved.

## **1.8. Safety and Health Training**

- 1.8.1. The Contractor shall arrange programs for the education and training of employees or any person to avoid and prevent from unsafe conditions and unsafe acts in the worksite.
- 1.8.2. The Contractor shall arrange for health and safety talks or training to be given on site before any hazardous work or high risk takes place. The talks or training shall cover the relevant activity and an attendance register must be kept and signed by all attendees. The register of attendees and the content of the topic shall be kept on the site safety and health file as evidence of on-going training.
- 1.8.3. The Contractor shall arrange the programs as below;
  - a. Site Induction for every personnel working at site or any visitors who will enter to construction site. The Contractor must develop project-specific induction course in safety and health. The Contractor shall ensure that all employees under his control have gone through the induction course before commencing duties on site. The Contractor shall keep in the safety and health file, a copy of the attendance register of all employees who attended the induction course.

- b. Toolbox Talk shall be conducted as needed depending on the level of risks faced on the job, or the levels of experience of the employees. The Contractor shall keep in the safety and health file, a copy of the attendance register of all employees who attended the toolbox talk.
- c. Fire fighting program and emergency response plan at workplace shall be developed and implemented to assure adequate protection of employees at worksite.
- d. Others training or program that will enhance the safety and health to employees or any related to the scope of work that will be done at worksite.

**1.9. Emergency Response Plan (Preparedness, Response and Evacuation)**

- 1.9.1. The Contractor shall establish a written emergency response plan (ERP) and shall cover those designated actions employers and employees must take to ensure employee safety from fire and other emergencies during the construction period.
- 1.9.2. The plan shall be reviewed and communicated to all employees and ensure related training before implementing the ERP to sufficient number of workers at worksite.

**1.10. Hazards Identification, Risk Assessment and Risk Control**

- 1.10.1. The Contractor shall identify potential hazards to employees or, assess their risk, or likelihood or happening and effects they would have, and taking of necessary control measures for such hazards.
- 1.10.2. The Contractor shall prepare and undertake hazards identification, risk assessment and risk controls (HIRARC) for all construction activities.
- 1.10.3. Records shall be kept, maintained and submitted to the S.O. prior to commencement of the work.

**1.11. Monthly Report**

- 1.11.1. The Contractor shall prepare a site safety and health monthly report and submit to the S.O. and other related parties every first week of the consecutive month.
- 1.11.2. The content of the report shall include;
  - (a) Man hours worked;
  - (b) Major /minor accident;
  - (c) Near miss incident;
  - (d) Safety Audit Findings;
  - (e) Inspections carried out;
  - (f) OSH Programme (training, committee meeting, promotional activities, internal audit and inspections);
  - (g) Others;

- (h) Recommendation;

### **1.12. Site Safety Signage**

1.12.1. The Contractor shall provide and maintain general or standard safety signage at work site to ensure the workers and the public are aware about safety and health including information concerning the hazards to the employees or any persons within the contract period.

1.12.2. It is mandatory to provide, install and maintain the standard Ministry of Development safety signage – refer item 22: Safety Signs - Ministry of Development Health Safety and Environment Manual.

1.12.3. The safety signage shall be:

- (a) Waterproof materials;
- (b) Of metal or Flute board/corflute plastic with vinyl letters or equivalent;
- (c) Printed in letter high enough to be easily read;
- (d) Exhibited at a prominent position (building/hoarding).

1.12.4. Provision for the following safety signage but not limited to:

- (a) Beware of falling object
- (b) Beware of openings
- (c) Beware of excavation area
- (d) Electrical Safety Signage
  - i) Beware electricity
  - ii) Use Electricity safely
  - iii) Use safe electrical tools
  - iv) Beware of overhead cable
  - v) Others
- (e) No open burning
- (f) Use handrail
- (g) Use safety harness
- (h) Use safe access and egress
- (i) Road construction safety signage

### **1.13. Site Safety and Health Information Board**

1.13.1. The Contractor shall provide proper information board at site to ensure that persons at site including visitors are at least informed about the safety and health activities.

- 1.13.2. The boards shall be located at easily access to persons or close to areas of employees or workers use (in front of site office or near to assembly point).

**1.14. Notification and reporting of Accident, Dangerous Occurrence, Occupational Poisoning and Occupational Diseases**

- 1.14.1. The Contractor shall provide the procedure for notification and reporting of accident, dangerous occurrence, occupational poisoning and occupational diseases base on project or worksite.
- 1.14.2. Any accident at a worksite which leads to the death of any employee or any person who not at work or of any self-employed person, the Contractor shall, as soon as is reasonably practicable, notify to Public Works Department and/or authorities.
- 1.14.3. The Contractor shall comply with Workplace Safety and Health (Incident Reporting) Regulation, 2014.
- 1.14.4. All incidents must be investigated and reported to Public Works Department. A record of all reports and investigations shall be kept on the safety and health file. In the case of a serious incident or fatality, the Contractor shall report the incident within 24 hours to relevant authorities.
- 1.14.5. Provision for accident / incident investigation report inclusive for the cost to engage if there are any third parties involve (competent person / specialist) to investigate any accident at workplace. Contractor to engage a third party

**1.15. First Aid Facilities**

- 1.15.1. The Contractor shall appoint in writing at least two (2) First Aider(s). The appointed First Aider(s) are to be sent for accredited first aid training of an appropriate level before starting on site. Valid certificates are to be kept on site.
- 1.15.2. The Contractor shall provide onsite adequate first aid box, which shall be adequately stocked at all times.
- 1.15.3. The first aid box shall be under the control of the First Aider and shall be fully accessible at all times.
- 1.15.4. In addition, the Contractor shall have a stretcher on site to be used in case of a serious incident. A register must be maintained of first aid given and stock used.

**1.16. Portable Fire fighting Equipment**

- 1.16.1. Where required by the Fire Department or Public Works Department, the Contractor shall provide, at strategic positions on the site, portable fire extinguishers, which shall be serviced regularly, in accordance with the manufacturer's recommendations.
- 1.16.2. The locations of the fire extinguishers include the site office, quarters and standby for any hot works activities within the contract period. At least one (1) unit for site office, two (2) units for each quarter (depending on floor area) and one (1) unit standby for every hot work area.
- 1.16.3. Safety signage shall be prominently displayed in all areas where fire extinguishers are located.

1.16.4. The Contractor shall arrange for the training of the relevant personnel, in the use of fire extinguishers.

1.16.5. Wherever fire extinguishers have been provided, it shall be inspected periodically and maintained in accordance with the requirements and a copy of the monthly fire extinguisher inspection register must be filed or recorded.

## **2. AMENITIES AND FACILITIES**

### **2.1. Water Supply**

2.1.1. The Contractor shall provide or supply of portable water in all places of employment.

2.1.2. Portable water means water which meets the quality standards prescribed by Ministry of Health.

### **2.2. Temporary Structures and Sanitary conveniences at construction worksites**

2.2.1. The siting of temporary offices, living quarters and toilets within the construction sites shall be acceptable to the relevant competent authority.

2.2.2. A room space of not less than 10 cubic meters shall be provided for each worker in the living quarters.

2.2.3. The temporary office and living quarters shall be adequately lit and ventilated.

2.2.4. Sanitary facilities in the ratio of 1 water closet, 1 shower and 1 wash hand basin for every 25 workers or less shall be provided in the temporary office and living quarters. The toilet facilities shall be connected to a sewer/temporary septic tank with the approval of the relevant competent authority.

### **2.3. Temporary rest area**

2.3.1. The Contractor shall provide designated rest areas for workers and site staff. The areas provided shall be safe, ventilated and lighted.

### **2.4. Lighting**

2.4.1. The Contractor shall provide and maintain sufficient and suitable lighting, whether natural or artificial, in every part of the worksite in which persons are at work or passing including emergency lighting in case of a power failure.

2.4.2. Construction areas shall be lighted to not less than the minimum illumination intensities especially at the stairways, accesses and emergency routes to allow for the safe evacuation or rescue of persons in the worksite.

### **2.5. Ventilation**

2.5.1. Wherever hazardous substances such as dusts, fumes, mists, vapours, or gases exist or are produced in the course of construction work, their concentrations may be injurious to health. When ventilation is used as an engineering control method, the system shall be installed and operated according to the requirements of this section.

2.5.2. Local exhaust ventilation when used as described above shall be designed to prevent dispersion into the air of dusts, fumes, mists, vapours, and gases in concentrations

causing harmful exposure. Such exhaust systems shall be so designed that dust, fumes, mists, vapours, or gases are not drawn through the work area of employees.

### **3. PREVENTION OF FALLS AT WORKPLACES**

#### **3.1. General**

The Contractor shall provide fall protection systems. All fall protection required by this section shall conform to international guideline or standard for the prevention of falls at workplaces.

#### **3.2. Unprotect Sides and Edges**

Any employee on a walking/working surface (horizontal and vertical surface) with unprotected side or edge which is 2 metres or above a lower level shall be protected from falling by the use of guardrail systems, safety net systems, or personal fall arrest systems.

#### **3.3. Leading Edges**

3.3.1 Any employee who is constructing a leading edge 2 metres or more above lower levels shall be protected from falling by a guardrail system, safety net systems, or personal fall arrest systems.

3.3.2 Any employee who on a walking/working surface 2 metres or more above lower levels where leading edges are under construction, but who is not engaged in the leading edge work, shall be protected from falling by a guardrail system, safety net systems, or personal fall arrest systems. If a guardrail system is chosen to provide the fall protection, and a controlled access zone has already been established for leading edge work, the control line may be used in lieu of a guardrail along the edge that is parallel to the leading edge.

#### **3.4. Hoist Areas**

Any employee in a hoist area shall be protected from falling 2 metres or more to lower levels by a guardrail systems or personal fall arrest systems.

#### **3.5. Holes / floor opening**

3.5.1 Each employee on walking/working surfaces shall be protected from falling through holes (including skylights) more than 2 meters above lower levels, by personal fall arrest systems, covers or guardrail systems erected around such holes.

3.5.2 Each employee on a walking/working surface shall be protected from tripping in or stepping into or through holes (including skylights) by covers.

3.5.3 Each employee on a walking/working surface shall be protected from objects falling through holes (including skylights) by covers.

#### **3.6. Formwork and reinforcing steel**

Any employee on the face of formwork or reinforcing steel shall be protected from 2 meters or more to lower levels by personal fall arrest systems, safety net systems, or positioning device systems.

#### **3.7. Runways and Ramps**

Any employee on ramps, runways, and other walkways shall be protected from falling 2 metres or more to lower levels by guardrail systems.

### **3.8. Excavations**

3.8.1. Any employee at the edge of excavation which the person liable to fall 2 metres or more in depth shall be protected by effective guard-rails system/barriers/toe-boards or other means to prevent fall from height from falling by guardrail systems, fences, or barricades when the excavations are not readily seen because of plant growth or other visual barrier.

3.8.2. Open sides should be barricaded by effective guard-rails system/barriers/toe-boards or other means to prevent fall from height.

3.8.3. Any employee at the edge of a well, pit, shaft, and similar excavation 2 metres or more in depth shall be protected from falling by guardrail systems, fences, barricades, or covers.

3.8.4. The duty and responsibility of a professional engineer who designs the underpinning, sheet piling, bracing or other means of shoring, to ensure the drawings are certified and carried out accordingly as required by PWD.

### **3.9. Dangerous equipment**

Any employee less than 2 metres above dangerous equipment shall be protected from falling into or onto the dangerous equipment by guardrail systems or equipment guards.

Any employee 2 metres or more above dangerous equipment shall be protected from fall hazards by guardrail systems, personal fall arrest systems, or safety net systems.

### **3.10. Overhand bricklaying and related work**

Any employee performing overhand bricklaying and related work 2 metres or more above lower levels, shall be protected from falling by guardrail systems, safety net systems, personal fall arrest systems, or shall work in a controlled access zone.

### **3.11. Roofing work on low-slope roofs and steep roofs**

Employee engaged in roofing activities on low-slope roofs, with unprotected sides and edges 2 meters or more above lower levels shall be protected from falling by guardrail systems, safety net systems, personal fall arrest systems, and to provide sufficient and secured anchorage including personal fall arrest systems.

#### **Steep Roofs**

Each employee on a steep roof with unprotected sides and edges 2 metres or more above lower levels shall be protected from falling by guarding systems with toe boards, safety net systems, or personal fall arrest systems.

### **3.12. Wall openings**

Any employee working on, at, above or near wall openings where the outside bottom edge of the wall opening is 2 metres or more above lower levels and the inside bottom edge of the wall opening is less than 1 metre above the walking/working surface, shall be protected from falling by use of a guardrail system, a safety net system, or personal fall arrest systems.

**3.13. Walking/working surfaces not otherwise addressed**

Except as provided above, any employee on a walking/working surface 2 metres or more above lower levels shall be protected from falling by a guardrail system, a safety net system, or personal fall arrest systems.

**3.14. Protection from falling objects**

When any employee is exposed to falling objects, the Contractor shall have each employee wear a hard hat and shall implement one of the following measures:

- (a) Erect toe boards, screens, or guardrail systems to prevent objects from falling from higher levels; or
- (b) Erect a canopy structure and keep potential fall objects far enough from the edge of the higher level so that those objects would not go over the edge if it was accidentally displaced; or
- (c) Barricade the area to which objects could fall, prohibit employees from entering the barricade area, and keep objects that may fall far enough away from the edge of a higher level so that those objects would not go over the edge if they were accidentally displaced.

**3.15. Ladders**

3.15.1. The Contractor shall ensure that all ladders and the use thereof is of good construction, sound material and adequate strength for the purpose for which it is used.

3.15.2. All ladders must be specified with its international certification standards. Home-made ladder should not be permitted and must be removed from site.

3.15.3. The Contractor shall ensure that the ladders and step ladders are properly secured for the safety of the users.

**3.16. Scaffolding for Temporary Working Platform, Access and Egress**

Scaffold for temporary working platform :

- (a) The design of the scaffold shall be complying with the provision of the PWD requirements, and erected in accordance with that design under the supervision of the designated person.
- (b) Safe means of access shall be provided for each employee erecting or dismantling a scaffold where the provision of safe access is feasible and does not create a greater hazard. The employer shall have a competent person to determine whether it is feasible or would pose a greater hazard to persons, and have employees use a safe means of access. This determination shall be based on site conditions and the type of scaffold being erected or dismantled.

Scaffold and its components shall be inspected for visible defects by a designated person periodically, and after any occurrence which could affect a scaffold's structural integrity.

Scaffold shall be erected, moved, dismantled, or altered only under the supervision and direction of a person qualified in scaffold erection, moving, dismantling or alteration. Such



activities shall be performed only by experienced and trained employees selected for such work by the person.

### **3.17. Access and Egress**

#### **3.17.1. General**

In every building or structure entrance and exits shall be arranged and maintained as to provide free unobstructed access and egress from all parts of the building or structure at all times when it is occupied. No lock or fastening to prevent free escape from the inside of any building shall be installed except in mental, penal, or corrective institutions where supervisory personnel is continually on duty and effective provisions are made to remove occupants in case of fire or other emergency.

#### **3.17.2. Exit Marking**

Exits shall be marked by a readily visible sign. Access and egress to entrances and exits shall be marked by readily visible signs in all cases where the entrance or exit or way to reach it is not immediately visible to the occupants.

#### **3.17.3. Maintenance and workmanship**

Means of access and egress shall be continually maintained free of all obstructions or impediments to full instant use in the case of fire or other emergency.

### **3.18. Rubbish Chute**

Wherever rubbish / debris disposal chute is used, it shall be constructed and well maintained.

Any chute exceeding 12 metres in height shall be constructed in accordance with the design and drawings of the professional engineer.

### **3.19. Safety Nets**

3.19.1. The Contractor shall provide safety nets for workplaces where the use of ladders, scaffolds, catch platforms, temporary floors, safety lines, or safety belts is impractical. It is duty of Contractor to ensure that adequate overhead protection is provided to protect objects that could fall on or otherwise hit workers / any persons at worksite.

3.19.2. Where safety net protection is required, operations shall not be undertaken until the net is in place.

3.19.3. Safety nets shall conform to any acceptable industrial standard and shall be of type tested and approved by testing body.

3.19.4. All equipment's (safety hooks or shackle) to ensure the strength of the net shall be used to fasten the net to its supports or connections.

## **4. ELECTRICAL**

All electric power supply shall comply with the electrical safety requirement by PWD and Electric Services Department.

Submission of regular safety inspection and maintenance reports on electrical distribution box, switch box, temporarily wiring and generator set both indoors and outdoors on weekly basis, to be incorporated -in item 1.12 Monthly Report.

Provide electrical safety signs at workplace to ensure workers and public aware about electrical safety within the contract period and to be included under item 1.13 Site Safety Signage.

## 5. HAZARDOUS CHEMICALS AND MATERIALS

- (a) All hazardous substances in the worksites shall be placed under the control of a competent person who has adequate knowledge of the properties of the hazardous substances and their dangers.
- (b) Adequate warning notices in languages understood by all persons at work in the worksite specifying the nature of the danger of the hazardous substances shall be placed -
  - i) At all entrances to any workroom; and
  - ii) At appropriate locations where the hazardous substances are used or present.
- (c) Persons at work in a worksite who are liable to be exposed to hazardous substances shall be warned of the hazards involved and the precautionary measures to be taken.
- (d) All hazardous substances in the worksite shall be kept, stored, used, handled or disposed of in such a manner as not to pose a risk to the safety and health of any person at work in the worksites.

### 5.1 Warning labels

It shall be the duty of the occupier of the worksite in which there is any container of hazardous substances to ensure that, so far as reasonably practicable, every such container is affixed with one or more labels that-

- (a) Are easily understood by all persons at work in the worksite;
- (b) Warn of the hazards involved with the hazardous substance in the container; and
- (c) Specify the precautionary measures to be taken when dealing with the hazardous substance in the container.

### 5.2 Safety data sheet

- (a) Where any hazardous substance is used, handled or stored in a worksite, it shall be the duty of the occupier of the worksite to –
  - i) Obtain a safety data sheet of the substance;
  - ii) Assess the information in the safety data sheet and take precautionary measures to ensure the safe use of the substance; and
  - iii) Make available the safety data sheet to all persons at work in the worksite who are liable to be exposed to the substance.
- (b) Where any hazardous substance is sold to any person for use in a worksite, the seller or any agent of the seller who caused or procured the sale shall provide the buyer with a safety data sheet for the substance, giving accurate and adequate information on the substance, including as far as is reasonably practicable –

- i) Information on the identify of substance;
- ii) The safety and health hazard information of and ingredients used in the substance;
- iii) Information on the composition of and ingredients used in the substance;
- iv) Information on first-aid measures;
- v) Information on fire-fighting measures;
- vi) Information on accidental release measures;
- vii) Information on the precautions to be taken for safe handling and storage;
- viii) Information on the exposure controls and personal protection needed;
- ix) Information on the physical and chemical properties of the substance;
- x) Information on the stability and reactivity of the substance;
- xi) Toxicological information;
- xii) Ecological information;
- xiii) Information on disposal considerations;
- xiv) Transport information;
- xv) Regulatory information; and
- xvi) Any other relevant information.

## **6. PLANTS AND MACHINERY**

### **6.1. Certified Machinery**

The Contractor shall ensure the following plants shall have a valid certification (approved by authorised examiner) before they are being used in any worksite:

- (a) Hoist and lift
- (b) Lifting gear
- (c) Lifting appliance or lifting machine
- (d) Steam boiler
- (e) Steam receiver
- (f) Air receiver
- (g) Refrigerating plant pressure receiver
- (h) Pressure vessel
- (i) Any other machinery required by PWD.

### **6.2. Valid Certification**

Plant provided by the Contractor shall be deemed to be in compliance with the requirements of this part when evidence of current and valid certification by authorised third party assessor testing to the safe installation, inspection, and testing presented.

### **6.3. Certificate of Competency**

Where required, the Plant operator shall possess a valid certificate of competency issued by the third party assessor.

#### **6.4. Slingers and Signalman**

Crane operator shall be assisted by trained slingers and signalman throughout the crane operation.

#### **6.5. Safe Access to Plant**

Safe access for crane operators and other persons carrying out inspection and maintenance work on plant shall be provided to prevent these persons at risk of falling from a height.

### **7. SPECIAL WORK SITUATIONS**

#### **7.1. Working in Confine Space**

7.1.1. Working in a confined space such as working in sewer system or communication system (manhole), a silo, storage tank, pressure vessel or tank; trenches and others can expose a person to a very risky situation that can cause diseases and injury which leads to an accident and death.

7.1.2. Contractor shall ensure the workers always safe to enter any confined space by providing all the following items:

- (a) Develop permit system and procedure for entering confined spaces during the contract period;
- (b) Carry out air testing for toxic, flammable gas fumes and oxygen adequacy before access to the confined area of work by a competent person or authorised gas tester;
- (c) Provision of trained and experienced entry person and standby person;
- (d) Provision of ventilator system to regulate and ensure sufficient air flow to the confined work area;
- (e) Provide, install and maintain safety warning signs

7.1.3. To comply with relevant authorities and PWD requirements or if there are any S.O instructions.

7.1.4. Contractor shall comply with Regulation 25 – Dangerous fumes and lack of oxygen in confined spaces, WHSO 2009 Regulation.

7.1.5. Contractor shall refer to item 3 – Confined Spaces, Health, Safety and Environment Manual, Ministry of Development (MOD HSE Manual 2012).

#### **7.2. Traffic Movement Management within Site**

7.2.1. Inspection of the Existing Site Condition

The traffic movement and information regarding the project shall be reviewed, prepared and plan for all traffic and parking for area(s) based on the available space.

7.2.2. Public Convenience

- (a) Operation shall be conducted as to offer the least possible obstruction and inconvenience to the public, to maintain public safety, and shall have under construction no greater length or amount of work than can prosecute properly with due regard to the convenience and safety of the public.
- (b) Spillage resulting from hauling operations along or across any public travelled way shall be removed immediately by the Contractor at his expense.

7.2.3. Maintaining Vehicular and Pedestrian Traffic Control

- (a) Existing signals signs and street lighting

Existing traffic signal and street lighting systems shall be kept in operation for the benefit of the traffic during progress of the work.

Certain signs might be required to be covered which regulate or direct traffic.

Public passage through or around a construction area

Signs, light, flare, and other facilities in order to direct and expedite the passage of public traffic through or around the work in a safe manner shall be installed.

Competent flag personnel whose sole duties shall consist of directing the movement of public traffic through or around the work shall be engaged.

- (b) Prohibition of stopping and parking

Vehicles may be prohibited to stop or park within and adjacent to the construction site. As and when necessary, to provide temporary space required facilitating a particular construction activity. The “NO PARKING, NO STOPPING” zones sign in critical areas may have to be provided in the work areas.

- (c) Flag personnel

Flag personnel shall be used where necessary to control the flow of traffic through the construction site and shall be used in all cases where traffic is being routed through the construction under one-way control.

Flag personnel, while assigned to traffic control, shall perform their duties and shall be provided with the necessary equipment. The equipment shall be furnished and kept clean and in good repair by the Contractor at his expense.

7.2.4. Traffic Management plan

- (a) The Contractor shall prepare a traffic management plan by taking into consideration of the following factors;
  - i) The necessity for workers to carry equipment across the live carriageway
  - ii) The necessity to stop traffic in live traffic lanes
  - iii) The use of technology or equipment to help avoid or mitigate risks
  - iv) Safe access for maintenance operations

- v) The specification of materials or equipment for use during the work
- vi) The establishment of safe working areas
- vii) The establishment of safety zones
- viii) The adoption of safe working practices
- ix) The provision of safe access to and egress from the working areas for vehicles and pedestrians
- x) The implementation of a traffic flow and control system aimed at keeping traffic delays to a minimum
- xi) The needs of motorists, cyclists, pedestrians (including vulnerable road users)

7.2.5. Contractor shall refer to item 29 – Safe Working on Roads, Health, Safety and Environment Manual, Ministry of Development (MOD HSE Manual 2012).

### **7.3. Excavation**

7.3.1. Where the excavation exceeds 1.5 metres depth or more, the Contractor shall adequate a proper shoring to prevent collapse of the excavation, or any structures adjoining or over areas to be excavated.

7.3.2. If the excavation works exceed 4 metres depth or more, adequate shoring by underpinning, sheet piling, bracing or other means of shoring shall be made or erected in accordance with the design of a professional engineer to prevent collapse of the excavation, or any other structures adjoining or over areas to be excavated.

7.3.3. During any excavation work in a worksite, all reasonable practicable measures shall be taken-

- (a) To prevent any person being trapped by the collapse of the excavation;
- (b) To prevent any person being struck by any object, such as an excavating machine or by any material dislodged by the machine;
- (c) To prevent any person falling into the excavation; and
- (d) To prevent any person inhaling or otherwise being exposed to; carbon monoxide or another impurity of the air excavation.

7.3.4. Any employee at the edge shall be protected from falling by guardrail systems, fences, or barricades when the excavations are not readily seen because of plant growth or other visual barrier.

7.3.5. Any employee at the edge of a well, pit, shaft, and similar excavation 2 metres or more in depth shall be protected from falling by guardrail systems, fences, barricades, or covers.

7.3.6. The duty and responsibility of a professional engineer who designs the underpinning, sheet piling, bracing or other means of shoring, to ensure the drawings are certified and carried out accordingly as required by PWD.

7.3.7. To comply with relevant authorities and PWD requirements;

- 7.3.8. Contractor shall comply with Regulation 25 – Dangerous fumes and lack of oxygen in confined spaces, WHSO 2009 Regulation.

#### **7.4. Demolition Works**

- 7.4.1. Before commencing any demolition work in a worksite-

- (a) All glass and claddings on the exterior of the building to be demolished shall be removed; and
- (b) All gas, electric, water, steam and other supply lines shall be shut off and capped.

- 7.4.2. Where it is necessary to maintain any power, water, gas or electric lines during demolition in a worksite, such lines shall be re-located or protected with substantial coverings so as to protect them from damage and to afford safety to every person.

- 7.4.3. Protection of adjacent structures

- (a) Before and during the demolition of any structure in a workplace, the stability of the walls, ceiling, slabs and all other structures adjacent to the structure which are to be demolished shall be determined.
- (b) Where there is a possibility that an adjacent structure is unsafe or will become unsafe because of demolition operations in a workplace, no demolition shall be performed unless sheet piling, shoring, bracing or such other means as may be necessary to ensure the stability of the adjacent structure and to prevent the structure or other property from collapsing is provided.

- 7.4.4. Removal of load bearing structures

Where any demolition work in a workplace involves the removal of any column, beam, floor or other load bearing structure, it shall be the duty of the occupier of the workplace to ensure that the work is carried out-

- (a) With due regard to the integrity of the remaining structure; and
- (b) In accordance with the method statement prepared by the professional engineer.

- 7.4.5. Demolition of walls and partitions etc.

- (a) Demolition of walls and partitions in a workplace shall proceed in a systematic manner and all work above each tier of floor beams shall be completed before the safety of its support is impaired.
- (b) Masonry shall neither be loosened nor permitted to fall in a workplace in such masses as to endanger the structural stability of any floor or structural support.
- (c) No wall or other part of a structure which is being demolished in a workplace shall be left in such a condition that it may
  - i) Fall or collapse inadvertently; or
  - ii) Be weakened due to wind pressure, vibration or other causes.
  - iii) Where any demolition work in a workplace is carried out with the use of hand-tools.

- (d) Safe footing in the form of sound flooring or scaffolds shall be provided for persons working on an exterior wall; and
- (e) Walls or partitions shall not be left standing more than one storey above the uppermost floor on which persons are working.

#### 7.4.6. Access to floor

There shall be provided at all times access to and egress from every building in the workplace in the course of demolition by means of entrances, hallways, stairways, or ladder runs which shall be so protected as to safeguard the persons using from falling material.

#### 7.4.7. Barricades catch platforms and warning signs

- (a) Where demolition operations are being carried out in a workplace, a substantial barricade with signs to warn persons from unauthorised entry into the workplace shall be erected along every sidewalk or thoroughfare bordering the demolition operations.
- (b) During the demolition of an exterior masonry wall or as roof in a workplace, catch platforms shall be provided and maintained except where an exterior built-up scaffold provides equivalent protection.

#### 7.4.8. Mechanical method of demolition

- (a) Where a swinging weight is used in demolition operations in a workplace-
  - i) The building or structure or remaining portion thereof shall be not more than 24 metres in height; and
  - ii) A zone of demolition having a radius of at least one and half times the height of the structure or portion thereof being so demolished shall be maintained around the points of impact.
- (b) Where a clamshell bucket is used for the demolition work in a workplace, a zone of demolition shall be maintained within 8 metres of the line of travel of the bucket.
- (c) Where other mechanical contrivances are being used for the demolition work in a workplace, there shall be maintained in the area into which affected persons may fall an adequate zone of demolition to ensure the safety of the person.
- (d) No person other than any person essential to the demolition work in a workplace shall be permitted to enter a zone of demolition which shall be provided with substantial barricades.

### **7.5. Blasting or Explosion Works**

#### 7.5.1. General duty on employer and principal

It shall be the duty of –

- i) The employer of any person who carries out work in a worksite which involves the handling or use of explosives; or



- ii) The principal under whose direction any person carries out work in a worksite which involves the handling or use of explosives, to comply with regulations below;

7.5.2. Handling of explosives

- (a) Explosives shall not be handled or used in a worksite except in accordance with the manufacturer's instructions and by or under the immediate control of a designated person with adequate knowledge of the dangers connected with their use.
- (b) Reasonably practicable steps shall be taken to ensure that, when a charge is fired in a worksite, all persons are in such positions which do not expose them to risk of injury from the explosion or from flying materials caused by the explosion.

7.5.3. Smoking, open lights, etc.

- (a) Smoking, open lights and flame or spark producing devices shall be prohibited in or around the explosive magazine or storage enclosure in a worksite.
- (b) Appropriate warning signs of the prohibitions, understood by persons involved in the work in the worksite relating to the handling or use of explosives, shall be posted and maintained at every place where the explosives are kept or stored.

7.5.4. Opening packages

- (a) Packages of explosives in a worksite shall not be opened at any point less than 15.5 metres distance from any explosive magazine.
- (b) Metallic instruments shall not be used for opening packages of explosive in a worksite.

7.5.5. Deepening holes

It shall be the duty of :-

- i) The employer of any person who carries out work involving drilling of holes in a worksite; or
- ii) The principal under whose direction any person carries out work involving drilling of holes in a worksite,

to ensure that no drilling of holes is carried out in the worksite if the hole has at any time contained explosives.

7.5.6. Size of holes

(a) It shall be the duty of :-

- i) The employer of any person who carries out the work of drilling of holes to hold any cartridge of explosives in a worksite; or
- ii) The principal under whose direction any person carries out the work of drilling of holes to hold any cartridge of explosives in a worksite to comply with these sub-regulations;

(b) Any drilled hole in a worksite to hold any cartridge of explosives shall be of sufficient size.

- (c) Cartridges of explosives of the proper size shall be selected so that every cartridge can be easily inserted to the bottom of the drilled hole in the worksite without forcing or ramming.

7.5.7. Removing cartridge wrappers

It shall be the duty of :-

- i) The employer of any person who carries out the work of loading of dynamites into bored holes in a worksite; or
- ii) The principal under whose direction any person carries out the work of loading of dynamites into bored holes in a worksite,

to ensure that the dynamites are not removed from their original wrappers before being loaded into the bored holes in the worksite.

7.5.8. Loading near other operations

(a) It shall be the duty of :-

- i) The employer of any person who carries out the work loading of holes with explosives in a worksite; or
- ii) The principal under whose direction any person whose carries out the work of loading of holes with explosives in a worksite, to take all reasonably practicable measures to ensure that sub-regulations are complied with.

(b) The loading of holes with explosives in a worksite shall be carried out under the direct supervision of a blaster.

(c) The loading of holes with explosives in a worksite shall not be carried out within dangerous proximity to drilling or any other operations in the worksite.

7.5.9. Loading and tamping

(a) The employer of any person who carries out the work of loading and tamping of explosives in a worksite; or

(b) The principal under whose direction any person carries out the work of loading and tamping of explosives in a worksite,

to ensure that only a hardwood rod free from any metal part is used for the work.

7.5.10. Work of firing of any blast

Unless otherwise provided, it shall be the duty of :-

(a) The employer of any person who carries out the work of firing of any blast in a worksite; or

(b) The principal under whose direction any person carries out the work of firing of any blast in a worksite,

To take all reasonably practicable steps to ensure that regulations are complied with.

7.5.11. Warning and retreat

- (a) Before the firing of any blast in a worksite, it shall be the duty of the person firing the blast :-
  - i) To sound a warning distinctly audible to all persons within the danger zone, and
  - ii) To ensure that no blast shall be fired while any person is in danger zone.
- (b) When the warning is sounded, all persons within the danger zone shall retire to a safe distance or to a safe shelter.

7.5.12. Return to blast area

No person shall return from such safe distance or safe shelter referred to in regulation until permitted to do so by the blaster as announced by audible or visible signal.

7.5.13. Misfires

- (a) When there is a misfire of any blast in a worksite, every person in the danger zone shall retire to a safe distance or a safe shelter.
- (b) No person, other than a person appointed to dispose misfired charges, shall enter the danger zone until the misfired charge is disposed of.
- (c) It shall be the duty of the blaster who fired the blast in a worksite :-
  - i) To examine the blast area for evidence of misfired charges immediately following the blast; and
  - ii) To immediately report any misfire to the designated person.
- (d) It shall be the duty of the designated person to :-
  - i) Appoint the necessary personnel to dispose of the misfired charge; and
  - ii) Determine the safe and proper method of its disposal.

7.5.14. Operations during thunderstorm

In the event of a thunderstorm, it shall be the duty of the occupier of a worksite to ensure that:

- (a) Any handling or use of explosives in a worksite shall be stopped immediately; and
- (b) There shall be immediate evacuation of all persons in the area where the explosives are being the handled or used to a place of safety in a proper location as determined by the designated person.

**LIST OF REFERENCES**

1. Workplace Safety and Health Order, 2009
2. Workplace Safety and Health Regulations, 2014
3. Building Guidelines and Requirements – Brunei Darussalam Standard (PBD12)
4. Ministry of Development Health Safety & Environment Manual
  - a. ISBN 978-99917-56-01-9
5. Guidelines for Safety on Construction Sites 1994
6. Guidance Document – Site Safety Auditing (Issue 1)
7. Guidance Document – Guidelines for Safety Organisation (Issue 1)
8. Safety @ Work for Technical Development Programme – PWD
9. Safety at Workplace – Guideline (PWD)
10. Guide on Construction Safety (PWD)
11. Panduan Keselamatan Di Tapak Pembinaan (JKR)