



UniBuild Consultancy

# **HEALTH AND SAFETY MANUAL**



## INTRODUCTION

While every effort has been put in preparation of this guide, there remain many safety aspects that are yet to be covered. The information contained within this safety guide is intended only to supplement safety codes, insurance requirements, and local rules and regulations.

Safety must be given priority on any construction site be it in the office, on site, in workshops, or elsewhere to ensure that accidents are eliminated with an aim to improve productivity and minimize loss of life, time, and cost.

The information included within this guide is intended for use as reference materials. No warranties or guarantees are given, be it explicit or implied, as to the correctness and/or completeness of this guide nor to the information included within.

Every entity involved on our sites must ensure that its staff, of all levels, is properly trained for the tasks they intend to perform. Certain tasks may require special permits and/or licenses. Those must be in order prior to start of any construction activities on site. They must also ensure that their respective staff members have received a reasonable level of safety training prior to being engaged on site activities.



## SAFETY POLICY

- **Accidents hurt.**
- **Accidents cost.**
- **Accidents can be avoided.**

Every year, many accidents or near-accidents occur in the construction industry resulting in loss of life, permanent injuries, and loss of time.

Out of the above, the loss of human life is the most important to us. Each individual who works on our sites must be made aware of all safety aspects related to the site and his specific task on site. This is extremely critical in order to preserve human life and avoid loss of time and cost.

We must aim at elimination of accidents and injuries. This can be achieved by promoting the importance of safety and through compliance with the safety standards required in and around a construction site.

Safety training and awareness must be encouraged and nourished on our site without exception. This includes all those involved on our sites.

Caring for the environment must also be given a priority on our sites. We must avoid damage to the environment. We must focus on the risks and eliminate them. Proper handling of hazardous waste or products is a good starting point towards achieving that goal.

The above can only be achieved by team work and participation of all parties.

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## FUNCTIONS AND RESPONSIBILITIES

### A. PURPOSE

To define individual employee and management tier responsibilities and functions associated with the implementation of the Safety Program.

### B. APPLICABILITY

This section applies to all personnel working at this Project.

### C. POLICY

The responsibility for safety rests with all Contractor's personnel working on site. Specific functional accountabilities are assigned to all levels of management and supervision and individual employees as well.

### D. RESPONSIBILITIES

#### 1. Contractor's Safety Officers

Program administration rests with the Safety Officers, they will coordinate the development of the safety and health program. They will assist all departments in every manner possible toward a mutual goal of safe work. THEY CANNOT, HOWEVER, RELIEVE ANY SUPERVISOR OF ANY PART OF THE RESPONSIBILITY INHERENTLY HIS OR HERS TO DIRECT THE WORK OF THEIR EMPLOYEES IN A SAFE MANNER

#### 2. Contractor's Management/Supervision

Management and supervision at all levels are responsible and accountable for the enforcement of safe work practices and for maintenance of safe work conditions for employees, they have line responsibility for the implementation of the Project Safety/Health Program and compliance with established policies and procedures, and applicable codes and regulations. Supervisors shall report and be accountable to applicable Project Managers.

#### 3. Contractor's Employees

Each employee must be committed to performing their jobs in a safe manner and to take whatever actions are necessary to correct unsafe conditions or practices when they observe or encounter them in the course of their work.



## **RECORDKEEPING AND REPORTING PROCEDURES**

**A. PURPOSE**

To establish the required procedures to report accidents.

**B. APPLICABILITY**

This procedure applies to all contractors working on the project.

**C. POLICY**

To ensure that all accidents are recorded, investigated and proper corrective action is implemented.

**D. REFERENCE**

Local authorities and insurance company requirement.

**E. RESPONSIBILITY**

It is the responsibility of the contractor project manager to adhere to this procedure.

**F. DEFINITION**

Not used.

**G. PROCEDURE:**

This section discusses the recordkeeping that must be maintained by the Contractor



1. FIRST AID LOG

This is a chronological listing of all visits to receive first aid. First aid personnel must record every injury or illness reported, no matter how slight. Entries are made promptly following treatment. A sample of an approved project first aid log is included in this section (see Attachment 1). It is a permanent record, which is maintained in the project files when the job is completed.

2. EMPLOYERS FIRST REPORT OF INJURY

The first report of injury form must be prepared and submitted immediately after an employee reports a work-related injury or illness that requires attention by a physician.

The Contractor must investigate the accident/incident and verify the employee's statement or submit an attached statement of facts developed during the investigation.

3. SUPERVISORS' ACCIDENT ANALYSIS

The Supervisors' Accident Analysis form (see Attachment 2) must be prepared and submitted immediately after an employee reports a work-related injury or illness that requires attention by a physician. Following a thorough investigation, which may involve the designated safety representative, the injured employee (if available), the employee's foreman, general foreman, and superintendent, the employee's supervisor obtains the information to complete the form in detail. Supervisor to be specific. Explanations such as "foreign body in an eye," "strained back while lifting pipe," and "employee does not know how injury occurred," are not satisfactory.

If the situation was complex, finish the explanation on a separate sheet and attach it to the report.

The following investigation procedures should be used when completing the form. It is important that an accurate description of the circumstances leading to the accident be provided. The following questions should be asked of each person involved and of each witness:

- Where were you when the accident took place?
- What activity was being performed prior to the accident?
- What materials, equipment, or conditions were involved? Include all contributing factors.
- How did the accident occur?



- Why did the accident occur? Include all unsafe conditions and/or unsafe acts.
- To the best of the witnesses' knowledge, was there a previously known and/or reported problem or condition associated with the accident?
- What specific corrective action, if any, was taken. If corrective action is not applicable, or the accident can not be verified as job-related, indicated this on the report. ("Instructed employee to be more careful," etc., is not acceptable as corrective action.)

4. MONTHLY SAFETY PERFORMANCE REPORT

The timely and accurate submission of the Monthly Safety Performance Report to the Engineer is the responsibility of the Contractor. It is completed as soon as possible after the end of the month. It must be received in Engineer's office no later than the fifth day of the following month.







## SUPERVISORS' ACCIDENT ANALYSIS

Attachment 2  
Page 1 of 2

(Fill this report out in detail, use additional paper if necessary, and follow up with additional report(s) if necessary)

DATE OF INJURY \_\_\_\_\_ TIME \_\_\_\_\_

NAME OF INJURED EMPLOYEE \_\_\_\_\_ CIVIL I.D. # \_\_\_\_\_

CLOCK NO. \_\_\_\_\_ DEPARTMENT \_\_\_\_\_

SHIFT \_\_\_\_\_

JOB CLASS \_\_\_\_\_ TIME IN THIS JOB \_\_\_\_\_

CLASS \_\_\_\_\_

DATE OF BIRTH \_\_\_\_\_ DATE OF

HIRE \_\_\_\_\_

NAME OF DOCTOR OR HOSPITAL \_\_\_\_\_

HAS INJURED EMPLOYEE RETURNED TO WORK? \_\_\_\_ IF YES, DATE AND TIME \_\_\_\_\_

TYPE OF INJURY \_\_\_\_\_

(Cut, sprain, bruise, strain, etc.)  
BODY PART INJURE \_\_\_\_\_

Left hand, right foot, upper/lower back, left forearm, etc

LOCATION OF INCIDENT \_\_\_\_\_

WAS EMPLOYEE IN ASSIGNED AREA OF WORK AT TIME OF INJURY? \_\_\_\_\_

IF NO, WHY NOT? \_\_\_\_\_

WHAT WAS EMPLOYEE DOING WHEN INJURED? (Please be specific, identify tools, equipment or material that the employee was using)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



OBJECT OR SUBSTANCE THAT DIRECTLY INJURED EMPLOYEE (e.g., the employee was turning a frozen gate valve, or he hit his finger with a sledgehammer. Be specific)

DIRECTLY

WITNESS (ES) TO

ACCIDENT \_\_\_\_\_

\_\_\_\_\_

EMPLOYEE'S SIGNATURE \_\_\_\_\_ DATE

\_\_\_\_\_

\_\_\_\_\_

### SUPERVISORS' ACCIDENT ANALYSIS

**The Supervisor for whom the injured employee worked shall investigate the accident at one and completes this side of the form**

DESCRIBE THE UNSAFE ACT and/or CONDITION \_\_\_\_\_

\_\_\_\_\_  
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\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

ELABORATE ON CORRECTIVE ACTION PLANNED/TAKEN. POINT OUT ANY CONTRIBUTING CAUSES AND WHAT HAS BEEN DONE REGARDING THEM (ATTACH APPROPRIATE DOCUMENTATION).

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SUPERVISOR \_\_\_\_\_ DATE \_\_\_\_\_

PRELIMINARY \_\_\_\_\_ REPORT \_\_\_\_\_ FINAL  
REPORT \_\_\_\_\_

REPORT \_\_\_\_\_ DATE \_\_\_\_\_

REVIEWED BY \_\_\_\_\_ DATE \_\_\_\_\_ ACTION TAKEN \_\_\_\_\_

\_\_\_\_\_



GUIDELINES FOR COMPLETING ACCIDENT  
INVESTIGATIONS/CORRECTIVE MEASURES

**ACCIDENT CAUSE (S)**

**UNSAFE CONDITIONS**

1. Equipment ineffectively guarded or unguarded.
2. Improper type or poor design of tools, equipment or materials.
3. Defective tools, equipment or materials.
4. Defective motor vehicle equipment.
5. Faulty plant facilities (Improper or no emergency exits, poor light or ventilation, poor layout, etc.)
6. Poor housekeeping (congestion, improper piling and storing, scattered tools, equipment and materials, etc.)
7. Slippery surfaces.
8. Improper clothing.
9. Physical disability.
10. Other (full description).

**IMPROPER ACTION**

1. Short-cut, improper route, path or walk
2. Proper mechanical aid.
3. Proper personal protection equipment such as goggles, respirators, masks, etc. not used.
4. Improper tools or equipment used.
5. Horseplay.
6. Improper posture for lifting or straining.
7. Improper position in relation to work (including improper placement of hands and feet).
8. Improper operation of motor vehicle, power driven equipment or bicycle.
9. Improper method or procedure.
10. Other (full description).



## **PROPOSED CORRECTIONS (S)**

### **BY DIRECT SUPERVISION**

1. Give adequate or complete job instruction.
2. Enforce rules, standards or instructions closely.
3. Provide sufficient or better personal safety devices (goggles, safety harness, masks, respirators, etc.)
4. Provide correct or safe tools or equipment.
5. Provide safe plant facilities or equipment.
6. Review and correct inspection procedure.
7. Review and correct job planning.
8. Regulate pace of job.
9. Other (full description).

### **BY COUNSELING AND/OR PLACEMENT**

1. Change employee's duties or assignment to be more compatible with his physical and/or mental abilities.
2. Adequately train employee.
3. Counsel employee on haste with which he/she works.
4. Reprimand or take other counseling action.
5. Counsel employee on attention to detail of job.
6. Other (full description).



## **INVESTIGATING AND REPORTING SERIOUS ACCIDENTS, FATALITIES, AND MAJOR INCIDENTS**

The following procedure is to be followed to secure accident sites until the arrival of the Contractor Representative

1. Immediately following an occurrence, the following actions shall be taken by the Contractor or his designee:
  - a. Amelioration: Preliminary investigation findings shall be reported by the project superintendent to the project manager who will advise the designated Engineer of ameliorative actions where the initial investigation reveals an immediate need for improvement to preclude future incidents.
  - b. Secure and Preserve the Evidence: The accident site shall be secured as soon as possible. Record the existing scenes and conditions with a liberal number of photographs. Accident scenes shall not be disturbed until released by the Contractors Representative except where rescue and emergency measures dictate a need.
  - c. Identify witnesses and secure statements as outlined in section 5 of this procedure.
2. Once the designated Engineer or safety investigator arrives, the Contractor will make available to him information obtained in the preliminary investigation. (The Contractor will immediately report Accidents, which result in loss of life, by the most expeditious means. All accidents shall be promptly investigated.)
3. The Contractor shall promptly give the Engineer, a copy of the employer's first report of injury for all injured personnel referred to a physician.
4. The investigation must determine facts. The investigating team should include the project superintendent and the project supervisor/general be fact finding, not fault finding. The purpose is to learn the true cause so that similar accidents could be prevented.

Flag or rope off the scene of the accident until all investigations are completed. Do not remove or alter anything. (A security guard may be needed to ensure against unauthorized entry or removal).

All personnel assigned to the operation and all witnesses to the accident should be interviewed individually and in private and written statements taken as soon as possible. (see standard witness form Attachment 1). A copy of the statement must be given to the witness. It is important that the witness relate only first hand factual knowledge of what they actually observed. (Opinions, speculations, hearsay or ideas are not factual knowledge.) As a minimum the following questions should be asked of each person and witness involved:



- Where were you when the accident took place?
- What activity was being performed by those involved prior to the accident/incident?
- What activity were you performing at the time of the accident/incident?
- What materials, equipment, or conditions were involved? Include all contributing factors.
- What did you see take place?
- Why did it happen? Include all unsafe conditions and/or unsafe
- Was there a previously known and/or reported problem or condition associated with the accident/incident?

If equipment, tools or materials are involved in the accident/incident, they should be tagged or permanently marked for positive identification. The person tagging the item should be identified. The items should then be placed in safekeeping.

## 5. PHOTOGRAPHS AND DRAWINGS

Each project must have access to a camera outfit available for accident investigation. Drawings must be marked up and/or sketches prepared to indicate the location of the accident. All measurements such as time, distance, etc. must be accurate. Photographs must be taken as soon as possible since conditions often change rapidly. The photographs will be mounted on the Photo Information Sheet, (Attachment 2), and must contain the following information: description and location of the principal item(s) date and time, name of photographer. Photographs should be taken from as many angles as possible.

## 6. REPORTS

The Contractor must give the Engineer a daily report on the investigation. A complete and comprehensive report must be complete as soon as possible after the accident/incident. At a minimum, the report must contain the following information:

- Chronological order of all events, listed by dates, times, names, meetings, etc. and comment on all relevant events.
- Initial Accident Investigation Report(s)
- Drawings /Blue prints
- Law enforcement investigation report if available/applicable





- Coroner's report if available/applicable
- Personnel information on all injured employee(s)
- Worker's compensation form
- Statements of witnesses
- Photos
- Summary of possible causal factors

When the report is complete, it must be Submitted to the Engineer



**STATEMENT OF WITNESS**

Job No.: \_\_\_\_\_

Date: \_\_\_\_\_

The interview will try to determine the facts about the accident that occurred at or about  
\_\_\_\_\_ on \_\_\_\_\_

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**Initials** \_\_\_\_\_

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I have read the \_\_\_\_\_ pages of this statement and initialed each page. The statement is true and correct to the best of my knowledge

\_\_\_\_\_  
**Signature**

\_\_\_\_\_  
**Civil I.D. No.**

**Witness to Signatures:**

\_\_\_\_\_  
**Signature**

\_\_\_\_\_  
**Address**

\_\_\_\_\_  
**Signature**

\_\_\_\_\_  
**Address**



## **SAFETY/HEALTH EDUCATION**

### **A. PURPOSE**

To establish a program to provide Safety/Health Education for Contractor employees.

### **B. APPLICABILITY**

This procedure applies to all Contractor employees, both Temporary and Permanent.

### **C. POLICY**

To provide instruction regarding the Project Safety Program, including the necessary elements of accident/injury prevention, through the new hire orientation program, project safety meetings and specialized safety training sessions.

### **D. REFERENCES**

1. The Project Safety Practices Booklet and Local Regulations

### **E. RESPONSIBILITIES**

1. It is the responsibility of Contractor to establish the time, place, and format of project safety meetings and safety and health training programs. Contractor supervision will assure active participation by employees in the attendance of training, such as scheduled safety meetings, as well as specialized safety-training classes. Supervision shall also assure the immediate distribution and discussion of Contractor Safety and Health Directives/Procedures along with the posting of safety bulletins, posters, and other safety related materials.
2. Supervision will assure that documentation of all training sessions, including a record of attendance, will be maintained in project files for retention.

### **F. DEFINITIONS**

None



## **G**     **PROCEDURES**

### 1.    New Hire Safety Orientation

- a. Each new/temporary employee will receive instruction concerning the Safety Program on the Project. The safety orientation program outline shown as Attachment 1 is to be used as a summary document for each employee undergoing this orientation.

In addition, the following items will be reviewed with each new employee on the Project.

#### The Project Safe Practices Booklet

Each employee will be given a copy of the Safe Practices Booklet. The contents will be reviewed with the employee(s) and the employee(s) will sign the tear-out sheet, acknowledging receipt of the booklet. Contractor is responsible for ensuring that this tear-out sheet is retained in the project files for inclusion in the employee's personnel/payroll file (see **Attachment 3** for text of Safe Practices Booklet).

#### Accident/Injury Reporting

The Project accident and injury reporting requirements will be reviewed.

#### Safety Meetings

Employees will be informed that their attendance is mandatory at the scheduled project safety meetings and/or specialized training as required addressing potential hazards, which may be encountered during the course of their work.

#### Reporting Unsafe Acts or Conditions.

Employees will be informed that the Contractor expects them to report all observed unsafe acts or conditions to their supervisor, who will either resolve the problem or refer it to the next level of supervision. Unresolved problems must be reported to project management. Unresolved problems must be reported to project management. Situations which involve "imminent danger" must be report the first Company supervisor an employee can find.

#### Additional New Hire Information/Special Instructions

- Project work rules and action program
- Housekeeping



- Fire protection and prevention
- Emergency reporting procedures and evacuations
- Industrial hygiene and chemical handling
- Special Project requirements and procedures (sign, barricades, flagging, permits and tagging)
- Material storage and handling
- Electrical safety
- Mechanical and equipment safety
- Confined spaces and respiratory

2. Scheduled Safety Training

Monthly safety meetings (or more frequent as required) shall be conducted by project supervision and document as outlined in Section E (3) of this procedure (see **Attachment 2**, Record of Training).

3. Specialized Safety and Health Training

Specialized training such as CPR/First Aid Training, Confined or Enclosed Space Training, Hydrogen Sulfide (H<sub>2</sub>S) Training, Respiratory Protection Training, Chemical Handling and additional Special Hazards Training shall be provided as necessary.

**H. ATTACHMENT (S)**

1. New Hire Safety Orientation Program Outline and Summary
2. Record of Training Form
3. Safe Practices Booklet (text)



## **PURPOSE AND SCOPE**

Sufficient time must be allotted for the safety orientation of all newly hired employees. This orientation is important because it provides the employee with basic safety and health training. When effectively conducted, the safety orientation also helps reduce the potential for accidents and minimizes exposure to future legal liabilities.

The orientation should be conducted before new employees are assigned to work on the project. Special consideration should be given to the location where the orientation is conducted. The location should comfortably accommodate the number of attendees and provide a quiet environment, free of normal construction distractions. Keep in mind that the intent of the orientation is to provide each newly hired employee effective safety and health training.

Supervisors will attend and/or conduct the safety orientation. Active supervisory participation demonstrates the Contractor's commitment to safety and improves the effectiveness of the presentation.

This program contains the information you need to provide an effective orientation to new employees.

## **B. STARTING THE ORIENTATION**

At the start of the presentation you should do the following:

1. Introduce yourself and other supervisors attending by name and title.
2. Welcome employees to the project.
3. Summarize the Contractor's historical commitment to safety, emphasizing that the Contractor is committed on this project to providing employees a safe place to work.
4. State that the purpose of this orientation is to provide the new employees a basic understanding of the Contractor's safety requirements and to clearly define the employee's safety and health responsibilities while employed on this project.
5. Review the organization and identify the key members of the project team (i.e., project manager, superintendents, etc.)
6. Give a brief description of the type of project the Contractor is construction, emphasizing any unique features.
7. Give a thorough description of the geographical layout of the project. Emphasize the locations of such safety related landmarks as the first



aid facility or locations of the first aid kits, location of the first aid kits, location of other emergency equipment, emergency alarms, telephones, fire extinguishers, emergency evacuation staging areas, etc.

### **C. DOCUMENTATION OF THE ORIENTATION**

The Contractor is required by regulation to document that employees have received the necessary safety orientation. This is accomplished by the following procedures.

1. Distribute a copy of the Safe Practices Booklet to each employee. (See Attachment 3).
2. Explain to the employee that the safe practices in the booklet were developed for the employee's protection and must not be ignored even though they might question them. Safety and health standards and conform to good safety engineering practices. Emphasize that if employees have questions concerning the safe practices in the booklet, they should immediately discuss them with you, their supervisor.
3. Instruct employees to turn to page \_\_\_\_\_ of the booklet, read the page, and complete the blank sections. After completing the page, instruct them to tear it out and return it to you.
4. Distribute a training attendance roster and request that each employee sign it.
5. After orientation is complete, file the completed copy of page \_\_\_\_ in the employee's project file.
6. After the orientation is complete, file the training attendance roster in the project safety files.

### **D. SAFETY ORIENTATION FOR NEW HOURS**

This following information will help you understand the Contractor's policies and your key role in preventing or controlling work related accidents or injuries.

1. Safety Education
  - a. Safe Practices Booklet: The safe practices described in the Safe Practices Booklets are for the protection of all persons engaged on the project. Company employees must read, understand, and observe these guidelines. Most incidents happen without warning and are usually the



result of failure on the part of the worker and/or supervisor to follow these basic safe practices. Much of the information contained in the Booklet will be covered during this presentation.

- b. Safety Meetings: In addition to the basic safe practices described in the Safe Practices Booklet, you will receive specific safety instructions each week at the Toolbox Safety Meeting. This meeting will be held each \_\_\_\_\_(day) at \_\_\_\_\_ a.m./p.m. at a location designated by your supervisor. Your attendance is mandatory and you must sign the training attendance roster provided at the meeting.

If you have an idea that would improve safety on your job, discuss it with your foreman, supervisor, or discuss it at the toolbox safety meeting. Safety suggestions are always welcome.

- c. Special Training: Specialized training may be required prior to performing hazardous or unfamiliar tasks. Your supervisor will arrange for specific training when it is required.
- d. Supervisors Training: For those of you who are to be assigned as supervisors, additional information will be provided regarding your responsibilities for safety.

## 2. Employee Involvement

- a. The Safety Program on this jobsite can only be effective if you personally get involved. The Contractor expects you to be responsible for your personal safety.
- b. Prior to beginning a job, check your work area to determine what problems or hazards may exist.
- c. If your activity may endanger fellow workers or nearby equipment and materials, take the necessary steps to safeguard them.
- d. Always review the safety requirements of each job with your supervisor. You will not be expected to do a job that might result in injury or illness to yourself or to others.
- e. Report unsafe equipment, hazardous conditions, and unsafe acts which you observe to your foreman, general foreman, superintendent, or the Project Manager in that order. Situations that are immediately dangerous should be reported to the first Contractor supervisor you can find. **DO NOT BYPASS UNSAFE SITUATIONS.**

## 3. Review the Safe Practices Booklet. (Attachment 3)





**CONTRACTOR  
NEW HIRE SAFETY ORIENTATION SUMMARY**

This form is designed to aid the Contractor in presenting a thorough and understandable safety briefing to new, rehired, or transferred employees prior to the start of a new job.

Please fully complete this form and file in project office no later than the end of employee's first working day.

**Employee's Name** \_\_\_\_\_ **Date** \_\_\_\_\_

**Job Name** \_\_\_\_\_ **Supervisor** \_\_\_\_\_

- |  |   |
|--|---|
| <input type="checkbox"/> Issue Employee Safe Practices Booklet<br>1. Explain Company Safety Policy<br>2. Explain Safety Rules<br>3. Obtain Employee's Receipt of Booklet   | <input type="checkbox"/> Housekeeping<br>1. General<br>2. Owner Requirements  |
| <input type="checkbox"/> Explain Reasons for Obeying All Safety Rules<br>1. First Aid Procedures<br>2. Emergency Signs<br>3. Reporting, Evacuation Procedures<br>4. Pregnant Women (as applicable)   | <input type="checkbox"/> Explain Safety Practices For<br>1. Smoking<br>2. Equipment Operation<br>3. Machine or Tool Operation<br>4. Lifting:<br>-Know the item<br>-Get a good grip<br>-Bend the knees<br>-Keep back straight<br>-Lift with the legs   |
| <input type="checkbox"/> Obey Safety Signs   |   |
| <input type="checkbox"/> Fire Extinguishers Location and Use   |   |
| <input type="checkbox"/> Trenching Safety  | <input type="checkbox"/> Report Unsafe Conditions/Acts  |
| <input type="checkbox"/> Electrical Safety   | <input type="checkbox"/> Confined Space Safety  |
| <input type="checkbox"/> Personal Protective Equipment<br>1. Hard Hat - Required<br>2. Safety Glasses – When Required<br>3. Welding-Hood, Glasses, etc<br>4. Ear Protection for Grinding<br>5. Dual Eye Protection for Grinding<br>6. Specialized Equipment – As Required<br>7. Responsibility for Above Items | <input type="checkbox"/> Reports Injuries - Regardless of Severity<br><br><input type="checkbox"/> Explain Location of First Aid Kits<br><br><input type="checkbox"/> Attend Weekly Safety Meetings<br><br><input type="checkbox"/> Hazard Communication Program<br>1. Program Overview<br>2. Inventory of Hazardous Materials<br>3. Material Safety Data Sheets (MSDS's)<br>4. Annual Retraining |
| <input type="checkbox"/> Parking Area Rules:<br>1. Private Autos<br>2. Company Equipment<br>3. Speed Limits  | <input type="checkbox"/> Company Disciplinary Procedures  |

**All items above were discussed with employee.**

\_\_\_\_\_  
**Employee's Signature**  
 This report will be filed in employee's Personnel File.

\_\_\_\_\_  
**Supervisor's Signature**



**SUMMARY OF TRAINING**

**“THE CONTRACTOR”**

**Project No.** \_\_\_\_\_

**Date:** \_\_\_\_\_

**INSTRUCTOR** \_\_\_\_\_

**Subject (In detail):** \_\_\_\_\_  
\_\_\_\_\_  
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**ATTENDANCE**

**Name (PRINT)**

**Signature**

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# SAFE PRACTICES BOOKLET

**TEXT**



## SECTION I – GENERAL ORDERS

### A. SUPERVISORY RESPONSIBILITIES

1. All equipment shall be installed and operated in accordance with Company standards and applicable local, codes and regulations.
2. All levels of supervisors shall periodically inspect tools, equipment and working conditions to ascertain that there are no obvious safety hazards.
3. All levels of supervision shall enforce Contract and Government regulations, contained herein, which apply to the work operation for which they are responsible.

### B. EMPLOYEE RESPONSIBILITIES

1. Each employee shall read and be familiar with the contents of this booklet, and shall abide by the regulations contained herein.
2. Each employee shall follow company written and oral instructions issued by authorized personnel to safely perform the job.
3. If the employee has any doubt regarding his job procedure or the safety involved, he/she should consult with his supervisor before proceeding.

### C. EMERGENCY PROCEDURES

1. Each individual shall familiarize himself with the emergency procedure applicable in his work area for such occurrences as fires, medical or other major emergencies.
2. In the event of fire, injury, vehicle accident, etc., where professional assistance (fire department, ambulance) is needed follow your established project emergency procedures.

### D. SCAFFOLDING

After erection, alteration or moving, each scaffold must be inspected and approved by a “competent person” to ensure that it conforms with established standards.

1. Guardrails, mid rails and toe boards must be installed on all open sides of scaffolds.
2. All scaffolds must be fully planked. Scaffold planks must be at least 2 x 25 c m full – thickness lumber, structural grade, or the equivalent and must be cleared or secured from movement.



3. Access ladders must be provided for each scaffold. Climbing the end frames is prohibited unless their design incorporates an approved ladder.
4. Scaffolds or work platforms must not be altered by unauthorized personnel.
5. All scaffold members must be visually inspected before each use. Damaged scaffold members must be removed from service immediately.

#### **E. LADDERS**

All types of ladders are available on the project for your use. There is no excuse for using a make shift means of access to a work area.

1. All straight an extension ladders must be equipped with safety feet or be secured.
2. All straight ladder must be tied off at top or otherwise secured to prevent movement.
3. Ladders used for access to a floor or platform must extend at least 0.91 meters above that floor or platform.
4. Always move the ladder to avoid overreaching.
5. Stepladders must be fully opened to permit the speaker to lock.
6. Employees must never stand on the top two steps of a stepladder.
7. Broken or damaged ladders must not be used. Ladders that need repair must be reported to your supervisor, tagged out, and/or removed from the work area.

#### **F. FLOOR/WALL OPENINGS**

1. Floor openings must be barricaded or covered, secured, and labelled, "Floor Opening - Do Not Remove."
2. Wall openings must be guarded with a top rail, midrail and teboard.
3. Every open-sided floor or platform 1.8 meters or more above the adjacent floor or ground level must be guarded by a top rail, midrail and toeboard.

#### **G. EXCAVATIONS AND TRENCHES**

All excavating and trenching operations and work performed in such area must conform with established standards.



1. Trenches 1.5 meter or deeper must be shored or sloped back to the angle of repose. Any excavation in unstable soil may require shoring or sloping.
2. Materials must be placed 60 cm or more from the edge of the excavation. Precautions must be taken to prevent such materials from falling into the excavation.
3. Each excavation must be inspected daily and after each rain, snow, freeze, etc., by a “competent person.” If evidence of cave-ins or slides is apparent, all work in the excavation must cease until necessary precautions have been taken to safeguard employees.
4. Where vehicles or equipment operate near excavations or trenches, the sides of the excavation must be shored or braced as necessary to withstand the force exerted by the superimposed load.
5. Safe access must be provided into all excavations by means of ladders, stairs, or ramps.
6. Trenches must have ladders spaced so that employees’ lateral travel does not exceed 7.5 meter. Such ladders must extend to at least 90cm above the grade level.

#### **H. HOUSEKEEPING, MATERIAL HANDLING AND STORAGE**

1. Good housekeeping is an important part of any Safety Program. It is your responsibility to keep your work area clean and free from hazards.
  - Protruding nails must be bent over or pulled.
  - All materials must be properly stacked and secured to prevent sliding, falling or collapse. Aisles, stairs and passageways must be kept clear and clean. Exit ways and work areas must not be blocked.
2. When handling heavy and/or awkward materials, use mechanical assistance or ask your supervisor for help. Always use proper lifting technique when handling material:
  - Keep your back straight. Do not lean over.
  - Bend your knees, get down close to the load.
  - Lift gradually, using your legs. Do not jerk or twist.
  - Get help for bulky or heavy loads.
  - Whenever possible, try to use mechanical aids to reduce the amount of lifting you are required to do.



## **I. FIRE PROTECTION AND PREVENTION**

Read, understand and comply with the project fire reporting instructions. In case of fire, assure the fire safety of all personnel, then use the appropriate fire-fighting equipment until help arrives.

1. Report all fires regardless of size to your supervisor.
2. You are expected to know the location of all fire-fighting equipment and alarms in your work area.
3. Learn the classifications of fires:
  - Class A – Ordinary combustible materials such as wood, coal, paper or fabrics where wetting and cooling is the method of extinguishments.
  - Class B – Flammable petroleum products or other flammable liquids where oxygen must be excluded for extinguishment.
  - Class C – Fires in or near energized electrical equipment where, because water would be hazardous, a “non-conducting” extinguishing agent must be used.
4. Keep the work area neat. An orderly project reduces the fire and accident hazard.
5. Where fire hazards are prevalent, check with your supervisor for proper precautions.
6. If Hot Work Permits are required, see your supervisor for instructions on how to obtain a permit

## **J. HAND AND PORTABLE POWER TOOLS**

1. Tools must be inspected daily to ensure that they are in proper working order. Defective tools must be returned immediately to the tool room for repair. Power saws, grinders and other tools that are made to have guards must have those guards in place at all times. Don't abuse electric tools by lifting them by their power cords.
2. Only employees who possess valid credentials are permitted to use powder-actuate tools. Certification cards must be carried by employees using powder – actuated tools.

## **K. ELECTRICAL EQUIPMENT**

All electrical equipment used on the project must be listed by an approved testing laboratory (Underwriters Laboratories, Inc., or Factory Mutual Laboratories) for the specific application. All electrical installations must conform to the MEW regulation.



1. All electrical tools and equipment must be grounded or double insulated.
2. Ground fault circuit interrupters must be utilized on all 120-volt, single phase, 15 and 20 ampere construction receptacle outlets or an assured equipment grounding conductor program must be implemented.
3. Damaged or defective electrical tools must be tagged out of service and returned immediately to the tool room for repair.
4. Tampering with or the unauthorized repair of electrical tools or equipment is prohibited.
5. Temporary lighting must have guards over the bulbs. Broken and burned-out lamps must be replaced immediately. Bulbs must not extend beyond the protective guards. Do not attempt to remove broken bulbs until the circuit is deenergized.
6. Energizing wiring in junction boxes, circuit breaker panels, and similar places must be labelled and covered at all times.
7. Hazardous areas must be tagged, barricaded, and appropriate warning signs posted.

**L. CRANES, MOTOR VEHICLES, HEAVY EQUIPMENT**

Our equipment is built for safe operation, but it is only as safe as the operator.

All cranes, hoists, motor vehicles, elevators, and heavy equipment must be operated and maintained to conform with established standards.

1. When working with equipment, operators must take signals from only one person; in an emergency, however, a STOP signal can be given by anyone.
2. Only standard hand signals will be acknowledged.
3. Accessible areas within the swing radius of all cranes must be barricaded to prevent employees from being struck by the counterweight.
4. Be aware of overhead electrical lines.
5. No crane or other equipment should be operated within 3.0 Meter of energized electrical transmission or distribution lines. **NOTE:** This restriction may be farther than 3.0 Meters for higher powered transmission lines.
6. Loads must not be suspended on an unattended crane.





7. Employees are prohibited from riding on loads, fenders, running boards, tailgates, or trucks with unsecured loads. Sit on the bed or on a provided seat.
8. Do not operated any vehicle or equipment that you feel is unsafe. Report any unsafe vehicle or equipment to your supervisor.

#### **M. RIGGING**

Makeshift rigging will not be permitted.

1. Mechanic's tow chains with grab hooks must not be used for overhead lifting.
2. All rigging equipment must be inspected before use and removed from service if defective. Job-made rigging fixtures must be designed by a qualified engineer and proof tested before service.
3. Number 9 wire, tie wire, etc., will not be used to suspend loads.
4. A flag person must be used whenever hoisting. Don't hoist any loads over anyone's head. Audible warning must be signaled before hoisting near other workers.
5. Taglines are required for handling suspended loads. When walking loads with the crane, the load must be tied back to the crane to prevent unnecessary movement.

#### **N. WELDING AND BURNING OPERATIONS**

Welding and burning operations have a high potential for personal injuries and fires. When performing either task, it is essential to always follow these precautions:

1. Before starting to burn or weld, you must inspect your work area to ensure that sparks or molten metal will not fall on flammable or combustible materials. If you cannot provide the necessary safeguards, check with your supervisor before starting work.
2. You must be sure that suitable fire extinguishing equipment is available in your work area.
3. When you are involved in any welding operation you must wear approved hard hats with welding hood/face shield.
4. During storage, use, and transport, cylinders must be properly capped and secured in an upright position.

#### **O. SAFETY SIGN, BARRICADES, AND SAFETY TAGS**

1. Safety signs and barricades are used to provide warning and protection from potential work place hazards. You must read and obey all signs and honor all barricades.



2. Safety tags are a temporary means of providing a warning to personnel of a hazardous condition, defective tools or equipment, etc. These tags are installed to prevent injury from accidental startup.
  - Never alter the position of a safety-tagged piece of equipment.
  - Do not remove safety tags. Only the person who installed the tag is authorized to remove it.

**Q. OTHER REQUIREMENTS (TO BE DEVELOPED/IMPLEMENTED AT THE PROJECT)**

1. Contract Requirement
2. Site Sensitive Requirements
3. Lockout/Tagout (see company procedure)



## **SECTION II – PERSONAL PROTECTIVE EQUIPMENT**

Personal protective equipment is available for your use. When equipment has been specified for certain work assignments or areas, you must use it.

1. All employees, must wear a hard hat. Alterations must not be made to the hat or its suspension.
2. You must wear clothing suitable for the work you are going. Minimum attire is long pants and a T-shirt with sleeves. No shorts, cutoffs, tank tops, or mesh shirts are allowed. Sturdy work shoes or approved safety shoes are required. Additional foot protection may be available from the tool room.
3. Eye injuries are the most frequent type of injury to construction workers. Most of these injuries are readily preventable through the wearing of proper eye protection. When exposed to flying or falling objects, dust, chemicals, concrete, or harmful ray, appropriate eye protection is available and must be worn. There are many situations where double eye protection is mandatory. Employees who are welding, cutting, grinding, chipping or handling chemicals must wear an appropriate welding hood or face shield **IN ADDITION** to their basic eye protection
4. Hearing protection is mandatory in designated areas or for specific tasks. As a rule, if you are in an environment where you have to shut loudly to be heard, hearing protection is required.
5. Respiratory protective equipment may be required in areas where health hazards exist due to accumulations of dust, fumes, mists, or vapors. When respiratory protective equipment is required, male employees must be clean shaven to ensure proper fit. Employees who are required to wear respirators must be medically qualified. Use of respiratory protective equipment must be coordinated with your supervisor.
6. Safety harnesses and lifelines must be use when other safeguards such as nets, planking, or scaffolding are not provided. Be sure safety lines are independent of other rigging. The lanyard must be secured at or above the level of the belt an be of a “shock absorbing nature.”
7. Gloves may be required when handling objects or substances that could cut, tear, burn, or otherwise injure the hands. Employees using insulated gloves should inspect them for defects before each use.
8. Rubber boots and gloves must be worn for work in concrete or in or around other materials that present a hazard
9. Situations that may require unique safety equipment and special training should be discussed with your supervisor before starting work.
10. Modification or alteration of any personal protective equipment is strictly prohibited. Defective or damaged personal protective equipment must be returned to the tool room for replacement.

### **WHEN IN DOUBT CONSULT YOUR SUPERVISOR**



## SECTION III –INDUSTRIAL HYGIENE

Employee health, both immediate and long term, must be protected on the job. This is accomplished through proper evaluation, recognition and control of chemical, physical and biological hazards in the workplace. The following subsections highlight key industrial hygiene program elements.

### A. OCCUPATIONAL HEALTH

1. An effective occupational health program on a construction site requires an increased amount of cooperation and communication between the employee and the employer. Your support is requested at all times.
  - Any employee who has any physical, mental, or general health problem including fear of heights, confined spaces, or darkness, or any other disorder that may prevent that employee from working safely or that may endanger the well-being of a fellow employee must report this condition to his or her supervisor an Project Management.

### B. HAZARD COMMUNICATION

LABELS listing the name and potential hazards of the hazardous substance must be on containers.

MATERIAL SAFETY DATA SHEETS (MSD's) which list information regarding ingredients, fire hazards, health hazards, special protection, first aid, etc., are available for your review.

HAZARDOUS SUBSTANCES LISTS have been compiled and will be updated by Project Management.

### C. HAZARDOUS CHEMICALS AND WASTES

The hazard communication program, utilization of proper personal protective equipment, and wise chemical selection will minimize the hazards associated with solvents, corrosion/scale inhibitors, biocides, oxygen scavengers, acids, caustics and various wastes. Always contact your supervisor if you are unsure about a possible inhalation, direct contact, ingestion hazard associated with any substance. Never combine different chemicals unless you know it's safe and you are under direct supervision.

When employee exposures to hazardous substances cannot be properly controlled by such engineering methods as ventilation, wetting, enclosure or by such administrative methods as product substitution a reducing e exposure time, personal protective equipment will have to be utilized.



#### **D. RESPIRATORY PROTECTION PROGRAM**

Employees required to wear respirators must be:

- Deemed medically able to wear a respirator by a physician
- Trained in the use of the respirator
- Trained in the hazards of contaminants to be present
- Fit – tested and trained to wear the specific respirator (facial hair will prevent proper fitting)

Respirators must be selected on the basis of the type and number of contaminants to be encountered and be cleaned, inspected and maintained after each use.

Contractor's Project Management will coordinate all of the above. Contact them if you have any questions or concerns about airborne exposure to hazardous materials.

#### **E. CONFINED SPACE ENTRY AND WORK**

Special procedures, including a permit, are required for confined space entry and work. Examples of confined spaces include tanks, vaults, sumps, chests, manholes, dryers, pits and other partially enclosed spaces which may contain or are subject to the accumulation of toxic and/or flammable gases or vapors; or, may have an oxygen deficient atmosphere. Prior to permit issuance, the following must be complete:

- A comprehensive hazard assessment, including atmosphere monitoring
- Training of employees
- Isolation, blinding, lockout of lines/systems which could adversely affect the safety of the area.
- Flushing, purging and ventilating the space as necessary
- When suitable atmosphere cannot be ensured, or when respirators must be worn, special additional procedures including respirators, standby CPR-first aid trained employees, rescue equipment, etc. are required.

#### **F. HEARING CONSERVATION AND NOISE CONTROL**

A hearing conservation program, including noise control, is in effect to ensure that:

- Employees receive proper training



- High noise areas (90 decibels or greater) are identified/posted
- Proper engineering and personal protective controls are in effect
- Audiometric testing is performed, as necessary, for employees

Employees must utilize earplugs or earmuffs (company furnished) in all posted “Hearing Protection Required” areas and in other obvious high noise situations.

#### **G. IONIZING RADIATION**

Potential exposure to harmful ionizing radiation is very minimal but some non-destructive testing (NDT), density or weight gauges utilizing radioactive sources may be present. Subcontractors involved in such operations must submit a comprehensive radiation safety program and follow detailed State and Federal requirements. Operational areas of high radiation will be posted “DANGER – RADIATION – KEEP OUT” and will be under surveillance by at least one person associated with the operation. Unauthorized personnel not associated with radiological work or devices must keep out of these areas.

#### **H. PORTABLE AIR SAMPLING DEVICES**

Portable air sampling devices (gas meters) will be available, as needed from Project Management to employees trained in the use of such equipment. The devices are necessary for confined spaces permits, some fire permits, and in the general detection of combustible/flammable gases. Before each use, meters should be tested and properly set (oxygen level at 20.9%, LEL set at 0%, a carbon monoxide at 0%). The oxygen alarm point is 19.5% O<sub>2</sub> and the LEL alarm point 20% LEL. Gas meters must be used and maintained in accordance with manufacturer and Company instructions. Project Management may also coordinate air sampling for asbestos containing materials, hydrogen sulfide (H<sub>2</sub>S, etc.)

#### **I. SPECIAL HEALTH CONCERNS**

An employee who has any physical, mental, or general medical problem including fear of heights, confined spaces, darkness, or any other disorder that might prevent that employee must report this condition to his supervisor. Specific medical limitations, including prior sensitization to chemicals, must be considered in all work assignments.

**WHEN IN DOUBT CONSULT YOUR SUPERVISOR**



## **SECTION IV – OPERATING MOTOR VEHICLE EQUIPMENT**

### **A. RESPONSIBILITIES**

1. The driver of a Contractor or subcontractor vehicle on the project is responsible for:
  - a. Operating the vehicle in a safe and legal manner.
  - b. Using the vehicle for the purpose for which it is designed.
  - c. The safety of his passengers or helpers.
2. DRIVERS OF CONTRACTOR AN/OR SUBCONTRACTOR EQUIPMENT/VEHICLES ARE PERSONALLY RESPONSIBLE AND LIABLE FOR THE CONSEQUENCES OF VEHICLE VIOLATIONS.
3. Under the Influence: Under no circumstances are drivers under the influence of intoxicating beverages or drugs to operate vehicles. The Contractor will follow this example. Drivers are not to operate a vehicle when such drugs will interfere with their ability to operate a motor vehicle safely. All traffic laws and rules applicable to the project will be adhered to and enforced.

### **B. LICENSES.**

1. ALL DRIVERS OF VEHICLES OPERATED BY THE CONTRACTOR EMPLOYEES SHALL HAVE A VALID OPERATOR'S PERMIT AS REQUIRED BY LAW.
2. DRIVER'S SHALL CARRY PROPER PERMITS/LICENSES WHEN OPERATING MOTOR EQUIPMENT/ CRANES/ FORKLIFTS/ VEHICLES, ETC

### **C. INSPECTION OF VEHICLES**

1. Drivers of all Contractors and/or subcontractor vehicles shall inspect the condition, supply, and operation of the following, as warranted, and at least once each day before starting engine. Tires, horn, windshield wipers, rear view mirrors, brakes, steering gear, windshields, headlights, taillights, turn signals, stop lights, gasoline, oil and water.
2. IF ANY MOTOR VEHICLE EQUIPMENT IS FOUND TO BE MISSING OR DEFECTIVE IT SHALL BE REPORTED IMMEDIATELY TO THE SUPERVISOR.

### **D. SEAT BELTS**

SEAT BELTS IN COONTRACTOR AND/OR SUBCONTRACTOR MOTOR VEHICLES AND CONSTRUCTION HEAVY EQUIPMENT MUST BE PROVIDED AN USED, EITHER WHEN DRIVING OR AS A PASSENGER.



**E. TOOLS AND EQUIPMENT**

1. Tools and equipment shall not be left loose in the cabs or passenger compartments of cars or trucks.
2. Flammable liquids shall be carried in safety cans outside the vehicle passenger compartment.

**F. BREAKDOWNS**

1. In case of breakdown, vehicles should be parked with all wheels off the main roadway, if possible.
2. Where it is necessary to tow equipment, no person shall be between the towed vehicle and the towing vehicle while it is in motion.
3. Vehicles without effective brakes shall be moved only by a tow truck.

**G. PASSENGERS**

1. Flatbed trucks, dump trucks and pickups which are occasionally used for the transportation of employees shall not be put to such use unless the following conditions, where applicable, are complied with:
  - a. Where possible, all employees shall ride in the cab.
  - b. Personnel can only ride in the rear beds of vehicles if a seat and seat belts are provided.
  - c. Employees shall not ride on top of the side rails, on top of cabs, on running boards, on fenders, on the hood, or with their legs hanging over the ends or sides.
2. Vehicles used regularly for transportation of employees that have separate driver and passenger compartments shall possess a means by which passengers can readily communicate with the driver.

**H. SAFE PARKING**

1. Vehicles shall be parked so as not to present a hazard to other traffic.
2. Unattended vehicles with automatic transmissions shall be parked with ignitions turned off, hand brakes set, and transmissions placed in low gear when parked
3. Unattended vehicles with automatic transmissions shall be parked with ignitions turned off, hand brake set, and transmissions placed in “park position.”

**I. ACCIDENTS**





1. All accidents occurring on the projects shall be reported to the Contractor and the Engineer.
2. In case of a motor vehicle accident involving Contractor, equipment or vehicles which occurs off the project, the employees shall notify a law enforcement officer as required by law.
3. In case of vehicle accident, the employee driver shall.
  - a. Pull of road, if possible, to avoid obstruction of traffic.
  - b. Place warning reflectors on the road as necessary.
  - c. Render aid to injure persons.
  - d. Report the accident to his supervisor as soon as possible.

**WHEN IN DOUBT CONSULT YOUR SUPERVISOR**



## SECTION V – FIRST AID

### A. FIRST AID

First aid is provided for your care and treatment if you are injured or become ill during your course of employment. Qualified personnel are available to render treatment and to maintain required records.

1. Report all injuries, no matter how minor, to your supervisor. Treatment will be given, and the incident will be recorded. Should later medical care be needed, the Contractor will have a record of your injury. Failure to report an injury may result in denial of benefits and/or disciplinary action.”
2. Notify your supervisor prior to leaving the project because of a work-related injury or illness.
3. If you get outside medical treatment for a work-related injury or illness, you must notify the Contractor supervisor at the start of the next scheduled work day. Failure to do so may result in disallowance of your claim and/or disciplinary action.
4. Prior to returning to work after a job-related injury or illness, you must present a medical clearance (return to work slip) from the attending physician to your supervisor. Every effort will be made to accommodate employee’s with work restrictions.
5. If you are required to wear any external appliance for a personal injury such as a cast, brace, splint, etc. that may restrict your work activity, you must present a medical clearance from your attending physician to your supervisor. Your supervisor will review your work assignment with the Contractor to determine if accommodations can be made to allow for return to your regular duties.

### B. EMERGENCY PROCEDURES

1. In the event of a project emergency such as an accident, employee injury, or fire, use the most available means to communicate the problem to Project Management. The following emergency numbers should be used:



## SAFE PRACTICES BOOKLET

**PLEASE COMPLETE AND RETURN TO THE CONTRACTOR**

Project Number \_\_\_\_\_

Date \_\_\_\_\_

I acknowledge my responsibilities to read and understand the contents of this booklet. While working on this project, I will follow the procedures outlined in this booklet. Failure to follow the safe practices in this booklet may result in disciplinary action up to and including termination.

I also understand that failures to immediately report a jobsite injury or illness to may result in the denial of Worker's Compensation benefits.

\_\_\_\_\_  
**(Print) Last Name**

\_\_\_\_\_  
**First name**

\_\_\_\_\_  
**Middle name**

**Signed** \_\_\_\_\_

**Job Classification** \_\_\_\_\_

**Department** \_\_\_\_\_



<b>DEPARTMENT</b>	<b>TELEPHONE</b>	<b>RADIO</b>
Safety		
First Aid		
Fire		
Ambulance		
Doctor		
Hospital		

2. When reporting an emergency remain calm and give the following information:
- Nature of emergency
  - Exact location
  - Extent of injury, if any
  - DO NOT break communication

**WHEN IN DOUBT CONSULT YOUR SUPERVISOR**



## **SAFETY INSPECTION PROGRAM**

### **A. PURPOSE**

To ensure that safety inspections are routinely performed to identify the presence of unsafe acts and conditions, and then achieve any necessary corrective measures.

### **B. APPLICABILITY**

This procedure applies primarily to Contractor's managerial/supervisory personnel, but individual Contractor's employees shall also inspect/assess their work areas and methods.

### **C. POLICY**

Compliance levels with applicable standards and Safety Program requirements will be monitored through regularly scheduled inspections.

### **D. REFERENCE**

1. 29 CFR 1926.20(B)(2)
2. Job Hazard Analysis, Project Safety Manual

### **E. RESPONSIBILITY**

Each Contractor's Project Manager shall ensure that a comprehensive inspection program is implemented and maintained for the projects.

### **F. DEFINITIONS**

None.

### **G. PROCEDURE**

1. Types of Inspections
  - a. Management inspections (as needed) shall be performed to identify the compliance levels with applicable requirements.
  - b. Managerial inspections shall be performed and documented by members of individual projects on a monthly basis (Attachment 2).
  - c. Supervisory Self Inspections (primarily general employees' awareness) shall be performed by the foreman permanently or



temporarily assigned to work area/operation. (Attachment 2, Information for Self Inspections)

- d. Special inspections shall be conducted by individual project managers or designees that address:
  - A special request from executive management
  - Installation of new procedures
  - Relocation or revision of operations
  - Other modifications
- e. Technical inspections requiring unique expertise shall be conducted as required and coordinated through Contractor's project management. Examples include: crane certifications, specialized fire protection equipment inspections/certifications, industrial hygiene surveys.

## 2. Unsafe Acts/Conditions – Reporting & Action

- a. Individual employees shall "report" any unsafe acts or conditions to their immediate supervisor.
- b. Supervisors upon discovering or being informed of an unsafe act or condition shall implement corrective measures.
- c. An employee may contact the Contractor's project manager if he is not satisfied with his supervisor's response to the identified safety concern.
- d. Instances where (life threatening) imminent danger is identified, the person identifying the situation shall implement immediate proper positive controls to prevent injury or damage.
- e. In instances where (life threatening) imminent danger is identified; the Contractor's Project Manager shall be immediately notified.

## 3. Standardized Reports/Checklists/Schedules

- a. Standardized checklists, consistent with manufacturer and Safety Program requirements, shall be utilized by individual projects as much as possible for inspection purpose (see Attachment 2, sample checklists).
- b. Each project shall have a schedule of regular inspections to be performed by Contractor Project Management.



- c. Supervisors shall document all unsafe acts and conditions, discovered or reported to them, and the associated corrective action(s).

**H. ATTACHMENT**

1. Information for Supervisory Self Inspections
2. Safety Inspection Checklist



## **SAFETY INSPECTION PROGRAMME**

### **INFORMATION FOR CONTRACTOR'S SUPERVISORY SELF INSPECTIONS**

In addition to the foreman job hazards analyses and in conjunction with them self-inspection is critical, to the continued safety of our jobs. Self inspections should be conducted at least two times per week. It must be entered in the jobsite logbook with any problems noted, along with the corrective action. These inspections are conducted in addition to the monthly formal documentation required for submission under G(1)(b) of the Safety Inspection Program.

Self inspections are one of the principal means of locating potential hazards so that they can be corrected before an accident occurs.

Remember that self inspections are not conducted to find fault. They are conducted to improve job conditions that will result in a safer work environment.

Also, they should not be limited to identifying unsafe physical conditions, but also include detecting unsafe work practices and health hazards.

The Contractor's Supervisors have the ultimate responsibility for all inspections within the project. This does not however, limit the involvement of foreman and the workers themselves. The more people aware of the safety guidelines, the better the Safety Program.

As supervisors, you are already primarily involved in continuous inspections. This type of inspection does not conform to a set schedule, plan or checklist.

As an example, when you are not at work, you are continuously observing equipment, machines and tools are in good condition and that safety precautions are being followed.

Daily observations on your part should include making sure that:

- Workers are complying with safety regulations.
- Tools and equipment are in a safe condition.
- Required guards and appropriate warning signs are in place.
- Proper housekeeping is being maintained.





## SAFETY INSPECTION PROGRAMME

If you observe a potential hazard or unsafe act, you must initiate corrective action immediately. If you do not take action, then expected standards of performance will be lowered in the eyes of the employees.

You should also be aware of the disadvantage your familiarity with the job may have. Over a period of time, hazards become so familiar that they are no longer noticed.

In other words, you may become less objective toward daily safety rules and regulations over an extended period of time.

The greater the accident severity potential, the more often the item or area should be inspected.

Two critical areas in the inspection process are recording the hazards observed and follow-up for corrective action.

A clear and specific description of the hazard or unsafe condition should be recorded. Avoid describing a hazard or condition in general terms such as “poor housekeeping”. Take the opportunity to conduct and establish a Job Hazard Analysis.

Specific details such as what, where or who should be given so that the problem can be corrected.

Once the information is recorded, it must be acted upon. In fact, you may already have corrected some items during the physical inspection process. If so, note this in the report.

For those hazards noted, but not immediately corrected, recommend specific corrective action, who will correct and establish a definite abatement date.

Follow-up also includes making sure that the hazard or unsafe act has, indeed, been corrected.

Many of the Job Hazard Analysis benefits are applicable here. Self inspection, when performed properly can:

- Uncover training needs.
- Encourage corrective action by everyone.
- Contribute to improved safety attitudes.

Through proper documentation and follow-up, you will be showing workers your concern for locating hazards and establishing corrective measures prior to an accident occurring.



## **SAFETY INSPECTION PROGRAMME**

Safety improves operations. It increases efficiency, effectiveness and profitability.

By realizing that hazard recognition is not an extra activity, you can help prevent accidents in the most effective way. It is part of your job to be done continually as you go about your normal routine.

The self inspection process is a vital part of an effective loss prevention program. It is a monitoring function on your part to assess how well safety procedures are being followed.

To conclude this program, discuss, recommend, suggest improvements to inspection criteria you use and the inspection procedures you follow. Do you review them regularly?

Together, we can improve the safety and quality of the work environment on all Company projects.



UNIBUILD CONSULTANCY  
PROJECT SAFETY INSPECTION

Project Name/Number: \_\_\_\_\_

Inspector: \_\_\_\_\_

Date: \_\_\_\_\_

	DESCRIPTION	N/A	YES	NEEDS ACTION	COMMENTS
	JOB-START-UP				
<b>A.</b>	<b><u>House-keeping</u></b>				
1.	Are containers for trash and scrap supplied?				
2.	Are combustibile trash and scrap removed regularly?				
3.	Do flammable and hazardous waste (caustic, acids) have a separate container with cover?				
<b>B.</b>	<b><u>Signs</u></b>				
1.	Is a visitor' sign posted designating where the field office is located?				
2.	Are the following signs posted around the periphery of the site: Danger – Construction Area No Trespassing. Caution – Hardhat Area, All Visitors Report to Contractor's Office before entering job-site?				
3.	Applicable Minimum Wage Signs? Are the following signs posted where applicable? No Trespassing Caution – Men Working Overhead Danger – Do not Enter Caution - Open Trench Caution – Hard Hat Area No Parking Danger – High Voltage				
<b>C.</b>	<b><u>Barricades</u></b>				
1.	Are barricades properly built to direct pedestrian or vehicle through and around construction site?				
2.	Are the barricades strong enough for an adult to fall against it without tipping and strong enough to with stand strong gusts of wind?				
3.	Is barricade erected so that construction material will not enter pedestrian areas or roadways? (Sometimes this can be combined with erosion control system).				
<b>D.</b>	<b><u>Personnel Protection Equipment and Clothing</u></b>				
1.	Are hardhat worn by all persons on the site at all times that an overhead hazard exists				
E.	Is eye protection worn when grinding, burning, welding or handling an acidic or caustic substance?				
3.	Are proper gloves worn when burning and welding?				
4.	Are safety belts and lanyards worn when working 3.0 meters or more above ground, deck. Etc. (Except during steel erection) when guard railing is not installed?				
5.	Are all employees wearing long trousers, shirts with sleeves, and work shoes?				



**UNIBUILD CONSULTANCY**  
**PROJECT SAFETY INSPECTION**

Project Name/Number: \_\_\_\_\_

Inspector: \_\_\_\_\_

Date: \_\_\_\_\_

	<i>DESCRIPTION</i>	<i>N/A</i>	<i>YES</i>	<i>NEEDS ACTION</i>	<i>COMMENTS</i>
	<b>FIRE PREVENTION PROTECTION CFR 1926.150</b>				
1.	Is fire fighting equipment conspicuously located?				
2.	Are temporary structures supplied with a 20 ABC fire extinguisher?				
3.	Is a 10B fire extinguisher? Available for any 5 gallons or more off flammable liquid stored on the job-site?				
	Is safety can with fire arrestors utilized for storage of 5 gallons or more of flammable liquid stored on the 3. job-site?				
	Are flammable combustible liquids in excess of 60 gallons stored outside the building? The following criteria must be met:				
A.	Tanks are not to be grouped where there combined volume exceeds 1,000 gallons. Tanks are not within 6 Meter of a building.				
B.	The storage area must be graded to run spills away from the building or a 30 CM dike installed. A30 CM access must be provided so that fire trucks may approach with 60 meters of the storage area. A 20 ABC rated fire extinguisher must be available no closer than 0.6 meters nor further than 2.0 meters. The fire extinguisher must be visible, otherwise signs must point to the extinguisher. Tanks must be mark "Danger, Flammable Liquid, No smoking or Open Flame."				
C.	When dispensing, no other operation is permitted within 7.5 meters				
D.	When transfer is made, the containers must be electrically interconnected. This necessitates a ground. The hose must also be grounded and the metal nozzle must touch the metal of the receiving vessel. A metal self closing valve must be utilized to transfer the liquids.				
I.	The dispensing tank must be protected from collision from vehicles.				
J.	Class I flammable Liquid Storage Tank must have a vent that extends 3.5 M above the surrounding level. In general, the larger holding tanks with electrically operated pumps fall into this category.				
K.	All tanks must be grounded and vented.				
L.	The dispensing hose must be grounded to the tank.				
M.	A metal, self cleaning nozzle shall be utilized. nozzle will touch the throat – a continuous ground results.				



**UNIBUILD CONSULTANCY**  
**PROJECT SAFETY INSPECTION**

Project Name/Number: \_\_\_\_\_

Inspector: \_\_\_\_\_

Date: \_\_\_\_\_

	<i>DESCRIPTION</i>	<i>N/A</i>	<i>YES</i>	<i>NEEDS ACTION</i>	<i>COMMENTS</i>
N.	A Bern, log, railroad tie. Etc., will be placed in front of the storage tanks to prevent vehicles from running into the tank.				
	combustible trash and scrap removed regularly?				
7.	o flammable and hazardous wastes (caustics, acids) have a separate container with covers?				
8.	Are class A materials kept away from buildings, flammable liquids?				
9.	Are Class A .materials kept away from buildings, flammable liquids?				
10.	Is all firefighting equipment checked (Pulled pins, low gauge readings, leakage etc.?)				
11.	Are oxygen and acetylene separated by at least 6M when stored? Are the cylinders vertical and secured against falling?				
12.	Are all heating devices no closures than 1.5 meters from Class A combustibles?				
13.	Are all heating devices in proper working order (no gas leaks, frayed cords, safety guard, etc.?)				
14.	Do enclosed buildings have a 2 A rated fire extinguisher for every 330 SM and travel distance no greater than 30 meters?				
15.	Do enclosed buildings have a 2 A rated fire extinguisher for every 330 SM and travel distance no greater than 30.0 meters?				
	<b>EXCAVATIONS CFR 1926.650</b>				
1.	Has MEW been notified of intended digging and all utilities located?				
2.	Are daily inspections made of the excavation to determine the possibility of a cave – in and are necessary steps taken to protect employees?				
3.	Are shoring and sloping systems used to support the walls sand faces of the excavations sufficient to insure against cave – ins?				
4.	Is there a ladder in the excavation within 7.5 Meter of every employee in the trench or excavation?				
5.	Are all excavations staked and marked, and are all wall, pits shaft, etc. barricaded or cover?				
6.	Is heavy equipment being operated near an excavation? If so, is the excavation sheet piled, shared in braced to resist extra pressure?				
7.	Are all materials or objects stored at least 0.60 meters from the edge of the excavation where the employees work?				
8.	Is site properly drained to prevent cave – due to soil saturation?				
9.	Are all trees, boulders, and other surface encumbrance located where they did not pose a threat to workers?				
10.	Is the construction entrance located in a place where the vehicles running n – site can properly remove mud?				
11.	Are roads and sidewalk surrounding the site free from dirt, rock and other surfaces encumbrances?				



**UNIBUILD CONSULTANCY**  
**PROJECT SAFETY INSPECTION**

*Project Name/Number:* \_\_\_\_\_

*Inspector:* \_\_\_\_\_

*Date:* \_\_\_\_\_

	<b>DESCRIPTION</b>	<b>N/A</b>	<b>YES</b>	<b>NEEDS ACTION</b>	<b>COMMENTS</b>
12.	Is the proper erosion control and visqueen barrier installed around the site?				
13.	Are trenches in unstable or soft soil shored, sheeted traced, sloped properly?				
	<b>CRANES, MATERIAL HOISTS, AND POWER LIFT TRUCKS</b>				
A.	<b>Cranes – CFR 1926.550</b>				
1.	Are dead man controls in working order on powered traveling machines?				
2.	Are rated load capacities, operating speed, and instructions posted and visible to the operator?				
3.	Is machinery inspected daily prior toes to make sure it is in proper operating condition?				
4.	Are wire ropes, chains, and other rigging equipment inspected prior to use?				
5.	Are appropriate safety precautions taken when operating near electrical lines?				
6.	Are accessible areas within swing radius barricaded?				
7.	Are tag lines being used to prevent dangerous swing or spin of materials when raised or lowered by crane or derrick?				
8.	Are cranes or derricks restricted from operating within 3.0 meters of any electrical distribution or transmission line?				
9.	Is afire extinguisher f at least 5 BC rating provided on the crane and located in the cab				
10.	Are crane outriggers used as required?				
11.	The crane hooks safely latched "moused" if applicable?				
12.	Do crane platforms and walkways have anti-skid surface?				
13.	Is broken, worn or damaged wire rope removed from service?				
14.	Are exhaust pipes guarded or insulated where employees could make contact?"				
15.	Are cab windows of safety glass or equivalent?				
16.	Are guardrails, handholds, and steps provided for safe and easy access to car and cab?				
	<ul style="list-style-type: none"> <li>• Is the wire rope meeting the following criteria removed and/or replaced?</li> </ul>				
A.	In running rope six (6) randomly distributed broken wires exist in one (1) lay or three (3) broken wires exist in one (1) lay or three (3) broken wires exist in one (1) strand in one (1) lay.				
B.	Wear of 1/3 of original diameter of outside individual wires.				
C.	Kinking, crushing or bird caging				
18.	Are illustrations of hand signals to crane and derrick operators posted on the job-site?				



**UNIBUILD CONSULTANCY**  
**PROJECT SAFETY INSPECTION**

Project Name/Number: \_\_\_\_\_

Inspector: \_\_\_\_\_

Date: \_\_\_\_\_

	DESCRIPTION	N/A	YES	NEEDS ACTION	COMMENTS
19.	Does hood –man use correct signals for crane operator follow?				
20.	Does crane operation comply with manufacturer’s specifications?				
A.	<b>B. Material Hoists – CFR 1926.552</b>				
1.	Are workers prohibited from riding the hoist?				
2.	Is overhead protection provided over the cage or platform?				
3.	Is load rating plate attached to the hoist?				
4.	Has wire rope been inspected for harmful defects?				
5.	Are materials hoist entrances protected by gates or bars and painted with diagonal contrasting lines?				
6.	Are there at least three (3) full wraps on the winding drum when the platform is at the lowest point of travel?				
7.	Is there at least 0.91 meters of clearance between the cathead sheave and the top of cage when it is at the uppermost terminal or landing?				
8.	Are sheave bearing well lubricated?				
9.	Are brakes capable of stopping and holding 125% of the rated load?				
10.	The operator remains at the controls while the load is suspended or the master clutch is engaged?				
11.	Are the gears on the hoisting machine well guarded?				
12.	Barricades around hoist to prevent workers from being hit from above when the hoist descends?				
C.	<b>Powerlift Trucks</b>				
1.	Are powered industrial trucks examined before being placed into service for any conditions that may adversely affect the safety of the vehicle?				
2.	Are defective powered industrial trucks immediately repaired or removed from service?				
3.	Are the high lift rider trucks equipped with and overhead guard to protect the operator?				
4.	Are powered industrial trucks provided with an audible warning device to alert others in the area of its presence while backing-up?				
5.	Are only trained and qualified personnel permitted to operate powered industrial trucks.				
6.	Are unauthorized riders prohibited from riding on lift trucks?				
7.	Are the rated load capacities of the powered industrial trucks clearly marked and not exceeded/				
8.	Are the raised loads kept as close to the ground possible to prevent tripping while traveling?				
9.	Are the trucks driven with load facing upgrades when ascending order descending grades in excess of 10%?				
	<b><u>STEEL ERECTION</u></b>				
1	Is a tightly planked temporary floor or metal deck floor installed above 9.14 meters or two stories when steel erection work is being accomplished?				
2	Are safety railing of ½ wire rope (or equal) installed 106 cm off the floor around the periphery of temporary planked or temporary metal deck floors. These safety railings should remain in place until exterior wall or permanent handrails are installed. Once the deck is poured it is considered permanent and standard guard railing prevails – top railing mid railing and toe board when necessary.				
3	Are safety railing of ½ wire rope (or equal) installed 106 cm off the floor around the periphery of temporary planked or temporary metal deck floors. These safety railings should remain in place until exterior wall or permanent handrails are installed. Once the deck is poured it is considered permanent and standard guard railing prevails – top railing mid railing and toe board when necessary.				
4	Are single post shores horizontally braced on both the longitudinal and transverse directions, and is diagonal bracing installed? <small>Sec 65 - Safety Inspection Programme (WITH FORMS)</small>				



5	Are safety railing of ½ wire rope (or equal) installed 106 CM off the floor around the periphery of temporary planked or temporary metal deck floors. These safety railings should remain in place until exterior wall or permanent handrails are installed. Once the deck is poured it is considered permanent and standard guard railing prevails – top railing mid railing and toe board when necessary.				
6	Are single post shores horizontally braced on both the longitudinal and transverse directions, and is diagonal bracing installed?				
7	Are the rated load capacities of the powered industrial trucks clearly marked and not exceeded/				
8	Are the raised loads kept as close to the ground possible to prevent tripping while traveling?				
9	Are the trucks driven with load facing upgrades when ascending order descending grades in excess of 10%?				
	<b>STEEL ERECTION</b>				
1	Is a tightly planked temporary floor or metal deck floor installed above 9.14 meters or two stories when steel erection work is being accomplished?				
2	Are safety railing of ½ wire rope (or equal) installed 106 Cioffi the floor around the periphery of temporary planked or temporary metal deck floors. These safety railings should remain in place until exterior wall or permanent handrails are installed. Once the deck is poured it is considered permanent and standard guard railing prevails – top railing mid railing and toe board when necessary.				
3	Are safety railing of ½ wire rope (or equal) installed 106 CM off the floor around the periphery of temporary planked or temporary metal deck floors. These safety railings should remain in place until exterior wall or permanent handrails are installed. Once the deck is poured it is considered permanent and standard guard railing prevails – top railing mid railing and toe board when necessary.				
4	Are single post shores horizontally braced on both the longitudinal and transverse directions, and is diagonal bracing installed?				
5	Are tag lines used to control elevated load?				
6	Are containers used for storing rivets, bolts and drift pins and secured to prevent accidental displacement when aloft.				
	<b>CONCRETE</b>				
	<b>CFR 1927/700</b>				
1.	Is form work and shoring adequate to support all intended loads during concrete placement?				
2.	Are protruding rebars covered or bent over where work must be performed overhead?				
3.	Do employees wear gloves an eye protection during form stripping operations?				
4.	Are nails removed or bent over from stripped forms?				
5.	Are clear pathways maintained through stripping areas?				
6.	Is the nozzleman wearing protective head, face, and body protection during concrete pumping operations?				
7.	Are blade guards placed on the power concrete trowels?				
8.	Do the power concrete trowels have dead man switches?				
	<b>LADDERS</b>				
	<b>CFR 1926.450</b>				
1.	Are employees made aware that metal ladders are not to be used around electrical equipment?				
2.	Are ladders with broken or missing rungs or split side rails, tagged and taken out of service?				
3.	Are portable wood ladders adequate for their purpose? In good condition, and provide with secure footings (safety feet)?				





**UNIBUILD CONSULTANCY**  
**PROJECT SAFETY INSPECTION**

Project Name/Number: \_\_\_\_\_

Inspector: \_\_\_\_\_

Date: \_\_\_\_\_

	DESCRIPTION	N/A	YES	NEEDS ACTION	COMMENTS
4.	Are areas around the top and bottom of the ladder kept clean?				
5.	Are portable ladders used at such a pitch that the horizontal distance from the top bearing to the foot of the ladder is about ¼ of the working length of the ladder?				
6.	Are ladders prohibited from being used in a horizontal position as platforms, as platforms, runaways or scaffolds?				
7.	Are portable ladders tied, blocked or otherwise secured against falling?				
8.	8made wooden ladder?				
9.	If simultaneous two-way traffic is expected, is a double cleat ladder installed?				
10.	Are double cleat ladders 7.3 meters or less in length?				
11.	Are single cleat ladders 9.0 meters or less in length?				
12.	Is the width of single cleat ladders at least 38 CM but not more than 51 CM?				
13.	Are the side rails of the ladder extending at least 0.91 meters above the landing?				
14.	Are the side rails of the ladder extending at least 0.91 meters above the landing?				
15.	Are side rails of single cleat ladders under 4.8 meter made 5 cm x 10 cm material?				
16.	Are side rails of single cleat ladders under 4.8 meter made of 7.5 x 15 cm material?				
17.	Is the minimum cleat size 3-9.5 x 2.0 cm?				
18.	Are double cleat ladders utilized when 25 or more people utilize the ladder or when 2-way traffic expected?				
19.	Are side of rails of double cleat ladders under 12 ft. made of 2"x4" material?				
20.	Are side rails of double cleat ladders over 3.66 meters but less than 7.32 meters made of 5 x 15 cm material?				
	<b>OXYGEN &amp; ACETYLENE BURNING EQUIPMENT</b>				
1.	Are cylinders secure n a vertical position when transported?				
2.	Whenever cylinders are moved the protective cap must be in place unless being moved in the specially provided oxygen- acetylene unit.				
3.	Are cylinders secure in place and capped when not being used?				
4.	Are oxygen cylinders separated from acetylene cylinders and kept 6 M apart?				
	<b>SCAFFOLDING</b> CFR 1926.451				
1.	The footing of the scaffold sound, rigid, and capable of carrying the maximum intended load?				
2.	Is the scaffold erected under the supervision of someone competent in a scaffold erection?				
3.	Are guardrails and toe boards provided on scaffolds more than 1.82 meters above the ground?				



**UNIBUILD CONSULTANCY**  
**PROJECT SAFETY INSPECTION**

Project Name/Number: \_\_\_\_\_

Inspector: \_\_\_\_\_

Date: \_\_\_\_\_

	<b>DESCRIPTION</b>	<b>N/A</b>	<b>YES</b>	<b>NEEDS ACTION</b>	<b>COMMENTS</b>
4.	Are heavy loads place over or near the bearers and not on center of the plank?				
5.	Is planking of sufficient stress grade of scaffold grade timber?				
6.	Are handrails 5x10 cm in size with the top rail 106 cm above the platform? Mid –rail must be half way between the top rail and toe board. The toe board must be 10 cm in size.				
7.	Does all plank over lap at ease 30 cm?				
8.	Are railings protecting floor openings, Platforms, or scaffolds equipped with toe boards wherever there is a possibility that falling material could cause a hazard?				
9.	Are employees wearing safety belts attached to life lines that are secured overhead while working on suspended scaffolds?				
10.	Where persons work under scaffold, is 12 mm mesh screen provided between toe board and guard rail?				
11.	Are poles, legs, or upright of scaffolds plumb and securely braced to prevent swaying and displacement?				
12.	Are effective parts on scaffolds immediately replaced or repaired?				
13.	Are guard rails and toe boards installed on all open sides an ends of scaffold platforms?				
<b>FLOOR &amp; WALL OPENING AND STAIRS</b>					
<b>CFR 1926.500</b>					
1.	Are floor openings guarded with a standard railing? If not, is floor opening covers secured and marked?				
2.	Are open –sided floor and platforms 1.82 meters or above the floor or ground guarded by a standard railing or the equivalent?				
3.	Are there standard railings runways that are 4.88 meters or more above floor or ground level?				
4.	Are the tops of standard railings about 1.07 meters from the floor?				
5.	Will standard railings withstand a 90.72 kg impact at any point/				
6.	The stairways are good condition and standard railings provided for every flight having four (4) or more risers?				
7.	Are hollow pen stair treads filled in with solid material to avoid trip conditions?				
<b>HAND &amp; POWER TOOLS</b>					
<b>CFR 1926.300</b>					
1.	Are hand tools and other equipment regularly inspected for safe conditions?				
2.	Is compressed air used for cleaning less than 30 psi?				
3.	Are power saws and similar equipment provided with safety guards?				
4.	Are tools used with the correct shield, guard, or attachments recommended by the manufacturer?				
5.	Are abrasive wheel grinders provided with safety guards which cover the spindle ends, nut and flange protections?				
6.	The portable circular saws equipped with guards above and below the base and shoe?				
7.	Are rotating or moving parts of equipment guarded to prevent contact by employees?				



**UNIBUILD CONSULTANCY**  
**PROJECT SAFETY INSPECTION**

Project Name/Number: \_\_\_\_\_

Inspector: \_\_\_\_\_

Date: \_\_\_\_\_

	<b>DESCRIPTION</b>	<b>N/A</b>	<b>YES</b>	<b>NEEDS ACTION</b>	<b>COMMENTS</b>	
8.	Do operators wear eye and face protection when grinding?					
9.	Is the pneumatic hose line secured to the pneumatic tool?					
10	Are appropriate ground fault circuit interrupters provided at the job-site?					
11.	Are electric powered tools double – insulated or properly grounded?					
	<b>POWER ACTUATED TOOLS</b>					
1.	Do all users of powder-actuate tools possess an “Operator’s Card” to display that they have been trained?					
2.	Are tools left unloaded until they are ready for immediate use?					
3.	Are tools inspected each day for effects or obstructions prior to use?					
4.	Are the following types of personal protective equipment used by operators and others in the area of tool use? Hard Hats? Safety Goggles? Safety Shoes?					
	<b>FLAG PERSONS</b>					
1.	As flag persons provided with the made to wear orange or red warning garments while working in vehicular traffic?					
2.	Are warning garments reflectorized material?					
3.	Are flag persons knowledgeable f standard flag signals to control traffic effectively?					
	<b>LASERS</b>					
	Contact Project Management					
	<b>TEMPORARY POWER</b>					
1.	Has temporary power been installed per National Electric Code and ANSI					
2.	Are all panel boxes clearly labeled and appropriate warning signs posted?					
3.	Are all disconnects equipped with lock –out switches?					
4.	Are all receptacles equipped with Ground Fault					
5.	Are all receptacles equipped with Ground Fault Interrupters (GFI’s) and are they in working order?					
6.	Has an Assured Ground Program has been established and are all power tools, electric cords, and receptacles properly color coded? Color cording scheme. Quarterly. January-March           White April-June                Green July-September         Red October-December      Orange					
	<b>HAND &amp; POWER TOOLS</b> <b>CFR 1926.300</b>					
7.	7. Are damaged or frayed cords removed from service immediately/					
8.	8. Do all temporary lights have protective covers or cages at each bulb?					
9.	9. Are all temporary lights in tool trailers and storage trailers protected by covers or cages?					





## JOB HAZARD ANALYSIS (JHA)

### A. PURPOSE

To establish a written procedure which identifies the hazards and potential hazards associated with each step of a job and develop methods to eliminate, guard against, or control such hazards.

### B. APPLICABILITY

This procedure is applicable to all work performed on this project and shall be utilized by both Main Contractor and subcontractors as required.

### C. POLICY

It is the policy of the project to analyze construction projects and maintenance work for potential hazards by using the Job Hazard Analysis as a tool to establish a means of mitigating/eliminating hazards. This procedure must be followed prior to the issue of any personal protective equipment (PPE) to employees.

### D. REFERENCES

1. 29 CFR 1926.95 (as amended)

### E. RESPONSIBILITY

It is the responsibility of the Contractor to identify hazards associated with jobs prior to the commencement of work.

### F. PROCEDURES

1. Hazardous and repetitive type operations identified by the shall have a JHA completed prior to the commencement of work.
2. Construction personnel, performing the work, shall break the job down into tasks (See Attachment 1, Instructions for completion - Job Hazard Analysis). The tasks are to be entered on to the JHA Form Key Quality and Production Factors as well as Key Safety Factors shall also be analyzed. (Attachment 2 – Example).
3. Each completed JHA shall be forwarded to the appropriate manager as a formal document. Also, Completed JHAs shall be kept on file in with the Safety Officer.
4. Safety Officers shall review JHAs periodically for revisions and corrections, based on new work procedures, etc. The revised JHA s periodically for revisions and corrections, based on new work procedures. etc. The revised JHAs must complete the appropriate review cycle and be reissued as formal documents.



5. Contractor shall periodically monitor JHA controlled work for compliance with the listed procedures and requirements.



## **JOB HAZARD ANALYSIS**

### **INSTRUCTIONS FOR COMPLETION JOB HAZARD ANALYSIS**

In order to maintain a safe job, the Contractor's Supervisor must develop the skill of observation. Constant observation of workmen, their tools, equipment and procedures will enhance the supervisor's ability to correct unsafe physical and environmental conditions that exist.

A Job Hazard Analysis is the way to review job methods and uncover potential hazards. Use this worksheet to develop the necessary information. Once the hazards are known, the proper solutions can be developed. A blank copy of the form is included for your use. As new hazard analyses are completed, forward them to the Project Manager for addition to the file and distribution.

There are five steps to the Hazard Analysis. A description of each step is included.

1. Select the job to be analyzed. Your experience will guide you to identify and prioritize jobs that cause accidents or injuries, or that have a potential for severe injury or major loss. Don't overlook jobs involving new equipment, machinery and procedures.
2. Separate the job into a series of successive steps or activities. Begin each step with an "action" word such as "move", "open", or "cut". Observe an experienced person performing that particular job and solicit his input on safe and efficient performance and sequence.
3. Identifying the hazards and potential accidents is the third and probably most important step in the Job Hazards Analysis process. Look for hazards and potential accidents associated with each recorded job step. These may be directly connected with the job procedure or be a part of the job environment. At each step, ask questions like, "Can an employee slip or fall?" or "Can an employee get caught in or struck by anything?"
4. The fourth set is to develop solutions that will prevent potential accidents and eliminate hazards which you have identified. Principle solutions may involve one or a combination of several of the following.



- Job Revision: Do the job another way.
- Substitution: Substitute safe procedures wherever they're needed.
- Substitution: Substitute safe procedures wherever they're needed.
- Reduction: If possible, reduce the frequency that a job must be performed.
- Protective Equipment: Provide necessary equipment and instruction on how to properly employ it.

After developing the solutions, review the complete Job Hazard Analysis with the workers who will be forming the job. They must be aware of any anticipated hazards and how to deal with them.

5. The fifth and final step in Job Hazard Analysis is regular review. If an accident occurs after the "Analysis" is in effect, review the Job Hazard Analysis to determine where it requires revision. Even if a Job Hazard Analysis prevents accidents altogether, it should be periodically reviewed to ensure it continue effectiveness. This will also allow for changes caused by technological advances.





### JOB HAZARD ANALYSIS

1. Project		2. Contractor Name & Address		3. Estimated Start Date Estimated Completion Date	
4. Scope of Work				5. Specify Building(s) to be Worked On:	
6. Item	7. Activity	8. Potential Hazard		9. Precautionary Action Taken	
10. Subcontractor: Signature: _____ Date: _____		11. Analysis Review with Contractor: Representative: _____ Date: _____		12. Contractor: Signature: _____ Date: _____	



### JOB HAZARD ANALYSIS

1. Project	2. Contractor Name & Address	3. Estimated Start Date Estimated Completion Date	
4. Scope of Work		5. Specify Building(s) to be Worked On:	
6. Item	7. Activity	8. Potential Hazard	9. Precautionary Action Taken
	<p>General work performed on a daily basis such as rough in HVAC, piping, hanger &amp; support installation</p>	<ul style="list-style-type: none"> <li>a. Fall objects resulting in injuries.</li> <li>b. Injuries caused by inappropriate dress.</li> <li>c. Eye injuries.</li> </ul>	<ul style="list-style-type: none"> <li>a. Hard hats will be worn at all times.</li> <li>b. Long pant, steel toes shoes (when required) or heavy boots, will be worn at all times. Work gloves and protective sleeves will be worn during activities which could cause injury to hand and arms.</li> <li>c. Safety glasses are to be worn at all times. Full face shields and goggles will be available when needed.</li> </ul>



10. Subcontractor: Signature: _____ Date: _____	11. Analysis Review with Contractor: Representative: _____ Date: _____	12. Contractor: Signature: _____ Date: _____
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**JOB HAZARD ANALYSIS**

1. Project	2. Contractor Name & Address	3. Estimated Start Date Estimated Completion Date	
4. Scope of Work		5. Specify Building(s) to be Worked On:	
6. Item	7. Activity	8. Potential Hazard	9. Precautionary Action Taken



	<p>Operating power tools (Port-a-band, Drills, Pipe Machine, Grinders)</p>	<ul style="list-style-type: none"> <li>a. Electric shock</li> <li>b. Eye injuries</li> <li>c. Hand and arm injuries</li> </ul>	<ul style="list-style-type: none"> <li>a. All power tools will be inspected and used properly. Grounds will be required on all cords. If cords or tools are faulty, I will read tag and send out to have them properly repaired.</li> <li>b. The job is wired in AFCI type receptacles. Only these receptacles will be used.</li> <li>c. Proper eye protection, such as safety glasses, face shields and goggles will be used when necessary.</li> <li>d. Gloves and proper clothing will be worn</li> </ul>
<p>10. Subcontractor: Signature: _____ Date: _____</p>	<p>11. Analysis Review with Contractor: Representative: _____ Date: _____</p>	<p>12 Contractor: Signature: _____ Date: _____</p>	

**JOB HAZARD ANALYSIS**

1. Project	2. Contractor Name & Address	3. Estimated Start Date Estimated Completion Date
4. Scope of Work		5. Specify Building(s) to be Worked On:



6. Item	7. Activity	8. Potential Hazard	9. Precautionary Action Taken
	Burning & Welding	a. Eye injuries	a. Eye protection will be worn. Proper color safety glasses will be issued for burning goggles and welding shields.
		b. Burns	b. Proper flash shield will be put around welder to protect fellow workers from eye injuries.
			c. Leather sleeves and gloves are supplied to certified welders and burners to protect against
			d. Non-welders shall gas up machines when required. This is done to avoid gas liquid or fumes on a man who may be exposed to flames
10. Subcontractor: Signature: _____ Date: _____	11. Analysis Review with Contractor: Representative: _____ Date: _____	12 Contractor: Signature: _____ Date: _____	

**JOB HAZARD ANALYSIS**

1. Project	2. Contractor Name & Address	3. Estimated Start Date Estimated Completion Date
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4. Scope of Work		5. Specify Building(s) to be Worked On:	
6. Item	7. Activity	8. Potential Hazard	9. Precautionary Action Taken
	Safety Meeting		a. The meetings will be held on Monday after lunch. The appointed shop steward shall be our "safety man". The meeting will have a main topic followed by comments pertaining to weekly encounters. You are welcome to these meetings. All our men realize safety is everyone's responsibility. As Superintendent, along with my Shop Steward (not yet appointed) safety inspections will be an everyday job.
10. Subcontractor: Signature: _____ Date: _____		11. Analysis Review with Contractor: Representative: _____ Date: _____	12 Contractor: Signature: _____ Date: _____

**JOB HAZARD ANALYSIS**



1. Project		2. Contractor Name & Address		3. Estimated Start Date Estimated Completion Date	
4. Scope of Work				5. Specify Building(s) to be Worked On:	
6. Item	7. Activity	8. Potential Hazard	9. Precautionary Action Taken		
	Rigging and moving material & equipment  a. 2 Boilers 2 Chillers  b. A.H.U. (6)	Bodily injury caused by dropping or swinging lifted objects improperly.	a. Boilers will be unloaded off flatbed with a crane and proper sized chockers or slings in a four-point lift usually consisting of spreader bars. Boiler once off flatbed will be guided by signal man plus at least one man per corner. The load at this time should not require hand lines because it will only be at 18" off the ground. It will then go outside building onto pipe rollers onto pad. Chiller will be rigged & moved by the same method.  b. These units 1450 lbs. Will be 4 point lifted by crane onto large scissors lift. They will then be maneuvered directly below location. At this time, the lift will elevate the unit up to stationary supports and then fastened securely.		
10. Subcontractor: Signature: _____ Date: _____		11. Analysis Review with Contractor: Representative: _____ Date: _____		12 Contractor: Signature: _____ Date: _____	



**JOB HAZARD ANALYSIS**

1. Project		2. Contractor Name & Address		3. Estimated Start Date Estimated Completion Date	
4. Scope of Work				5. Specify Building(s) to be Worked On:	
6. Item	7. Activity	8. Potential Hazard		9. Precautionary Action Taken	
	All work done above 6'	a. Falls which account for 37% of all construction injuries. Dropping or falling material.		a. Ladders will be used for light work duties only. All ladders will be inspected daily. Ladders will be tied at top to prevent slipping. The bottom will be tied down or safety feet will be installed. Scaffolds will be purchased or rented complying with OSHA regulations. We will use the tubular type with proper cross braces. Safety pins will be installed to secure sections together. Rolling wheel with locks will be used. Proper staging will be purchased and used. A toe board will be installed when necessary to prevent tools or materials from accidentally kicked off. Scaffolds will be inspected by all on a daily basis. Lifts will be used periodically. We will rent scissor lifts. These lifts will be inspected upon arrival and daily. An Operator's Safety Course will be given by Liberty High Reach Co. for each type of lift we use. Precautions will be taken when moving lift when extended. These precautions will include watching floor and ceiling obstructions. d. Safety belts/laundries will be available and used when needed. These will be fastened to secure objects such as structural steel or lift line cable to prevent a man from falling. e. When working above 6' tools and materials will be raised or lowered using a good 5/8" rope. Area will be safely taped off when handling potential fall objects.	
10. Subcontractor: Signature: _____		11. Analysis Review with Contractor: Representative: _____		12 Contractor: Signature: _____	





Date: \_\_\_\_\_

Date: \_\_\_\_\_

Date: \_\_\_\_\_

**JOB HAZARD ANALYSIS**

1. Project		2. Contractor Name & Address		3. Estimated Start Date Estimated Completion Date	
4. Scope of Work				5. Specify Building(s) to be Worked On:	
6. Item	7. Activity	8. Potential Hazard		9. Precautionary Action Taken	
	Rigging and moving material and equipment	a. Bodily injury cause by dropping or swinging a lifted object.		<p>a. All men have taken rigging course in required apprenticeship.</p> <p>Crane and lifting devices, such as chokers, slings, shackles, cables, etc. shall be inspected and monitored before and during use.</p> <p>Designated signal men will make sure that object is not swinging over men's head. All men in the area will be informed before lift starts. Men will be properly positioned.</p> <p>When using mech. Chain falls and come a long, the same precautions will be taken.</p> <p>5/8" tag lines, rope, will be used for controlling lifted material when needed. Most of our heavy equipment sit on 6" pads so tag lines may not be needed.</p>	



10. Subcontractor: Signature: _____ Date: _____	11. Analysis Review with Contractor: Representative: _____ Date: _____	12. Contractor: Signature: _____ Date: _____
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**JOB HAZARD ANALYSIS**

1. Project	2. Contractor Name & Address	3. Estimated Start Date Estimated Completion Date	
4. Scope of Work		5. Specify Building(s) to be Worked On:	
6. Item	7. Activity	8. Potential Hazard	9. Precautionary Action Taken



	<p>System testing and Start -Up</p>	<p>System failure</p> <p>System failure after system start-up</p> <p>Injuries cause by rotating equipment</p>	<p>a. All system components will be check to ensure that they are suitable for system test pressure. Any pressure vessels, relief valves or other components not rated for test pressure will be calved-off or isolated prior to testing. All plastic piping will be tested hydrostatically. All pressurized equipment and systems will be equipped with a pressure gauge during testing procedures. Flanges, unions, equipment connections, etc. will be checked for tightness prior to pressure testing. Temporary plugs or blind flanges will be installed to seal openings where necessary.</p> <p>b. All relief cackles and other safety appliances will be checked for proper operation prior to system start-up. No safety appliance or device shall be removing or made ineffective, expect for making immediate repairs or adjustments and then only after the pressure has been relieved and the power shut-off.</p> <p>c. All electrical equipment will be checked for proper phasing and rotation prior to start up. All equipment guards and other safety appurtenances shall be in place prior to start-up of equipment.</p> <p>d. Comply with requirements on EM-385-1-1</p>
<p>10. Subcontractor: Signature: _____ Date: _____</p>	<p>11. Analysis Review with Contractor: Representative: _____ Date: _____</p>	<p>12 Contractor: Signature: _____ Date: _____</p>	



DO NOT USE WELDING OR CUTTING TORCH ON THIS DRUM (EVEN EMPTY)

# METHANOL

DOT Proper Shipping Name:

METHYL ALCOHOL FLAMMABLE LIQUID UN1230

**DANGER!**

**POISON!**

- FLAMMABLE LIQUID
- MAY CAUSE EYE AND SKIN IRRITATION
- MAY BE HARMFUL IF INHALED
- LOWED OR ABSORBED THROUGH SKIN
- CONTAINS METHYL ALCOHOL



**MATERIAL SAFETY DATA SHEET**

**SECTION I**

MANUFACTURE'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (Number, Street, City State and Zip Code)	
CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS
CHEMICAL FAMILY	FORMULA

**SECTION II – HAZARDOUS INGREDIENTS**

PAINTS, PRESERVATIVE & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS FILLER METAL		
SOLVENTS ADDITIVES			PLUS, COATING ON CORE FLUX OTHERS		
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS OR GASES				%	TLV (Units)

**SECTION III – PHYSICAL DATA**

BOILING POINT(F)	SPECIFIC GRAVITY
VAPOR PRESSURE (MM H2)	PERCENT, VOLATILE BY VOLUME (5)
VAPOUR DENSITY (AIR-3)	EVAPORATION RATE (-1)
SOLUBILITY IN WATER	
APPEARANCE AND ODOR	

**SECTION IV – FIRE AND EXPLOSION HAZARD DATA**

FLASH POINT (Method Use)	FLAMMABLE LIMITS	LEL	UEL
EXTINGUISHING MEDIA			
SPECIAL FIRE FIGHTING PROCEDURES			
UNUSUAL FIRE AND EXPLOSION HAZARDS			



**SECTION V- HEALTH HAZARD DATA**

THRESHOLD LIMIT VALUE

EFFECTS OF OVER EXPOSURE

EMERGENCY AND FIRST AID PROCEDURE

**SECTION VI – REACTIVITY DATA**

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE		

INCOMPATIBILITY (Materials to avoid)

HAZARDOUS DECOMPOSITION PRODUCTS

HAZARDOUS	MAY OCCUR		CONDITIONS TO AVOID
POLYMERIZATION	WILL NOT OCCUR		

**SECTION VII – SPILL OR LEAK PROCEDURES**

STEPS TO TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

**SECTION VIII – SPECIAL PROTECTION INFORMATION**

RESPIRATORY PROGRAM (Specify Type)

VENTILATION	LOCAL EXHAUST	SPECIAL
	MECHANICAL (General)	

PROTECTIVE GLOVES	EYE PROTECTION
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OTHER PROTECTIVE EQUIPMENT

**SECTION IX – SPECIAL PRECAUTIONS**

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

OTHER PRECAUTIONS



## CHEMICAL INFORMATION/HAZARDOUS MATERIAL

COMPANY NAME: \_\_\_\_\_

WORK PLACE ADDRESS:  
(IF DIFFERENT THAN BUSINESS ADDRESS)

BUSINESS ADDRESS: \_\_\_\_\_

CONTACT PERSON: \_\_\_\_\_ TELEPHONE: \_\_\_\_\_

DATE OF PREPARATION OR REVISION: \_\_\_\_\_

TITLE: \_\_\_\_\_

COMMON NAME (1)	CHEMICAL NAME (1)	WORK AREA(S) (2)	DATE ADDED TO LIST

(1) Either the chemical name or the common name must be the identity of the chemical which is found on the label and the MSDS. More than one common name for a particular substance may be listed in the "Common Name" column.

If symbols, letter or numbers are used to identify work areas, the employer should also provide a key, map or other descriptive identification.



(PAGE 1 MUST BE ATTACHED TO THIS PAGE(S))

COMPANY NAME: \_\_\_\_\_

WORK PLACE ADDRESS:  
(IF DIFFERENT THAN BUSINESS ADDRESS)

DATE OF PREPARATION OF  
REVISION: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(1) COMMON NAME	(1) CHEMICAL NAME	(2) WORK AREA(S)	DATE ADDED TO LIST

CHEMICAL INFORMATION LIST (CONT.)

PAGE \_\_\_\_\_ OF \_\_\_\_\_





## HAZARD COMMUNICATION PROGRAM

### A. PURPOSE

To ensure that information regarding the associated potential hazards and safety/health precautions for hazardous substances are readily available and transmitted to employees and subcontractors (as applicable).

### B. APPLICABILITY

This procedure applies to all Contractor personnel and is particularly relevant for employees who may encounter or utilize hazardous substances. Further, elements of this procedure (disclosure) shall apply to subcontractors as required by specific conditions and circumstances.

### C. POLICY

Personnel must be familiar with all hazardous materials which they handle and proper safety/health controls must be employed.

### D. REFERENCES

1. Subcontractor Safety Requirements (Project Safety Manual)
2. 29 CFR 1910.1200
3. 29 CFR 1926.59

### E. RESPONSIBILITY

1. Contractor shall maintain a current written Hazard Communication Program.
2. Contractor Management shall be responsible for ensuring that material safety data sheets (MSDS) are received for all hazardous substances on its projects and that containers at time of delivery have proper labels. Further, Contractor Project Management shall ensure a current inventory of hazardous materials located on their project is maintained (See format, Attachment 1 and 2)
3. Contractor Project Management will maintain MSDS for all hazardous substances in use on its project and ensure labels are always legible and remain on all hazardous substance containers.



## HAZARD COMMUNICATION PROGRAM

4. Individual supervisors will be responsible for:
  - a. Ensuring that all employees have been trained in the recognition and/or proper use of hazardous materials which they may encounter or be required to use.
  - b. Verifying that proper procedures, including the review of MSS, and use of personal protective equipment are followed.
5. Individual employees shall be responsible for following this procedure, and reporting any discrepancies of their supervisors such as missing MSDS and/or unlabelled containers.

### F. DEFINITIONS

1. Container: Any bag, barrel, bottle, box can, cylinder, drum, reaction vessel, storage tank, or similar object that contains a hazardous substance. For purposes of this section, pipes or piping systems are not considered to be containers.
2. Exposure or Exposed: Any situation arising from a work operation where an employee may ingest, inhale and/or absorb through the skin or eyes, or otherwise come into contact with a hazardous substance.
3. Hazardous Substances: Any substance which is a physical or health hazard.
4. Health Hazard: A substance for which there is statistically significant evidence base on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed employees. The term "health hazard" includes substances which are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents which act on the hematopoietic system, and agents which damage the lungs, skin, eyes, or mucous membranes.
5. Physical Hazard: A substance for which there is scientifically valid evidence that it is flammable or combustible liquid, a compressed gas, explosive, an organic peroxide, an oxidizer, pyrophoric, unstable (reactive), or water-reactive.
6. Proprietary Information/Trade Secret: Any confidential formula, pattern, process, device, information, or compliance of information



## HAZARD COMMUNICATION PROGRAM

which gives its user an opportunity to obtain a business advantage over competitors who do not know or use it.

### G. PROCEDURES

#### 1. Warning Labels

- a. Each warning label must contain at least the following information:
  1. Identity of the hazardous chemical
  2. Appropriate hazard warnings (physical & health)
- b. Warning labels should be read by the employees who use the materials. If the employee does not understand the hazards and precautions stated on the label, the employee must not use the material. If the employee finds an unlabelled or improperly labeled container of a hazardous substance, he/she must report it to his supervisor.
- c. Contractor Project Management shall ensure that all appropriate subcontracts and purchase orders state “Vendor –supplied containers of hazardous substances must be labeled with a weather – resistant label or equivalent stencil, listing the identity of the contents, appropriate physical a health hazard warnings, name and address of the manufacturer”. The subcontract or purchase order number and deposit amount must also be stenciled on the container.

#### 2. Hazardous Materials List

A list (Attachment 3) of all hazardous materials used on this project shall be maintained and updated by Contractor Project Management.

#### 3. Material Safety Data Sheets (MSDS)

- a. MSDS which list information regarding ingredients, fire hazards, reactivity data, spill/clean –up procedures, special protection, as well as precautions and emergency telephone numbers must be on site and available to employees (Attachment 2).
- b. Contractor Project Management shall ensure that a current MSDS accompanies each shipment of containerized hazardous material, unless a current MSDS is already on file with Project Management and is listed on the MSDS master index.



## HAZARD COMMUNICATION PROGRAM

Contractor Project Management shall verify that containers at time of delivery are properly labeled; and, that a current MSDS is available for any associated hazardous substance. Discrepancies must be corrected prior to use.

- c. The Contractor shall designate one person's MSDS and shall ensure that appropriate MSDS are readily available to employee's in/near work areas and a current project index is maintained.
- d. An employee's request to see a particular MSDS should be directed to his supervisor or the associated project MSDS coordinator. If the MSDS is not readily available, the MSDS coordinator or Contractor Project Manager shall pursue the acquisition of a current MSDS.

#### 4. Employee Training

- a. All new Company employees will receive general safety and health information, education, and training upon hire. This training shall also briefly address hazardous chemicals on the project and basic elements of the Hazard Communication Program, including MSDS.
- b. When an employee's task involves handling and possible exposure to hazardous materials, the supervisor shall ensure that the employee receives further detailed training. Retraining will be provided when:
  - 1. New chemicals are introduced into the workplace.
  - 2. Process or equipment changes are made which could cause changes in the employee exposure.
  - 3. Employees are transferred from one work area to another where different hazards are present.

**NOTE: All Training shall be documented as to its nature and those who attended/Instructed (signatures required).**

#### 5. Non- Routine Tasks

- a. The supervisor of an employee performing a non-routine task, such as cleaning process equipment and vessels, repairing chemical pumps, sampling transformer liquids and handling hazardous wastes is responsible for ensuring that employees understand the potential hazards and proper procedures associated with the non-routine task. Supervisors shall also



## HAZARD COMMUNICATION PROGRAM

instruct employees of hazards posed by unlabelled processes/systems utilizing hazardous materials.

- b. The employee also shares in this responsibility by ensuring his or her immediate supervisor knows that the non-routine task will be performed.
- c. For hazardous materials spills and associated clean up activities, executive management shall be consulted for procedures specific to the situation.
- d. Special work permits shall be issued for such non-routine task, as confined space entry, welding and burning, etc. Also, some special tasks required employees to shut down and lockout power sources with padlocks, and assure all motion has stopped and energy released or isolate prior to performing work.

### H. ATTACHMENTS

1. Sample Hazardous Substance Label.
2. Sample Material Safety Data Sheet
3. Chemical Information/Hazardous Materials List

DO NOT USE WELDING OR CUTTING TORCH ON THIS DRUM (EVEN WHEN



## MATERIAL SAFETY DATA SHEET

### SECTION I

MANUFACTURE'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (Number, Street, City State and Zip Code)	
CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS
CHEMICAL FAMILY	FORMULA

SECTION II – HAZARDOUS INGREDIENTS					
PAINTS, PRESERVATIVE & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS FILLER METAL		
SOLVENTS ADDITIVES			PLUS, COATING ON CORE FLUX OTHERS		
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS OR GASES				%	TLV (Units)

SECTION III – PHYSICAL DATA					
BOILING POINT(F)		SPECIFIC GRAVITY			
VAPOR PRESSURE (MM H2)		PERCENT, VOLATILE BY VOLUME (5)			
VAPOUR DENSITY (AIR-3)		EVAPORATION RATE (0-1)			
SOLUBILITY IN WATER					
APPEARANCE AND ODOR					

SECTION IV – FIRE AND EXPLOSION HAZARD DATA			
FLASH POINT (Method Use)	FLAMMABLE LIMITS	L E L	U E L
EXTINGUISHING MEDIA			
SPECIAL FIRE FIGHTING PROCEDURES			
UNUSUAL FIRE AND EXPLOSION HAZARDS			



<b>SECTION V - HEALTH HAZARD DATA</b>			
THRESHOLD LIMIT VALUE			
EFFECTS OF OVER EXPOSURE			
EMERGENCY AND FIRST AID PROCEDURE			
<b>SECTION VI – REACTIVITY DATA</b>			
STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE		
INCOMPATIBILITY (Materials to avoid)			
HAZARDOUS DECOMPOSITION PRODUCTS			
HAZARDOUS	MAY OCCUR		CONDITIONS TO AVOID
POLYMERIZATION	WILL NOT OCCUR		
<b>SECTION VII – SPILL OR LEAK PROCEDURES</b>			
STEPS TO TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED			
WASTE DISPOSAL METHOD			
<b>SECTION VIII – SPECIAL PROTECTION INFORMATION</b>			
RESPIRATORY PROGRAM (Specify Type)			
VENTILATION	LOCAL EXHAUST		SPECIAL
	MECHANICAL (General)		OTHER
PROTECTIVE GLOVES			EYE PROTECTION
OTHER PROTECTIVE EQUIPMENT			
<b>SECTION IX – SPECIAL PRECAUTIONS</b>			
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING			
OTHER PRECAUTIONS			



## CHEMICAL INFORMATION/HAZARDOUS MATERIAL

COMPANY NAME: \_\_\_\_\_

WORK PLACE ADDRESS:  
(IF DIFFERENT THAN BUSINESS ADDRESS) \_\_\_\_\_

BUSINESS ADDRESS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

CONTACT PERSON: \_\_\_\_\_ TELEPHONE: \_\_\_\_\_  
\_\_\_\_\_

DATE OF PREPARATION  
OR REVISION:

TITLE: \_\_\_\_\_

(1) COMMON NAME	(1) CHEMICAL NAME	(2) WORK AREA(S)	DATE ADDED TO LIST

(1) Either the chemical name or the common name must be the identity of the chemical which is found on the label and the MSDS. More than one common name for a particular substance may be listed in the "Common Name" column.

If symbols, letter or numbers are used to identify work areas, the employer should also provide a key, map or other descriptive identification.





## HANDLING HAZARDOUS MATERIALS

### A. PURPOSE

To outline basic precautions and requirements necessary to protect employees from incurring any injury or developing any adverse health effect from handling hazardous materials.

### B. APPLICABILITY

All Contractors' personnel who may encounter hazardous materials or who in any manner may coordinate an activity involving hazardous materials shall be familiar and comply with this policy and procedure.

### C. POLICY

Hazardous materials will be handled in such a manner that employees are properly safeguarded from injury or any adverse health effect. Where practical, engineering and administrative controls shall be developed and utilized to limit reliance on personal protective type controls.

### D. REFERENCES

1. Project Respiratory Protection Program
2. Project Hazard Communication Program

### E. RESPONSIBILITY

1. Contractor's Management shall provide technical assistance to and shall monitor those projects involve with handling hazardous materials.
2. Contractor's Project Management shall coordinate hazardous waste related activities, particularly disposal.
3. Contractor's Project Managers and supervisors shall ensure that adequate resources, such as labor and equipment, are provided for hazardous material handling.
4. Contractor's immediate supervisors shall ensure that appropriate employees are aware of this policy and procedure and that applicable provisions are addressed.
5. Contractor's individual employees, involve in handling hazardous materials, shall be familiar and comply with this procedure.

### F. DEFINITIONS



1. Hazardous Material or Hazardous Substances: Any substance which is a physical or health hazard.
2. Health Hazard: A substance for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed employees. The term “health hazard” includes substances which are carcinogens, toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxin
3. Physical Hazard: A substance for which there is scientifically valid evidence that it is a flammable or combustible liquid, a compressed gas, an explosive, an organic peroxide, an oxidizer, pyrophoric, unstable (reactive), or water-reactive.
4. Hazardous Waste: A waste that is either listed as a hazardous waste or meets or exhibits any of the characteristics of a hazardous waste (ignitable, flammable, toxic, corrosive). Hazardous materials which are not in a useable condition or are scheduled for disposal or recycling are usually classified hazardous wastes.

#### **G. PROCEDURES**

1. Hazardous materials shall not be used under conditions which are inconsistent with information listed on MSDS and labels. Conditions which must be avoided for some chemicals include ignition sources, heat, other chemicals, certain types of container materials, etc. Flammable hazardous materials shall not be used for solvent or other cleaning purpose.
2. Contractor supervisors shall provide training or otherwise ensure that employees have received specialized training before handling hazardous materials. Training must include a review of the Company’s Hazard Communication Program and address the hazards of the material, appropriate precautions, protective equipment, and emergency procedures. Employees shall be familiar with information on MSDS and labels.
3. Contractor shall utilize proper personal protective equipment when handling hazardous materials. The type of equipment necessary is dependent on the nature of the material being handled and methods employed. The following general guidelines shall apply.
  - a. Synthetic gloves (such as rubber, neoprene, nitrile or viton), a face shield and/or chemical goggles shall be worn whenever direct contact with a hazardous material is possible. Examples: handling methanol, solvents, and oil & water treatment chemicals.



- b. Whole body protection (gloves, goggles, disposable coveralls or full rainsuits and possibly chemical boots) shall be worn whenever gross splashing or spraying of a corrosive liquid or other high skin hazard chemical is possible.
  - c. Respiratory protection must be worn by employees if the allowable airborne exposure limit of the hazardous material is exceeded (see the Company's Respiratory Program).
  - d. Clear directives ("shall" or "must" statements) on labels and MSS regarding use of personal protective equipment shall be followed.
4. In major facilities where hazardous materials are regularly handled, plumbed emergency flushing facilities shall be readily available. At remote locations, emergency flushing water (15-minute supply) must be readily available when personnel may be exposed to hazardous materials with significant eye/skin contact hazards. The Contractor, shall have a supply of portable eyewash units which can be temporarily assigned to areas as needed.
5. Different hazardous materials, including hazardous wastes, shall not be mixed in any manner unless Contractor verifies the compatibility of the materials prior to mixing.
6. No eating, smoking, or drinking shall be allowed when handling hazardous materials. Employees shall wash their hands and face as necessary after handling hazardous materials.
7. Individual projects shall develop concise written handling procedures specific to any hazardous materials used on a regular basis.
8. Contractor must ensure to reduce the potential for hazardous material exposure to employees.
9. The following general first aid/emergency treatment precautions shall apply for hazardous materials unless noted otherwise on labels or material safety data sheets:
  - a. Eye contact: Irrigate with flowing water immediately and continuously for fifteen minutes.
  - b. Skin contact: Wash/rinse with water immediately. For corrosive liquids and chemicals readily absorbed through skin, flush for at least fifteen minutes.
  - c. Inhalation overexposure: Get to fresh air (rescuers-do not become overexposed during rescue efforts; apply oxygen or cardio-pulmonary resuscitation as required to victim).



- d. Seek outside medical treatment for serious emergencies or if any irritation or symptom exists after initial first aid treatment.
10. Contractor's Management shall be immediately notified of any chemical handling relate injury.
11. All hazardous waste handling operations shall be coordinate through Contractor Project Manager prior to commencement of work. The EPA requires specific training for hazardous waste handling.



## **FIRE PERMIT REQUIREMENTS**

### **A. PURPOSE**

To establish fire permit control system for potentially hazardous areas with operations involving ignition sources.

### **B. APPLICABILITY**

This procedure applies to all Contractors' operations.

### **C. POLICY**

To protect employees and property from injury or damage when working with or around ignition sources in potentially hazardous areas by means of a permit system.

### **D. REFERENCES**

The "Fire Prevention During Hot Work" Procedure

### **E. RESPONSIBILITY**

It is the responsibility of the Contractor's Project Managers and their superintendents/foreman to assure fire permits are issued in accordance with this procedure.

- The project manager shall designate representatives, by work classification, responsible for the issuance of fire permits. Designated personnel shall be fully knowledgeable of hazards that may be involve with work operations and shall be thoroughly familiar with the requirements of this procedure.

### **F. DEFINITION**

1. **AUTHORIZED REPRESENTATIVE** – Representatives designate by the respective project managers responsible for the issuance of fire permits.
2. **IGNITION SOURCE** – An ignition source serves as the "starter" for the process of combustion (fire). Examples of ignition sources include welding, cutting, use of open flames, internal combustion

## **FIRE PERMIT REQUIREMENTS**



Engines (including vehicles), electric motors, electric hand tools, and any other sources that may serve as a “starter” for the process of combustion.

**G. PROCEDURE**

1. A written and numbered Fire Permit (Attachment 1) shall be issued and signed by an authorized representative before any source of ignition is introduced into the following areas:
  - a. Within the fenced area of any LPG Storage Area or within 15 meters of any non-fence storage area.
  - b. Within 15 meter of any open sump area subject to collection of hydrocarbons.
  - c. Within any non-posted hydrocarbon tank setting boundaries.
  - d. Within any non-posted hydrocarbon tank impoundment area (diked area) and within 4.5 meter of the drainage path of tanks provided with remote impounding. Within 3.0 meter of any hydrocarbon storage tank in the open (no dike) in a non-posted area.
  - e. Within any warehouse where rum or cylinder storage for flammable materials is locate. Within 2.54 meters outside storage for flammable materials.
  - f. Within any other area where the possibility of flammable gases or liquids may be liberating from pipelines, vents, sewers, drains, ditches, etc.
2. The Fire Permit shall designate the effective date, the place of use, and the hours during which the source of ignition may be used.
  - a. At any time, when circumstances make the continued use of a source of ignition hazardous, the permit is considered immediately VOID, and is not to be considered valid until the issuing authority counter signs the permit indicating that conditions are again safe to proceed with work.

**FIRE PERMIT REQUIREMENTS**



- b. The Fire Permit shall clearly designate the specific area and/or piece of equipment, the nature of its use and any special precautions or limitations to be observed during the use of the source of ignition. Fire Permits shall expire at the end of a shift, unless otherwise designated as expiring prior to the end of a shift.
    - c. The Fire Permit shall not be valid unless completed in its entirety and conspicuously posted at the work location.
  3. Prior to issuance of any Fire Permit, the Authorized Representative shall personally inspect the planned location to determine that the source of ignition may be safely used.
    - a. If the permit is for the use of a source of ignition within a confined space, a test of the atmosphere in the confined space shall be made (see also the Company's "Confined Space Entry" Procedure.)
    - b. No permit shall be signed or otherwise issued unless the aforementioned conditions have been met unless the flammable gas or vapor content is less than 10 per cent of the lower explosive limit (LEL).
  4. When a source of ignition requires a fire permit to be used, the Authorized Representative shall also assure compliance with the provisions of the Company's "Fire Prevention During Hot Work" procedure.
  5. The signed Fire Permit shall be kept at the work location where the source of ignition is being used the work is completed, the permit expires, or is revoked.
    - A copy of each permit issue shall be kept on file with the issuing project for six (6) months following the date of issue.
  6. Suitable fire extinguishing equipment shall be readily available to the employees who are using a source of ignition in places which requires a Fire Permit.

## **H. ATTACHMENT**

Fire Permit (Sample)



# FIRE PERMIT

POST THIS PERMIT IN WORK AREA  
VALID FOR ONE SHIFT ONLY OR TIME LIMIT INDICATED

Issue to \_\_\_\_\_ Date/Time Start \_\_\_\_\_ a.m./p.m  
Employer \_\_\_\_\_ Date/Time Start \_\_\_\_\_ a.m./p.m

\_\_\_\_\_  
Job Supervisor's Signature

Work to be done \_\_\_\_\_

Equipment to be used \_\_\_\_\_ Motor Powered Equipment \_\_\_\_\_ Other \_\_\_\_\_  
Welding/Open Frame \_\_\_\_\_

Location of work to be performed \_\_\_\_\_

Atmosphere test(s) required?  
By Whom

	N/A	YES	NO
Have all connections been blanked off?	_____	_____	_____
Have valves been tagged and locked closed?	_____	_____	_____
Have electrical brakes been locked open?	_____	_____	_____
Have equipment and all attached piping been cleaned?	_____	_____	_____
With water _____ Steam _____ Inert gas _____	_____	_____	_____
Has Equipment free or flammable?	_____	_____	_____
Have surrounding conditions been inspected, and are they such as to be safe?	_____	_____	_____
Is a fire watch required?	_____	_____	_____

Special precautions to be observed and/or protective garments required  
\_\_\_\_\_  
\_\_\_\_\_

Issued by \_\_\_\_\_ Job Title \_\_\_\_\_  
Issued by \_\_\_\_\_ Time \_\_\_\_\_

IN CASE OF FIRE, SPILL, OR ACCIDENT, THE PERMIT IS VOID UNTIL COUNTERSIGNED THAT  
CONDITIONS ARE SAFE TO PROCEED WITH THE JOB.





## **FIRE PREVENTION DURING HOT WORK**

### **A. PURPOSE**

For the guidance of cutters and welders, their foreman, fire watchers, and the respective superintendents of the areas in which hot work is being performed.

### **B. APPLICABILITY**

This procedure establishes requirements for the safe performance of hot work, especially in the use of oxy-acetylene and arc welding equipment of the Contractor.

### **C. POLICY**

To take practical measures to protect employees and property from injury or damage for operations involving hot work.

### **D. REFERENCES**

The procedure entitles "The Permit Requirements"

### **E. RESPONSIBILITY**

The Contractor is responsible for ensuring this procedure is enforced for the safe performance of all hot work within their facilities/projects. Each employee and subcontractor are responsible for complying with this procedure.

### **F. DEFINITION**

Authorized Representative – Representatives designated by the respective project managers responsible for issuance of Fire Permits.

### **G. PROCEDURE**

Based on fire potentials, the Contractor's Project Manager shall establish approved areas for hot work and ensure that proper procedures are followed for authorizing hot work in unapproved areas.

1. The Contractor's Project Manager shall designate authorized representatives by job classification which shall be responsible for authorizing hot work operations in areas not specifically designed or approved for such processes. The personnel shall be fully knowledgeable of the fire hazards that may be involved and shall be thoroughly familiar with the provisions of this procedure. Representatives authorized to issue Fire Permits, shall:



- a. Allow only approved apparatus to be use and all equipment and tools will be in goo repair.
  - b. Assure that subcontract operators and their supervisors are:
    1. Suitably trained in the safe operation of their equipment and the safe use of the process.
    2. Are familiar with emergency procedures to be followed in the event of a fire or accident.
  - c. Inform subcontractors about flammable materials or hazardous conditions and assure they have an awareness of the magnitude of the risks involve.
2. The job foreman of hot work in areas not designated or approved for such processes shall ensure the following:
- a. The job foreman shall be responsible for the safe operations of hot work process and equipment.
  - b. The job foreman shall determine the combustible materials and hazardous conditions present or likely to be present at work location.
  - c. The job foreman shall ensure that combustibles are protected from ignition by complying with the following (as applicable):
    1. Have the work moved to a location free from combustibles.
    2. Shield the combustibles or remove them to a safe location.
    3. Assure operations that might expose combustibles to ignition are not start during hot works.
  - d. The job foreman shall secure an approved Fire Permit from the project Authorized Representative (refer to Section G (1) of this procedure).
  - e. The job foreman shall determine that fire protection equipment is available and properly positioned at the work site.
  - f. Where a fire watch is required (refer to Section G4(e) of this procedure), the job foreman shall see that one is available at the side.



- g. The job foreman shall determine that conditions are safe prior to allowing work to begin.
  - h. Where a fire watch is not required, a final inspection shall be made by the job foreman after the completion of the hot work, to detect and extinguish possible smoldering fires.
3. Individuals, performing hot work, shall handle and use equipment safely so as not to endanger lives and/or property, as follows:
- a. Have approval of an authorize representative prior to performance of hot work.
  - b. Perform hot work only where conditions are safe.
  - c. Continue to perform hot work only so long as conditions are unchanged from those under which approval was originally granted.

4. **Fire Prevention Precautions**

- a. Hot work shall be permitted only in areas that re or have been made safe (see “First Permit Requirements”)
- b. Hot work shall not be permitted in the following situations:
  - 1. In areas not authorized by management.
  - 2. In sprinkled buildings while such protection is impaired.
  - 3. In the presence of explosive atmosphere might develop before adequate warning could be given and hot operations shut down.
- c. Before hot work is permitted, the areas shall be inspected by an Authorized Representative to ensure that the location is safe for such work. This individual shall designate precautions to be followed in granting authorization to proceed.
- d. The Authorized Representative shall sign the Fire Permit only after the following items are verified:
  - 1. Hot work equipment shall be in goo repair.
  - 2. Before repair work is started on installations producing or containing flammable vapor, the vapor concentration must be reduced to a safe point – 100% of the lower flammable limit (LFL) or less. This shall be done by blinding or dismantling attached piping.



3. Equipment to be required or entered shall be isolated to prevent entry of flammable vapor or liquid from connected equipment. This shall be done by blinding or dismantling attached piping.
  4. Where combustible materials are on the ground, the ground shall be cleared for a radius of 3.0 meters and effective shielding shall be used to stop sparks and/or hot materials.
  5. Where practicable, all combustibles shall be relocated at least 15.0 meters horizontally from the hot work site.
  6. Where relocation is impractical, combustibles shall be protected with flame proof covers or otherwise shielded with noncombustible guards or curtains. Edges of covers at the floor shall be tight to prevent sparks from going under them.
  7. Wall, floor, or drain openings within 15.0 meters of the site shall be tightly covered to prevent the passage of sparks.
  8. Cutting or welding on pipes or other metal in contact with combustible materials shall not be undertaken if close enough to cause ignition by conduction.
  9. Fully charged and operable fire extinguishers, appropriate for the type of fire possible, shall be available at the work area.
- e. Fire watchers shall be required as determined necessary by the Authorized Representative whenever hot work is performed in locations where other than a minor fire might develop, or when any of the following conditions exist:
1. Appreciable combustible material in building construction or contents closer than 10 meters to the point of operation.
  2. Appreciable combustibles are more than 10 meters away but are easily ignited by sparks.
  3. Wall, floor, or drainage openings within a 15.0 meters radius expose combustible material or atmospheres.
  4. Combustible materials are likely to be ignited by conduction or radiation.
- f. Fire watchers shall:
1. Have the appropriate fire extinguishment equipment readily available and shall be trained in its use.



2. Utilize a combustible gas detector as determined necessary by the Authorized Representative. The fire watcher shall be thoroughly trained in its use. Operations shall be stopped if the vapor concentration reaches 10% of the lower flammable limit.
3. Be familiar with facilities and procedures for sounding an alarm and/or reporting a fire.
4. Be in the immediate area and shall watch for fires in all exposed areas. If a fire should occur, the fire watcher shall try to extinguish it only when obviously within the capacity of the equipment available. All other fires shall be immediately reported in accordance with project emergency procedures.



## ASBESTOS HANDLING AND ABATEMENT

### A. PURPOSE

To ensure the identification, evaluation, proper handling and abatement of asbestos-containing materials.

### B. APPLICABILITY

This procedure applies to any Contractor's personnel who may perform or be associated with any operation or support activity involving asbestos-containing material. This procedure shall apply to all subcontractors.

### C. POLICY

Asbestos – containing materials and associated exposure hazards shall be identified, evaluated, properly handled/addressed, and eliminated in accordance with all applicable regulatory requirements. Complete elimination of all asbestos – containing materials is the ultimate intent of this policy and procedure. (see Attachment 1, for information on comparison of asbestos control strategies.)

### D. REFERENCES

Project Respiratory Protection Program  
29 CFR 1926.1101

### E. RESPONSIBILITY

1. The Contractor shall provide asbestos – related technical support to project managers who will coordinate implementation of this policy and procedure to ensure that.
  - a. Asbestos – containing materials are identified, properly controlled and handled.
  - b. Use and presence of asbestos – containing materials are reduced and eventually eliminated.
2. The Contractor is responsible for providing technical assistance regarding the proper disposal of asbestos – containing wastes. Contractor Project Management is responsible for coordinating interface with air pollution regulatory agencies.
3. Contractor Project Management is responsible for conducting visual surveys for asbestos-suspect materials and ensuring that asbestos – containing materials are handled in accordance with all applicable regulatory and Company requirements.



4. Individual supervisors and employees performing any operation or support activity involving asbestos – containing materials shall follow all applicable requirements.

## **F. DEFINITIONS**

1. Abatement – Any procedure to control fiber release from asbestos – containing materials, including removal, encapsulation, enclosure, and other repair.
2. Accredited Laboratory – An analytical laboratory that is certified by local authorities.
3. Asbestos – Containing Material – Any material that contains chrysotile, amosite, crocidolite, tremolite, anthophyllite, and/or actinolite (usually in concentration greater than 1% dry weight).
4. Asbestos - Suspect Material – Any material which may contain asbestos. Examples include: insulation, fire proofing, ceiling and floor tiles, transite – type pipes and wallboard, break and clutch linings, gaskets, fire blankets.
5. Competent Person – A person with specialized asbestos – related training and experience such as a certified industrial hygienist or EPA asbestos course – approved “competent person”.
6. Encapsulation – The application of an encapsulant to asbestos – containing materials to control the release of asbestos fibers into the air.
7. Friable Asbestos – Asbestos – containing material which can be crumble to dust, when dry, under hand pressure.
8. Permissible Exposure Limit (PEL) – The eight-hour time – weighted average airborne concentration of asbestos fibers listed as permissible by OSHA.

## **G. PROCEDURES**

1. Contractor working on projects with “asbestos – suspect” materials shall conduct visual surveys to identify locations/materials which should be tested for asbestos content. Special surveys must be performed prior to major building modification/demolition (presence of asbestos will significantly escalate associate costs). Laboratory analysis shall be performed by an “approved laboratory”. All laboratory results shall be distributed to involve Contractors Project Managers and shall also be available to the Engineer upon request.
2. As practical, locations with asbestos – containing material shall be identified by signs, stencils, or other identification.



3. The use and presence of asbestos – containing materials shall be phased out as soon as practical. Exposed friable asbestos containing materials shall be promptly abated.
4. All asbestos – related work shall be done in strict accordance with all applicable regulations, standards and codes governing asbestos handling and abatement. The most recent edition of any relevant regulation, standards, document or code shall be in effect. Where conflict among the requirements or with these specifications exists, the most stringent requirements shall be utilized.

**NOTE: A licensed asbestos abatement contractor with a “competent person” must be utilized when more than 10 S. M of asbestos – containing materials are to be disturbed.**

5. Prior to removal or alteration of asbestos – suspect material, The Engineer must be notified, and the material must be assessed for asbestos content. If the particular material has not been previously analyzed by an accredited laboratory, a sample shall be collected, then forwarded to such a laboratory. In situations, where work must immediately proceed on an asbestos – suspect material, the material shall be considered to contain asbestos.
6. An “Asbestos Work Permit” (Attachment 2) shall be issued by the Contractor before asbestos – containing materials are disturbed. For repetitive or routine type operations, such as asbestos – containing gasket removals, a general permit may be issued. The associate job supervisor shall be responsible for ensuring that all permit conditions are maintained.
7. All employees who are potentially exposed to asbestos fibers at or above the action level shall be formally trained, and retrained annually if necessary, by Contractor Project Management or designee.

Training must address:

- a. The nature of all health hazards directly attributable to asbestos exposure including carcinogenic hazards.
- b. The increased risk of lung cancer associated with smoking cigarettes and asbestos exposure.
- c. The specific nature of the operations and specific information to aid the employee in recognizing when and where asbestos exposure may result.
- d. The purpose for and a description of the monitoring program.





- e. The purpose for and a description of the medical surveillance program.
  - f. The necessary protective steps to prevent exposure, including engineering controls and safe work practices.
  - g. Where the employee is required to wear a respirator, the purpose for, proper use of and limitations to the respiratory devices.
  - h. Where protective clothing is required, the purpose for, proper use of and limitations of protective devices or clothing.
  - i. The purpose for, significance of and familiarization with emergency procedures.
8. Personnel and air monitoring shall be coordinated by Contractor Project Management whenever asbestos – containing materials are disturbed.
  9. Caution signs and/or rope shall be posted around asbestos work areas in such a manner that no unauthorized and unprotected personnel can enter any area with airborne asbestos fiber levels. Signs shall state the equivalent of:  
  

**CAUTION: DO NOT ENTER. ASBESTOS DUST HAZARD. BREATHING ASBESTOS DUST MAY CAUSE SERIOUS BODILY HARM. AUTHORIZED PERSONNEL ONLY.**
  10. To the extent possible, asbestos - containing materials shall be wetted (preferably with a commercially available wetting agent) before disturbances. Wetting shall continue to limit emission of airborne fibers. Excess liquid shall be treated as an asbestos – containing waste.
  15. No eating, chewing or smoking materials shall be allowed in any area where asbestos – containing materials are being disturbed.
  16. At no time shall any power saws, grinders, or chippers be use for the removal or alteration of asbestos – containing material.
  17. All Contractors employees involved in asbestos handling disturbances shall utilize proper personal protective equipment. The type of equipment necessary shall be determined by Contractor’s management and may include respirators, disposable coveralls, gloves and foot covers (see Respiratory Protection Program Requirements).

**NOTE: Subcontractors involve n “asbestos disturbances” must have detailed written asbestos procedures addressing all aspects of asbestos handling, including personal protective equipment. These, procedures must be reviewed by Contractor prior to commencement of asbestos related activities.**



**H. ATTACHMENTS**

1. Comparison of Asbestos Control Alternatives
2. Asbestos Work Permit



COMPARISON OF ASBESTOS CONTROL ALTERNATIVES			Page 1 of 2		
METHOD	ADVANTAGES	DISADVANTAGES	APPROPRIATE APPLICATIONS	INAPPROPRIATE APPLICATIONS	GENERAL COMMENTS
Removal	Eliminate asbestos source Eliminate need for special operations and maintenance program	Replacement with substitute material. Porous surfaces also may require encapsulation Improper removal may raise fiber levels	Always	Never	Containment barriers needed Worker protection require for all types of asbestos (amosite will not absorb water or water with traditional wetting agents) Disposal may be a problem in some areas. Unusual circumstances complex surfaces, and the presence of utilities requires special removal techniques.
Enclose	Reduces exposure in the area outside the enclosure. Initial costs may be lower than removal unless utilities need relocating or a major change. Usually does not require replacement of material.	Asbestos source remains and must be removed eventually. Fiber release continues behind enclosure. Special operations program required to control access to enclosure for maintenance and renovation. Periodic re-inspection required to check for damage. Repair of damaged enclosure necessary during construction of enclosure. Long term costs could be higher than removal.	When materials need be isolated from building occupants (e.g. exposed pipe) Disturbances or entry into enclosed area unlikely.	Damages or deteriorating materials causing rapid fiber release. Water damage evident Damage or entry into enclosure likely. Ceiling to be enclosed is low	Containment barriers needed Use of tools with HEPA filtered vacuum attachments advisable worker protection needed.
Special operations and maintenance program plus periodic inspection	Lowest initial cost of any alternative	Asbestos source remains. Special operations program required to prevent damage of material during maintenance or renovation Periodic re-inspection required	As a temporary measure until another alternatives selected Materials in good condition and has low potential for corrosion or disturbance. Materials are non friable.	Material not in good condition or has high potential for corrosion or disturbances.	Special building cleaning practice is essential.



COMPARISON OF ASBESTOS CONTROL ALTERNATIVES

METHOD	ADVANTAGES	DISADVANTAGES	APPROPRIATE APPLICATIONS	INAPPROPRIATE APPLICATIONS	GENERAL COMMENTS
Encapsulation	Reduces asbestos fiber release from material. Initial costs may be lower than removal. Does not require replacement of material.	Asbestos source remains must be removed later. If materials not in good condition, scalant may cause material to delaminate. Periodic re-inspection required to check for damage or deterioration. Repair of damaged or deteriorating encapsulated face required. Encapsulated surface is difficult to remove and may require dry techniques for eventual removal. Long term costs may be higher than removal.	Material still retains bonding integrity. Damage to material not likely. Material not highly accessible. Material still retains	Material does not adhere well to substrate. Mat'l is deteriorating or damaged, is likely. Water is fibrous/fluffy.	Containment barriers needed. Worker protection needed. Airless sprayer should be used. Damaged pipe insulation may be taped but not sprayed. Previously encapsulated materials may have to be reencapsulated.



# ASBESTOS HANDLING AND ABATEMENT

## ASBESTOS WORK PERMIT

**Date of Work:** \_\_\_\_\_

**Location:** \_\_\_\_\_

**Actual Work to be Performed:**

**Special Precautions:** \_\_\_\_\_


This operation has been reviewed, the requirements of the Company "Asbestos Handling and Abatement Procedures" have been addressed as minimum requirement, a permission is granted for this work to proceed in accordance with 29 CFR 1926.1101.

**Supervisor/Subcontractor Signature:** \_\_\_\_\_

**Company Project Manager:** \_\_\_\_\_

**Permit Expires:** \_\_\_\_\_

**Work Started (Time):** \_\_\_\_\_

**Work Completed (Time):** \_\_\_\_\_

**Names of personnel working under this permit:**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**(Permit must be returned to Project Management upon expiration)**



## CONFINED SPACE ENTRY/WORK

### A. PURPOSE

To establish a procedure which provides safeguards from dangerous air contamination and/or oxygen deficiency when entering and working in any confined space including tanks, vessels, cellars, pits, trenches, and other partially enclosed spaces which are subject to dangerous air contamination/oxygen deficiency and lack ready access/egress.

### B. APPLICABILITY

This procedure applies to all personnel, including associated supervisors/managers who may enter or work in confined spaces and similar work environments on projects. Subcontractor work shall be performed in accordance with this procedure as a minimum.

### C. POLICY

All applicable regulations pertaining to confined space entry and work will be adhered to this projects and employees will be safeguard to the highest degree feasible.

### D. REFERENCES

1. 29 CFR 1910.146(a)
2. 29 CFR 1926.20(b)(1)
3. 29 CFR 1926.21(b)(6)
4. The Lockout / Tagout Procedure
5. The Respiratory Protection Procedure
6. The Job Hazard Analysis Procedure
7. The Fall Prevention and Protection Procedure

### E. RESPONSIBILITY/DUTIES

1. It is the responsibility of the Contractor Project Manager in conjunction with the project superintendent to ensure compliance with the procedure by all project personnel.
2. Duties of authorized entrants. The Contractor shall ensure that all authorized entrants.



## CONFINED SPACE ENTRY/WORK

- a. Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;
  - b. Properly use equipment as required by this procedure.
  - c. Communicate with the attendant as necessary to enable the attendant to monitor entrant status and to enable the attendant to alert entrants of the need to evacuate the space as required.
  - d. Alert the attendant whenever:
    - (1) The entrant recognizes any warning sign or symptom of exposure to a dangerous situation, or
    - (ii) The entrant detects a prohibited condition; and
  - e. Exit from the permit space as quickly as possible whenever:
    - (1) An order to evacuate is given by the attendant or the entry supervisor,
    - (ii) The entrant recognizes any warning sign or symptom of exposure to a dangerous situation,
    - (iii) The entrant detects a prohibited condition, or
    - (iv) An evacuation alarm is activated.
3. Duties of attendants. The Contractor shall ensure that each attendant:
- a. Knows the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;
  - b. Is aware of possible behavioral effects of hazard exposure in authorized entrants;
  - c. Continuously maintains an accurate count of authorized entrants in the permit space and ensure that the means used to identify authorized entrants accurately identifies who is in the permit space;
  - d. Remains outside the permit space during entry operations until relieved by another attendant;
  - e. Communicates with authorized entrants as necessary to monitor entrant status and to alert entrants of the need to evacuate the space as required.



## CONFINED SPACE ENTRY/WORK

- f. Communicates with authorized entrants as necessary to monitor entrant status and to alert entrants of the need to evacuate the space as required.
  - g. Monitors activities inside and outside the space to determine if it is safe for entrants to remain in the space and orders the authorized entrants to evacuate the permit space immediately under any of the following conditions;
    - (i) If the attendant detects a prohibited condition;
    - (ii) If the attendant detects the behavioral effects of hazard exposure in an authorized entrant; or
    - (iii) If the attendant detects a situation outside the space that could endanger the authorized entrants; or
    - (iv) If the attendant cannot effectively and safely perform all the duties required of him;
  - h. Summon rescue and other emergency services as soon as the attendant determines that authorized entrants may need assistance to escape from permit space hazards;
  - i. Takes the following actions when unauthorized persons approach or enter a permit space while entry is underway.
    - (i) Warn the unauthorized persons that they must stay away from the permit space:
    - (ii) Advise the unauthorized persons that they must exit immediately if they have entered the permit space; and
    - (iii) Inform the authorized entrants and the entry supervisor if unauthorized persons have entered the permit space:
  - i. Performs non-entry rescues as specified by the Contractor rescue procedure: and
  - j. Persons no duties that might interfere with the attendant's primary duty to monitor and protect the authorized entrants.
4. Duties of entry supervisors. The Contractor shall ensure that each entry supervisor:
5. a. Knows the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;





- b. Verifies, by checking that the appropriate entries have been made on the permit, that all tests specified by the permit have been conducted and that all procedures and equipment specified by the permit are in place before endorsing the permit and allowing entry to begin;
  - c. Terminates the entry and cancels the permit as required;
  - d. Verifies that rescue services are available and that the means for summoning them are operable;
  - e. Removes unauthorized individuals who enter or who attempt to enter the permit space during entry operations; and
  - f. Determines, whenever responsibility for a permit space entry operation is transferred and at intervals dictated by the hazards and operations performed within the space, that entry operations remain consistent with terms of the entry permit and that acceptable entry conditions are maintained.
6. The CCSM shall be responsible for:
- a. Conducting a hazard assessment (JHA), including atmospheric monitoring, of the area prior to entry; and
  - b. Issuing the confined space entry and work permit.

## **F. DEFINITIONS**

1. **Confined Space:** A confined space means a space that:
  - a. Is large enough and so configured that an employee can bodily enter and perform assigned work; and
  - b. Has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry); and
  - c. Is not designed for continuous employee occupancy.
2. **"Permit-Required" Confined Space** – means a confined space that has one or more of the following characteristics:
  - a. Contains or has a potential to contain a hazardous atmosphere;
  - b. Contains a material that has the potential for engulfing an entrant;



- c. Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or
  - d. Contains any other recognized serious safety or health hazard.
3. Certified Confined Space Monitor (CCSM). An individual designated by a project manager and who has been trained, then certified by Executive Management or his designee to conduct confined space hazard assessments and issue entry permits.
4. Hazardous Atmosphere: An atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (that is escape unaided from a permit space), injury, or acute illness from one or more of the following causes:
- a. Flammable gas, vapor or mist in excess of ten percent (10%) of its lower flammable limit (LFL);
  - b. Airborne combustible dust at a concentration that meets or exceeds it LFL;
- NOTE:** This concentration maybe approximated as a condition in which the dust obscures vision at a distance of 1.52 meters or less.
- c. Atmospheric oxygen concentration below 19.5% or above 23.5%;
  - d. Atmospheric concentration of any substance for which a dose or a permissible exposure limit is published in Subpart G, Occupational Health and Environmental Control, or in Subpart Z, Toxic and Hazardous Substances, which could result in employee exposure in excess of its dose or permissible exposure limit; or
- NOTE:** An atmospheric concentration of any substance that is not capable of causing death, incapacitation, impairment of ability to self-rescue, injury or acute illness due to its health effects is not covered by this provision.
- e. Any other atmospheric condition that is immediately dangerous to life or health.

**NOTE:** For air contaminants for which OSHA has not determined a dose or permissible exposure limit, other sources of information, such as MSDS that comply with the hazard communication standard, CFR 1910.1200, published information, and internal



documents can provide guidance in establishing acceptable atmospheric conditions.

5. Oxygen Deficiency An atmosphere containing oxygen at a concentration of less than 19.5% by volume.
6. Permissible Exposure Level The maximum permitted 8-hour time weighted average concentration of an airborne contaminant to which an employee may be exposed (in accordance with applicable governmental regulations).

## G. PROCEDURE

1. Designation of Certified Confined Space Monitors (CCSM)

As necessary, each project manager shall appoint appropriate personnel, preferably supervisors, as certified confined space monitors (CCSM's).

2. A survey shall be performed to a certain the extent and nature of permit and non-permit required confined spaces on each project. Confined spaces shall be logged and posted to restrict access.

The posting shall state for permit required confined spaces:

**DANGER – KEEP OUT  
CONFINED SPACE  
ENTRY BY PERMIT ONLY**

Posting shall indicate the following for non-permit required spaces:

**RESTRICTED AREA  
AUTHORIZED ENTRY ONLY  
CONTACT FIELD (1) PROJECT MANAGEMENT FOR ENTRY**

3. Training of Employees for Confined Space Work
  - a. Each employee at time of hire shall be briefed at the safety orientation on the existence and importance of special procedures associate with confined spaces entry/work.
  - b. Prior to entry into a confined space, the direct supervisor of the operation shall ensure that employees understand:
    1. The general confined space entry requirements.

**CONFINED SPACE ENTRY/WORK**



2. The specifications on entry permits.
  3. Potential hazards specific to the individual confined space
  4. Operation of air sampling equipment
  5. Ventilating equipment operation
  6. Personal protective equipment (PPE)
  7. Communications equipment
  8. Lighting equipment
  9. Barriers a shield
  10. Ingress/egress equipment
  11. Rescue and emergency equipment
  12. Appropriate emergency rescue procedures
- c. All training activities must be documented an on file with the project safety records. (See Confined Space Training for “entrants” Attachment 2)
4. Area Preparation Prior to Confined Space Entry.
- a. All possible engineering and administrative controls, which would either eliminate or minimize the hazards encountered in confined spaces or similar work areas shall be implemented. Personal protective devices shall be utilized as necessary in addition to, not in lieu of, sound engineering and administrative practices. A JHA shall be performed prior to the issuance of a confined space entry permit and shall accompany the permit.
  - b. Pipelines which may provide the means for the entry of flammable, injurious or incapacitating substances into the confined space shall be isolated, blinded or blocked off such that development of dangerous air contamination or oxygen deficiency is prevented. When equivalent to the effectiveness of blinding, pipelines may be disconnected and misaligned, or double blocked (closed position with a bled off between block valves). The blind, disconnection, or shutoff shall be so located that inadvertent completed reopening/reconnection of the pipelines are physically prevented. The Contractor lockout and tagging procedure must also be followed at all times.
    1. Blinds and associate accessories such as gaskets shall be of sufficient strength for the particular conditions of pressure, temperature and operation.



2. A group of interconnected stationary tanks or vessels having no closed valves between them may be blinded as a unit provided that protection equivalent to blinding each separately is obtained. Further, each tank or vessel shall be open to the atmosphere through at least one manhole. In such cases, each space shall be tested separately, the results recorded, and the most hazardous condition found shall govern the procedures followed.
  - c. Machinery and other equipment/systems which could injure employees shall also be isolated, disconnected, or rendered inoperable. They must also be physically secured by chains, locks, etc to prevent unintentional operation. The Contractor lockout and tagging procedure must also be followed at all times.
  - d. The space shall be emptied, flushed, or otherwise purged of flammable, injurious or incapacitating substances to the extent feasible. Ventilation/exhaust must be maintained whenever a hazardous gas/dust may otherwise accumulate in excess of allowable limits.
  - e. Side openings on tanks, vessels, or similar confined spaces shall be opened to allow rapid entry and exit as well as natural ventilation whenever possible.
  - f. Personnel shall be protected from all exposures during all confined space entry operations. Fall protection shall meet the requirements of the company Fall Prevention and protection Procedure which is written in accordance with Subpart M CFR 1926 (as amended).
5. Issuance of a Confined Space Entry Permit
- a. (Attachment 1) A confined space entry permit specific to the location, time and type of operation must be issued, then posted at the location by a CCSM before entry is allowed. The copy labeled Human Resources shall be mailed or delivered to the appropriate Division Manager. Prior to permit issuance, the CCSM shall conduct a comprehensive onsite hazard assessment (JHA) of the confined space and the intended work operation with the associated direct supervisor.

Specifically:

1. Immediately prior to permit issuance and entry, the air shall be tested with an appropriate device by a CCSM to determine whether a dangerous air contamination and/or oxygen deficiency exists. The testing shall be done before an "entrant" enters a confined space, with a



direct-reading instrument, for the following conditions in the order given: (1) Oxygen content, (2) Flammable gases and vapor; and (3) Potential toxic air contaminants. Results shall be noted on the entry permit. Additionally, the work area and intended work operation must be assessed to determine whether the quality of the atmosphere may be significantly altered; i.e. fumes from welding, vapors from painting or off wall/floor deposits, dust from sandblasting, drifting vapors from adjacent areas, use of oxygen consuming equipment, etc. The extent to which dangerous air contamination/oxygen deficiency can be removed prior to entry and prevented during occupancy shall largely determine the applicability of special procedures and precautions.

2. The area shall be inspected to identify and ensure correction of any hazard associated with lighting, tripping, falling access/egress, etc. When natural lighting is inadequate, emergency/temporary lighting must be provided. Only explosion proof flashlights can be utilized for brief inspections and operations.
3. The area shall be assessed for fire hazard/risk. Only approved lighting and electrical equipment that are intrinsically safe shall be used in confined spaces which are subject to dangerous air contamination by flammable/explosive substances. These requirements also apply to all confined spaces which have or are designed to contain flammable/explosive material.

**NOTE:** If dangerous air contamination/oxygen deficiency is indicated or any other imminent danger exists, the CMS shall prominently write “Keep Out” on the permit and immediately implement measures, such as posting “Keep Out” signs and notifying the direct supervisor to prevent accidental entry by personnel. The hazard(s) must be properly addressed before the CMS can continue entry permit completion (refer to the next section and c).

- b. The confined space entry permit will be valid only after all previous requirements are followed and:
  1. Airborne contaminant levels are within permissible employee exposure limits and an unfavorable air quality change in the confined space is not foreseeable in any manner.



2. An air-testing device is opening continuously while employees are inside the confined space, unless noted otherwise by the CMS.
  3. A minimum of two persons are involved in the operation (one for outside standby purposes unless noted otherwise on the permit by CMS).
  4. All special precautions specified on the permit by the CMS direct supervisor for unusual conditions are followed.
  5. The fully completed entry permit specific to the appropriate time periods is posted on location after being signed by both the certified confined space monitor and direct supervisor.
- c. If the meter alarms in the confined space at any time, all persons shall exit the space immediately and entrances must be prominently posted “DANGER KEEP OUT.” Re-entry will not be allowed until:
1. A supervisor with an additional meter verifies that the atmosphere and conditions are acceptable and haven't change since permit issuance.
  2. A new confined space entry permit is issued by a CCSM.
- d. If an atmosphere free of dangerous air contamination and/or oxygen deficiency cannot be ensured, or if respirator usage (excluding dust masks) is necessary in a confined space because permissible exposure levels are/may be exceeded, the following additional requirements shall apply to entry and work operations.
1. At least one standby person trained and certified in first aid a cardiopulmonary resuscitation (CPR) shall be immediately available and in contact with employees wearing required respirators (except dust masks) in the confined space (attendant). The stand by person shall have appropriate, approved respiratory protective equipment, including an independent source of breathing air available for immediate use. At least one additional employee who may have other duties shall be within sight or call of the standby employee. The attendant will remain outside the space until relieved by another qualified attendant.



2. An effective means of communication between employees inside a confined space and a stand by employee shall be provided and used whenever respirators are necessary or whenever employees inside a confined space are out of sight standby employee(s).
  3. When employee entry into a confined space with a known dangerous atmosphere is necessary, Project Management shall first verify the need for such an activity, then either approve or is approve the operation and associated procedures.
  4. A standby employee, protected with an independent air supply type respirator, may enter the confined space, but only in case of emergency, and only after alerting one additional employee outside of the confined space. Of the existence of an emergency and of the standby employee's intent to enter the confined space. (Any person utilizing respirators must be fully trained and qualified.)
  5. Contractor Project Management and the CCSM shall ensure that outside rescue services (if this source is to be use) are familiar with project logistic, communications and that nature of potential hazards to be encountered. An onsite orientation shall be completed semi-annually or as determined by the CCSM and Project Management.
- e. Emergency Procedures
1. Each member of the rescue team shall be provided with, and trained in the proper use of applicable personal protective equipment and rescue equipment necessary for making rescues in the specific confined space.
  2. Each member of the rescue team shall be trained to perform the assigned rescue duties and, in those duties, assigned the entrants.
  3. Each rescue team member shall be trained in CPR/First Aid and SCBA usage. A certificate of current CPR/First Aid training shall be available at the project location.
  4. To facilitate non-entry rescue, retrieval systems or methods shall be used whenever an authorized entrant enters a permit space. This shall be done unless the retrievl equipment would increase the overall risk of entry or would not contribute to the rescue of the





entrant. Retrieval systems shall meet the requirements of applicable Federal or State codes.

**H. ATTACHMENT**

1. Confined Space or Enclosed Special Work Authorization (Sample)
2. Employee Training for Confined Space Entry.



**CONFINED SPACE ENTRY PERMIT**

**No.:**

GENERAL INFORMATION

DESCRIPTION OF THE CONFINED SPACE

DATE OF ISSUED      TIME ISSUED      DATE EXPIRES      TIME EXPIRES

ENTRY SUPERVISOR

ATTENDANTS(S)

COMMUNICATION BETWEEN ATTENDANTS(S)

VOICE     SIGH                       RAD                       OTH

DESCRIPTION OF WORK

CHECKLIST FOR ISOLATION AND UNAUTHORIZED ACCESS PREVENTION

	YES	NO	N/A	INITIAL
External Barrier(s) in Place	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Mechanical Lockout / Tagout	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Electrical Lockout / Tagout	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Lines/Pipes Disconnected	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Lines/Pipes Blocked	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Lines/Pipes Capped	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Lines/Pipes Blinded	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Hot Work Permit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Warning Signs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Other: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

REPORT ANY UNAUTHORIZED ENTRY TO:  Project Manager      PHONE NO:       RADIO NO:       PAGER NO:

PRE-ENTRY CHECKLIST

PURGING, INSERTING, OR FLUSHING				MECHANICAL VENTILATION			
Performed	Yes	No	N/A	Initial	Continuous	Partial	Description
Method use	<input type="checkbox"/> Nitrogen	<input type="checkbox"/> Steam	<input type="checkbox"/> Fresh air Injection	<input type="checkbox"/> hrs	<input type="checkbox"/>		_____
	<input type="checkbox"/> Water	<input type="checkbox"/> Other (specify) _____	General (e.g. fans)	<input type="checkbox"/> hrs			_____
			Local Exhaust	<input type="checkbox"/> hrs			_____

SPECIFIC HAZARDOUS TASKS

Certain Tasks performed in confined spaces greatly increases the risk to entrances check all tasks to be performed.

<input type="checkbox"/>	WELDING/GRINDING	<input type="checkbox"/>	PAINTING OR CLEANING WITH SOLVENTS
<input type="checkbox"/>	THERMAL CUTTING	<input type="checkbox"/>	CLEANING/SWEEPING/VACUUMING
<input type="checkbox"/>	SOLDERING/BRAZING	<input type="checkbox"/>	SCRAPING/REMOVING RESIDUE
<input type="checkbox"/>	ELECTRICAL	<input type="checkbox"/>	CHEMICAL USE
<input type="checkbox"/>	OTHER EXPLAIN _____		



CONFINED SPACE ENTRY PERMIT

No.:

INITIAL ATMOSPHERIC TEST PERFORMED

CAUTION: Toxic of flammable gases or vapors may stratify in the confined space. Be sure to test at various levels and locations within the Confined space. Always check the oxygen content first.

INITIAL TESTING							
HAZARD TESTED	ACCEPTABLE RANGE	READING	READING	DATE AND TIME	ACCEPTABLE		
					YES	NO	
% Oxygen	19.5 – 23%						
% L.E. L	10% or Less						
	PEL =						
	PEL =						
	PEL =						

RESCUE PROCEDURE

PLAN DESCRIPTION

ON-SITE RESCUE CONTACTS

PHONE NUMBER	RADIO NUMBER	PAGER NUMBER	OUTSIDE SOURCES PHONE
			FIRE DEPARTMENT
			AMBULANCE
			HOSPITAL
			OTHERS

SPECIAL EQUIPMENT NEEDED

<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>

- RESPIRATORS (Type)
- SAFETY HARNESSSES/WRISTLETS
- LIFELINES
- HOISTING APPARATUS
- VENTILATION EQUIPMENT
- TEMPORARY LIGHTING (Type)
- NON-SPARKING TOOLS
- PROTECTIVE CLOTHING
- OTHERS

\_\_\_\_\_

\_\_\_\_\_

ENTRY SUPERVISOR'S SIGNATURE	DATE	PERMIT ISSUER SIGNATURE	DATE
------------------------------	------	-------------------------	------



CONFINED SPACE ENTRY PERMIT

No.:

PERIODIC ATMOSPHERIC TEST RESULTS

DESCRIPTION CONFINED SPACE

TESTER INFORMER	ATMOSPHERE HAZARD TESTED	ACCEPTABLE RANGE OF HAZARD	TEST RESULTS	ACCEPTABLE		
				YES	NO	COMMENTS
Date:	Oxygen Content	19.5% - 23%	%			
Time:	(% O <sup>2</sup> )					
Initials:	(%LEL)	0%-10%	%			
	Other (Specify)	PEL= ppm	ppm			
Date:	Oxygen Content	19.5% - 23%	%			
Time:	(% O <sup>2</sup> )					
Initials:	Combustible Gas	0%-10%	%			
	(%LEL)					
	Other (Specify)	PEL= ppm	ppm			
Date:	Oxygen Content	19.5% - 23%	%			
Time:	(% O <sup>2</sup> )					
Initial:	Combustible Gas	0%-10%	%			
	(%LEL)					
	Other (Specify)	PEL= ppm	ppm			
Date:	Oxygen Content	19.5% - 23%	%			
Time:	(% O <sup>2</sup> )					
Initials:	Combustible Gas	0%-10%	%			
	(%LEL)					
	Other (Specify)	PEL= ppm	ppm			
Date:	Oxygen Content	19.5% - 23%	%			
Time:	(% O <sup>2</sup> )					
Initials:	Combustible Gas	0%-10%	%			
	(%LEL)					
	Other (Specify)	PEL= ppm	ppm			
Date:	Oxygen Content	19.5% - 23%	%			
Time:	(% O <sup>2</sup> )					
Initial:	Combustible Gas	19.5% - 23%	%			
	(%LEL)					
	Other (Specify)	PEL= ppm	ppm			
Date:	Oxygen Content	19.5% - 23%	%			
Time:	(% O <sup>2</sup> )					
Initial:	Combustible Gas	19.5% - 23%	%			
	(%LEL)					
	Other (Specify)	PEL= ppm	ppm			



## **CONFINED SPACE ENTRY/WORK**

### **REQUIRED CONTRACTOR TRAINING FOR CONFINED SPACE ENTRY**

- 1) INTRODUCTION
- 2) PURPOSE
- 3) DEFINITIONS
- 4) RESPONSIBILITIES
- 5) PROCEDURES
- 6) QUESTION AND ANSWER
- 7) EXAMINATION
- 8) EXHIBITS



## **1.0 INTRODUCTION**

Vessel entry or entry into a confined space is a potentially hazardous act and must receive careful and thoughtful consideration. To assure that this consideration is given to each entry, a vessel entry permit may be required from both the client and the Safety Department. The hazards from which employees must be protected and the required clothing or equipment for this protection will depend upon the condition of the vessel or confined space.

## **2.0 PURPOSE**

To ensure the safety and health of personnel and protection of equipment when entrance into confined spaces is required through the proper preparation of equipment, establishment of necessary precautions prior to entry, and the monitoring of conditions throughout the job sequence.

## **3.0 DEFINITIONS**

1. Confined Spaces – Enclosures having limited means of egress as, but not limited to, storage tanks, tank cars, process vessels, bins, boilers, column skirts, and other tank-like compartments; open-topped spaces more than 1.22 meters in depth, such as pits or floating roof tanks; ventilation or exhaust ducts, sewers, underground utility tunnels, and similar structures.
2. Entry - Physical entry is defined as the insertion of the head or any part of the body into a confined space.
3. Maintenance - The group responsible for performing the work. (Note: This includes utility mechanics and construction personnel.)
4. Operating – As used herein, the word “operating” refers to the group responsible for the equipment or area where the confined space entry is to be performed.

## **4.0. RESPONSIBILITIES**

1. Accountability for the execution of this procedure rests with the superintendent who has the responsibility for the equipment being work on.



2. Operating First Line Supervisors (CCSMs) are responsible to assure that preparations are complete and that the precautions are in place prior to a confined space entry.
3. Preparing and approving a vessel entry permit: Construction personnel will sign off on an approve vessel confine space entry permit (which has been complete by a CCSM
4. Preparing and approving a vessel entry permit: Construction personnel will sign off on an approve vessel confine space entry permit (which has been completed by a CCSM) prior to employees working in the vessel.

## 5.0. PROCEDURES

1. VESSEL ENTRY – Vessels are to be emptied, cleaned, purge, and ventilated. There is no single practice that can assure a safe atmosphere in a vessel the construction superintendent is responsible for specifying the purging, cleaning, and ventilating method to be use, but the following is considered a general recommendation:

Step 1 Discharge liquids or solids from the equipment. Pump/rain out as much sludge, sediment, residue, solid, and/liquid as possible.

Step 2 If the material last store in the vessel will not react with water, flush with water an if necessary, fill with water and boil. Be sure of adequate venting capacity.

Step 3. Purge with inert gas if the equipment has contained flammable material. When purging with an inert gas, introduce the gas at the top and remove from the bottom of equipment that contained gas heavier than the purging gas. Reverse the process when the equipment-contained gas is lighter than the purging gas.

Step 4. Provide air ventilation with grounded approved air moving equipment. Air moving equipment should exhaust and not feed to the vessel. Air should be admitted into the vessel near the bottom and removed at the top. Care is to be taken that the intake air is free of vapor. Even though many vapors are heavier than air, it is essential to remove them at



a point where there will be a maximum diffusion and the least change of flammable gases pocketing where there may be a source of ignition. Blower motors must be explosion proof of when used in hazardous areas.

2. All power and energy sources shall be physically disconnected at the immediate site of the entry if they present a life-threatening risk. This includes lifting power wiring leads (not just removing fuses or closing a breaker) and disconnecting piping on pneumatically driven equipment. Physical immobilization shall be performed when necessary to prevent movement. This may involve chaining, blocking, pinning, or physically disconnecting to prevent movement.
3. Connections to vessels are to be isolated at their nearest points to the vessel by blanking, blind flanging, disconnecting, or capping and must be able to withstand upstream pressures and to keep out foreign materials. Instrument leads and pressure regulating stations are not to be overlooked.
4. Any radiation sources are to be placed in their safe/off positions. The Radiation Protection Officer must be called to conduct a measurement of stray radiation (if applicable).
5. No person will ever enter a vessel, regardless of equipment used, that contains a combustible/explosive atmosphere (when the test for combustibles exceeds 10% LEL).
6. All initial testing specified on the permit must be completed, initial safe test result logged, and meet minimum requirements prior to entry. Re-testing indicated on the permit must be performed as specified and after breaks or shift changes.
7. Supplied-air hose line respirators or self-contained breathing apparatus will be provided nearby even though the atmosphere in the confined space is safe and free and toxic material. If supplied-air breathing cylinders are used, each cylinder will be checked to ensure that 19.5 to 23.6% oxygen is contained in the cylinder and the results are recorded on a tag to be attached to the cylinder. (The cylinder may be certified as class D breathing air in lieu of this requirement.)

If the confined space atmosphere changes while work is being performed to an oxygen content below 19.5%, greater than 23%, or the combustibles exceed 10% LEL, the work is to be stopped and all persons inside the vessels are to exit until a safe condition can be restored. There shall be no re-entry into an atmosphere in which combustibles exceed 10% LEL





8. Only grounded 12-volt (max.) lighting sources are to be used in vessels with the transformer kept outside the vessel. Flashlights, mine safety lights, etc. of less than 12 volts are approved for use if the area is acceptable.
9. Harnesses are to be used on persons entering the confined space. Lifelines will normally be attached. Only in that case where it is agreed by those persons authorizing the permit that greater safety for the individual is served by leaving the life line unattached, but nearby, will lifelines be allowed to remain unattached.
10. A Qualified Attendant must be at the opening with a pre-arranged means or procedure to communicate with persons in the vessel.
11. A proven tested means shall be provided to remove employees from fixed vessels with top entry and other entries where personnel removal is significantly hindered. A “Manhole Safety Davit” is recommended, but any mechanical hoisting mechanism is acceptable.
12. Warning signs will be placed in the area of confined space to indicate an entry is in progress.
13. All compressed gas/oxygen cylinders except breathing containers, are to be located outside the confined space. All hoses from compressed gas cylinders that will extend into the confined space should be inspected prior to use for signs of fraying or other damage that could result in leakage of compressed gas or oxygen into confined space during such use.
14. A Confined Space Permit is to be completed for each vessel will be entered. Supervisors of the employees entering a confined space shall review the preparations and precautions with them prior to their initial entry. A copy of the vessel isolation sketch or list shall be attached to the Permit.

## 2. CONFINED SPACE ENTRY OTHER THAN VESSELS

1. Supervisors of the employees entering a confined space shall review the preparations, precautions, and any other pertinent information in the permit with the entrants prior to their initial entry.
2. All power and energy sources shall be physically disconnected at the immediate site of the entry if they present a life-threatening risk. This includes lifting power wiring leads (not just removing fuses or closing a breaker) and, disconnecting piping on pneumatically driven equipment. Physical immobilization shall be performed when necessary to prevent movement. This may involve chaining, blocking, pinning, or physically disconnecting to prevent movement.



3. All testing is completed and meets minimum standards for combustibles, oxygen, toxic materials, maximum ambient temperature of 95 °F unless methods are taken to reduced heat stress, i.e. work-rest regimentation, cooling vest, etc., an/or other tests specified on the Confined Space Permit. Initial safe test result is logged on the permit prior to entry.
4. Harnesses are to be on persons entering the confined space. Lifelines will normally be attached. Only in those cases where it is agreed by those persons authorizing the permit that greater safety for the individual is served by leaving the lifeline unattached, but nearby, will lifelines be allowed to remain unattached.
5. A Qualified Attendant will be at the opening with a pre-arranged means or procedure to communicate with persons in the confined space.
6. Warning signs will be placed at the entry site.
7. All compressed gas/oxygen cylinders except breathing containers, are to be located outside the confined space. All hoses from compressed gas cylinders that will extend into the confined space should be inspected prior to use for signs of fraying or other damage that could result in leakage of compressed gas or oxygen into the confined space during such use.
8. No person will enter a confined space, regardless of equipment used, that contains a combustible/explosive atmosphere (when the test for combustible exceeds 10% LEL).
9. When trenches or openings are created while preparing for or performing work on the job, the area around them will be barricaded. The circumstances must be considered when deciding what type of barricade is sufficient.
10. Other applicable Department/Client Rules and Procedures shall be followed.
11. Refer to the attached generic vessel/confined space entry permit for other precautions and preparations.



## CONFIND SPACE ENTY/WORK

### CONFINED SPACE ENTRY EXAMINATION

- 1) Name 4 examples of confined space.  

A)	_____
B)	_____
C)	_____
D)	_____
- 2) All confined spaces require a written permit.  

TRUE          FALSE
- 3) It is permissible for hydraulic energy sources not to be locked out for a confined space entry.  

TRUE          FALSE
- 4) All radiation switches must be placed in the "OFF" position or blocked.  

TRUE          FALSE
- 5) If the Lower Explosive Limit exceeds \_\_\_\_\_% no person may enter a confined space.
- 6) The oxygen content inside a vessel must be at least \_\_\_\_\_% and no greater than \_\_\_\_\_%.
- 7) When using GFC's it is permissible to locate them inside a confine space.
- 8) Barricades must be in place during an entry, but it's up to the supervisor whether or not to install Warning Signs.  

TRUE          FALSE
- 9) A qualified attendant must be at the opening with a pre-arranged means or procedure to communicate and summon rescue personnel.  

TRUE          FALSE
- 10) The front-line supervisor (CCSM) is responsible for the continued space safety precautions while his crew is performing the work.



## **CONFINED SPACE ENTRY/WORK**

### **CONFINED SPACE ENTRY**

#### **ANSWER KEY**

- 1) Storage tanks, tank cars, vessels, bins, boilers, excavation, etc.
- 2) F
- 3) F
- 4) T
- 5) 10
- 6) 19.5, 23
- 7) F
- 8) F
- 9) T
- 10) T



<p><b>Zero Your Instrument in Known Fresh Air Prior to Sampling for Suspect Gases or Vapors.</b></p>		<p><b>Sample Through a Pick-Hole, or Open the Cover Slightly on the Down-Wind Side, Before Opening the Cover Completely.</b></p>
<p>All instruments should first be checked for a proper zero indication for combustible and toxic gases a for 20.9% oxygen indication in fresh air</p>		<p>There is the potential for high concentrations of hazardous gases to be present in some confined spaces. Identifying this situation before opening the cover completely can mean the difference between life and death.</p>
<p><b>Sample at all Levels.</b></p>		<p><b>Once Work Begins, Sample Frequently or Continuously Conditions Can Change</b></p>
<p>. Some gases are lighter than air and some are heavier. The lack of normal ventilation in a confine space allows gases to collect at one level depending on their vapor density (weight compared to air). Do not sample at one level only. Take several samples at varying levels. Take no chances.</p>		<p>As work progresses, a once-safe atmosphere can become hazardous due to leaks, combustion, cleaning processes or other influencing factors</p>



<p style="text-align: center;"><b>Combustion or Oxidation Can Create a Hazardous Atmosphere in a Confined Space.</b></p>		<p style="text-align: center;"><b>Cleaning Processes Can Create a Hazardous an Atmosphere in a Confined Space</b></p>
<p>Combustion (welding, heating, gasoline or diesel engines, cutting and brazing), and oxidation (rusting) can create hazards.</p> <p><b>Oxygen Deficiency</b> – Oxygen is consumed by the combustion or oxidation process, or displaced by the combustion products.</p> <p><b>Toxic Gases</b> -Carbon Monoxide is produced by incomplete combustion. Other gases can be produced by the material heated; i.e., cutting cadmium plate bolts with a torch release a toxic vapor.</p>		<p>Even after an empty tank has been purged, gases can desorb from porous walls be liberated from sludge during cleaning.</p> <p><b>Oxygen Deficiency</b> – Oxygen can be displaced by other gases.</p> <p><b>Combustible Gases</b> – Liberated gases can produce a combustible concentration.</p> <p><b>Toxic Gases</b> – Toxic gases can be liberating from sludge or from cleaning solvents, or produced by chemical reactions with cleaning solvents and other materials.</p>



<p>Oxygen Enrichment Can Create a Hazardous Atmosphere in a Confined Space.</p>		<p>Absorption of Oxygen Can Create a Hazardous Atmosphere in a Confined Space.</p>
<p>Oxygen above the normal level of 21% increases the flammability range of combustible gases or material and causes them to burn violently. Do not purge confined spaces with oxygen in place of air. Improper blanking off of oxygen lines can produce oxygen enrichment.</p>		<p>Oxygen can be absorbed by the vessel or the product stored, causing an oxygen deficient atmosphere.</p>



<b>All Combustible Gases and Vapors Have a Different Explosive Range.</b>		<b>Instruments Usually Monitor for Combustible Gases Below the Lower Explosive Limit</b>
<p>The lowest concentration (air-fuel mixture) at which a gas can ignite is called its Lower Explosive Limit (LEL). Concentrations below this limit are too lean to burn.</p> <p>The highest concentration that can be ignited is its Upper Explosive Limit (UEL). Above that concentration, the mixture is too rich to burn.</p> <p>A gas is only combustible between its LEL and UEL, but any concentration of combustible gas should be a concern. Lean mixtures can be dilute with air to become combustible.</p>		<p>A gas-air mixture becomes explosive at the lower explosive limit (LEL), but the monitoring range of most instruments (0-100% of the LEL) is below this limit to provide advanced warning. Alarm levels may be set at 10% (and 40% for a high alarm) of the LEL to forewarn workers of a potentially hazardous combustible atmosphere.</p> <p>Hazardous atmospheres in a confined space can be created by many conditions.</p>





<p style="text-align: center;"><b>Leaking Gases and Liquids Can Create a Hazardous Atmosphere in a Confined Space</b></p>		<p style="text-align: center;"><b>Decomposing Organic Matter Can Create a Hazardous Atmosphere in a Confined Space.</b></p>
<p>Leaking materials from storage tanks, natural gas lines, underground storage tanks, process flanges and valves etc. can find their way into confined spaces. A number of hazards can exist depending on the leaking gas or liquid.</p> <p><b>Oxygen Deficiency</b>- Leaking gases or vapors can displace available oxygen.</p> <p><b>Combustible Gases</b> - Leaking gases or vapors can produce explosive concentrations.</p> <p><b>Toxic Gases</b> – Leaking gases or vapors can be immediately dangerous to life or health.</p>		<p>Decomposing organic matter, such as domestic waste and plant life, can produce methane, Carbon Monoxide, Carbon Dioxide and Hydrogen Sulfide and can consume existing oxygen.</p> <p><b>Oxygen Deficiency</b> - Oxygen can be consumed by bacterial action or displaced by other gases.</p> <p><b>Combustible Gases</b> – This produced Methane, CO or H<sub>2</sub>S can reach explosive concentrations.</p> <p><b>Toxic Gases</b> – Both Hydrogen Sulfide and Carbon Monoxide are life threatening gases.</p>



<p style="text-align: center;"><b>Combustible Dust Concentration Can Create a Hazardous Atmosphere in a Confined Space</b></p>		<p style="text-align: center;"><b>Every Possible Atmospheric Hazard Which May Be Encountered in a Confined Space Cannot Be Listed.</b></p>
<p>Carbon, grain, cellulose, fibers, plastics, and finely ground combustible materials can create explosive atmospheres.</p>		<p>Your safety depends on your knowledge and application of proper work procedures prior to entering a confined space. Atmospheric testing and monitoring, as well as pre-planning of your work and rescue procedures, are all critical aspects of your job safety.</p>
<p style="text-align: center;"><b>Preplan Your Work by Using Your Company's Space Entry Permit as a Guideline</b></p>		<p style="text-align: center;"><b>Fully Understand the Operation and Calibration of Your Atmosphere Testing Instrumentation.</b></p>
<p>Item to be considered:</p> <ol style="list-style-type: none"> <li>1. Atmospheric Testing &amp; Monitoring.</li> <li>2. Procedures Initial Plan Standby Person Communications/Observation Rescue Work.</li> <li>3. Preparation Isolate/Lockout/Tag Purge and Ventilate</li> </ol>		<p>Assure that the instrument is working properly. Follow manufacturers' recommended calibration procedures and intervals. Become familiar with all aspects of operation and any limitations or cautions.</p>



<p>Cleaning Processes Requirements for Special equipment/tools Labeling &amp; Posting</p> <p>4. Safety Equipment a Clothing Head Protection Hearing Protection Hand Protection Foot Protection Body Protection Respiratory Protection Safety Belts Lifelines, Harness</p> <p>5. Rescue Equipment</p>		
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## RADIOGRAPHIC OPERATIONS

### A. PURPOSE

To ensure that radiography – related operations (including nondestructive testing) are performed in accordance with applicable regulatory requirements and to specifically prevent circumstances that could result in the exposure of personnel to excessive levels of ionizing radiation.

### B. APPLICABILITY

Personnel including subcontractors performing or coordinating radiography – related operations shall be familiar and comply with this policy and procedure.

### C. POLICY

Radiography- related operations and other operations involving the use of radioactive substances shall be performed in accordance with applicable local and international regulations.

### D. REFERENCES

1. 10 CFR 34, Radiography Licenses and Radiation Safety Requirements
2. 10 CFR20, Standards for Protection Against Radiation
3. Environmental Protection and Compliance Plan (EPCP), Section 6.4, Radiation Sources and Devices.

### E. RESPONSIBILITY

1. The Contractor shall routinely assess radiography – related operations and provide technical assistance when necessary and possible.
2. The contractor shall also ensure proper compliance. For subcontract or radiography – related operations, the contractor shall actively assess the subcontractor’s safety procedures.
3. The supervisor associated with a specific radiography operation shall verify that all basic radiation safety requirements are addressed for the particular operation.
4. Individual employees shall comply with this procedure appropriate and report any concern/incidents to their supervisor.

### F. PROCEDURES



1. The procedures and requirements as detailed in 10 CFR 34 and 10 CFR 20 shall be the minimum criteria to be followed. The referenced procedures and requirements address but are not limited to:
  - a. radioactive materials license
  - b. written operating and emergency instructions
  - c. vehicle placarding
  - d. film badges, dosimeters,
  - e. sign posting and exclusion zones
  - f. area surveillance
  - g. equipment inspections
  - h. radiation safety officer
2. Radiography operations shall be randomly assessed and the Radiography Safety/Health Checklist (see Attachment 1) completed at least quarterly by the responsible radiation safety officer. Checklists are to be retained in project files and distributed to concerned parties.
3. Any radiography incident, including “lost” radioactive sources or employee overexposure, must be reported to both Project and contractor’s management immediately.
4. Subcontractors related to the performance of radiography shall acknowledge that compliance with all applicable regulations listed in the “Reference” section is mandatory. Written operating and emergency instructions must be submitted with the method statements or safety procedures.
5. Before a subcontractor initially brings any radioactive materials onto the project, he needs to inform the applicable project manager.

**G. ATTACHMENT**

1. Radiography Safety/Health Checklist

**RADIOGRAPHIC OPERATIONS**

**Attachment 1  
Page 1 of 2**

Date \_\_\_\_\_  
Company Name \_\_\_\_\_  
Location \_\_\_\_\_  
Assessor \_\_\_\_\_

**RADIOGRAPHY SAFETY/HEALTH CHECKLIST**

1. Subcontractor has radioactive materials license?

Expiration date?

2. All radiographers listed on license?

<u>Employee Name</u>	<u>Radiographer/Asst.</u>	<u>License</u>
/	/	/
/	/	/
/	/	/
/	/	/
/	/	/
/	/	/

3. Written operating and emergency procedures reviewed?

Copy on location with each crew?

4. Employees well-versed in applicable safety/health procedures?

5. Vehicle identified with “radiation” placards?

How many?

Truck license number?

6. Film badges on location/worn as necessary?

7. Pocket dosimeters available/worn as necessary?

8. Calibration records? Where?

List Reading on Dosimeters

<u>Serial No.</u>	<u>Reading</u>
/	/
/	/
/	/
/	/

**RADIOGRAPHIC OPERATIONS**

9. Adequate “Radiation” signs available/posted, no type?

10. Immediate area under direct surveillance when radioactive source is outside shielded storage container?  
YES/NO

NOTE: If an item number is circled, see the “Comments” or “Action Items”.

11. General radiation survey meters on location, number?  
\_\_\_\_\_



<u>Mode/Type</u>	<u>Serial No.</u>	<u>Date</u>	<u>Calibration</u>
/	/	/	/
/	/	/	/
/	/	/	/

12. Type of camera(s), serial numbers \_\_\_\_\_

Surface leakage rates \_\_\_\_\_

External truck wall leakage levels \_\_\_\_\_

13. Radiography equipment in good condition?

Wind out cable(s) number & condition(s) \_\_\_\_\_

Snorkel number & conditions(s) \_\_\_\_\_

14. Any excessively worn items? \_\_\_\_\_

15. Radiation Safety Officer's name \_\_\_\_\_

Contact number? \_\_\_\_\_

16. Was a "crank in" or "out" witnessed?

Specific Information  
Source I.D.number(s) \_\_\_\_\_

Decay chart on \_\_\_\_\_

Source strength (current) \_\_\_\_\_

General Comments  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Necessary Action Item  
\_\_\_\_\_  
\_\_\_\_\_



## CRANES AND OTHER LOAD LIFTING EQUIPMENT

### A. PURPOSE

There is a continuous advance in the size and variety of cranes used on construction sites. Constant demand to handle and erect heavy modules, in order to keep on-site work to a minimum, has resulted in the development of large and sophisticated cranes. The safe and proper use of cranes and lifting equipment is essential if serious injury, collapse, overturning or other failures are to be avoided, therefore the requirements of this and other related sections must be implemented on site.

To provide standardized procedures for the use, maintenance, inspection, and testing of all cranes, hoists, monorails, trolleys, spreader bars, trunnions, and special tooling used for materials handling purposes on Company projects or in fabrication shop areas.

### B. APPLICABILITY

This standard applies to all operations carried out on site.

### C. POLICY

Cranes, hoists and other load lifting equipment shall be inspected, maintained and operated in accordance with international and local codes, and the manufacturer's recommendations/requirements.

### D. REFERENCES

1. American National Standards Institute (ANSI)  
Specifications:

B30.1-1975	B30.9-1971	G61.-1968
B30.2.0-1967	B30.10-1971	
B30.4-1973	B30.11-1973	
B30.5-1968	B30.15-1973	
B30.6-1969	B30.16-1973	

2. 29 CFR 1926.550-556 (Subpart N)

### E. RESPONSIBILITY

1. Contractors are responsible for their own implementation of this procedure.





2. A permanent inspection and proof-load test file for any operated cranes and load lifting equipment (exceeding a 1-ton capacity on cranes and a 2-ton capacity on chain hoists) will be maintained on site at all times.
3. Each user/operator shall visually inspect his/her assigned piece of lifting or material handling equipment on a daily basis prior to any operation. Any questionable items shall be referred to party responsible for safety for resolution before use. The Daily Inspection Records shall be used for documenting the daily inspection of cranes (see Attachments 1 and 2).

## **F. DEFINITIONS**

### **1. Inspection and Testing Schedule**

#### **a. General**

1. All cranes and hoists exceeding 3 ton rated capacity will not be put into service until an initial proof-test or manufacturers certification, which attests to soundness of same. These records shall be maintained with the crane's permanent file.
2. Subcontractors shall provide proof of certification prior to putting a crane, hoist or material lifting device exceeding 3 ton into service.
3. Cranes and hoists with greater than 3 ton rated capacity will be reviewed prior to being put into service.
4. Newly purchased, repaired, or modified hoists/cranes/monorails/jibs/booms/etc. shall be proof-load tested in accordance with the manufacturer's requirements prior to being put into or returned to service.
5. New spreader bars, chain hoists and other overhead material handling equipment shall not be put in service until manufacturer's proof-load certifications are provided.
6. All initial, periodic and daily inspections as well as testing and maintenance shall comply with the applicable BS, ANSI and manufacturer's requirements.

#### **b. Daily Inspections of Lifting Equipment**

1. The crane/hoist operator will perform a visual safety inspection of load lifting equipment to be used.
  2. Bridge cranes and hydraulic cranes greater than 3-ton capacity require a daily documentation of the crane inspection. (see Attachment 1)
- c. A quarterly inspection is to be performed or arranged by the contractor of their third-party qualified inspector. (see Attachment 2)



- d. Annual inspection and certification (non-quadrennial year) of cranes/hoists exceeding 3-ton capacity.
  1. The annual safety inspection of all cranes and hoists greater than 3-ton capacity will be performed by a qualified third-party inspection agency.
  2. The inspection shall conform to applicable BS, ANSI specifications, and the manufacturer's requirements.

## 2. Maintenance of Cranes/Load Lifting Equipment

- a. Maintenance and/or lubrication of lifting equipment shall be performed in accordance with manufacturers standards and good maintenance practices.
- b. Hydraulic hoses, fittings, and tubing shall be inspected daily.
- c. Hydraulic relief valves shall be installed and maintained in accordance with manufacturer's requirements.
- d. All crane and hoist load chart and hand signal placards, as well as safety signs, will be maintained legibly and in place during all crane operations.
- e. All crane controls, air, electric and hydraulic will be properly identified as to its function and maintained in proper working order.

## H. OPERATORS – QUALIFICATIONS

1. Only employees authorized, trained, or known to be qualified in the safe operation of cranes or hoisting apparatus shall be permitted to operate such equipment.
2. Trainees are not authorized to operate cranes or hoisting devices on projects.
3. Authorized inspectors, maintenance, or test personnel may operate such equipment when it is necessary in the performance of their duties.
4. Operators of cranes or derricks which are operated from cab, cage, or remote operating station shall furnish satisfactory evidence of qualifications and experience.

### Legal Requirements

Statutory provisions applicable to cranes must be strictly adhered to.



## 1. Wind Speeds

All tower cranes are fitted with wind speed indicators.

The final decision on the safety and advisability of a lift rests with the crane driver and lifting supervisor. In the event of a disagreement the more cautious view will prevail. The crane manufacturer's handbooks must also be consulted and adhered to.

The same conditions apply to mobile cranes although generally they are not fitted with wind speed indicators. The crane manufacturer's operating handbook MUST be consulted to determine when it is safe to lift in windy conditions and these must be strictly observed.

## 2. Maximum Working Hours

The maximum weekly working hours of a crane driver or banksman will be in accordance with local laws and regulations. Said work hour shall not be excessive to avoid fatigue and loss of alertness of the crane operator.

## 3. Management of Lifting Operations

### 3.1 Safe System of Work

A safe system of work must be established and this must be followed for every lifting operation whether it is an individual lift or a group of repetitive operations, with either mobile or tower cranes. The safe system of work must include the following:

- Planning of the operation.
- Selection, provision and use of suitable cranes and equipment.
- Maintenance, examination and testing of cranes and equipment.
- Current test/thorough examination certificates and other documents are available.
- Trained and competent crane drivers and banksmen/slingers.
- Adequate supervision by properly trained and competent personnel having the necessary authority.
- Preventing unauthorized movement or use.
- The safety of persons not involved in the lifting operations.
- Survey of the foundation for a mobile crane.

The safe system of work must be effectively communicated to all parties concerned.

### 3.2 Control of Lifting Operations - The Crane Coordinator

#### **One) Tower Cranes**

To ensure the implementation of the safe system of work, every project using tower cranes will require a dedicated crane coordinator. On sites with more than one tower



crane, the coordinator will be a full-time role additional to the crane drivers. Where one tower crane is only in operation, the coordinator may be the relief crane driver on the ground.

The appointed crane coordinator must be trained, certified and experienced to perform the role, and must have a thorough knowledge of Safety requirements. The crane coordinator must ensure that the following duties are fulfilled:

1. The assessment of the lifting operation to provide such planning, selection of cranes, lifting gear and equipment, instruction and supervision as is necessary for the task to be undertaken safely. This must include consultation with other responsible bodies if necessary and ensuring that where different organizations are involved they collaborate as necessary.
2. Ensuring that statutory tests, thorough examinations and daily/weekly inspections have been carried out and the necessary registers and certificates are completed.
3. Ensuring routine inspection and maintenance as required by the crane manual is undertaken.
4. All necessary safe working procedures are implemented as required.
5. Special or unusual lifts are personally supervised, engineering input obtained where necessary, and that the weight and load distribution of the load are accurately known.
6. Assessing any local dangers, i.e. overhead power cables etc.
7. Only competent, experienced and properly trained operators and banksmen/slingers conduct lifting operations.
8. A clear means of communication is maintained between all site crane operators, i.e. tower, mobiles, etc. (Radios and back-up radios as necessary).
9. Liaison with local governmental Safety Department.
10. Ensuring that there is an effective procedure for reporting defects incidents or stoppages (e.g. high winds) to management and taking any necessary corrective action.

The appointed crane coordinator must have the authority to stop the operation whenever he considers that danger is likely to arise if the operation were to continue. Duties, but not responsibilities, may be delegated to another person where considered appropriate.

### **Two) Mobile Cranes**

Where tower cranes are already in use on a site the tower crane coordinator will also control all mobile cranes and ensure that the checks given above are carried out for mobile cranes.

Where there is no tower crane on site the role of the coordinator must be delegated to another competent person in writing, who must carry out the duties given above.



All of the provisions of this section apply to mobile cranes or similar items of crane-based plant such as drilling rigs, crawler cranes, hydraulic wheeled cranes etc.

A rigid control system must be set up by the crane coordinator. Provide method statement to the Engineer for review and comments.

#### **4. Safe Operation - Crane Drivers and Banksmen**

- A lifting appliance shall not be operated other than by a person trained and competent to operate that appliance. Training of operators shall not be permitted on site.
- No person under eighteen years of age shall be employed either to give signals to the operator of any lifting appliance driven by mechanical power, or to operate any such appliance.
- Where the load cannot be directly seen by the crane driver then the crane supervisor will station one or more trained and competent persons to give signals to the crane driver.
- Trainee crane drivers must not be used.

##### **Banksman/Slinger**

In all cases where a crane is in operation there shall be a trained banksman/slinger in attendance. All crane drivers and banksmen/slingers must hold a certificate of competency.

The crane driver must have a list of qualified banksmen/slingers in his cab, and must have written instructions that he is not to operate a load/lift unless it is being slung/banked by an operative on this list.

The banksman/slinger must be equipped with high visibility colored arm bands or a high visibility jacket to BS 6629 for distinctive identification.

The list of trained banksmen/slingers must be held also by the lifting supervisor.

#### **5. Safe Working Load (SWL)**

All cranes must be marked with the safe working load and at no time must this be exceeded other than undergoing a statutory test inspection. SWL indicator must be inspected weekly and an entry made in the form.

#### **6. Warning Lights on Tower Cranes**

Aircraft warning lights must be fitted at all tower cranes erected in the proximity of airports or helicopter landing pads.



**I. ATTACHMENTS**

1. Daily Hydro Crane and Overhead Crane Inspection Record.
2. The Company Inspection of Cranes (for tire, crawler, fixed boom cranes, etc).



# CRANES AND OTHER LOAD LIFTING EQUIPMENT

## DAILY HYDRO CRANE AND OVERHEAD CRANE INSPECTION RECORD

Manufacturer \_\_\_\_\_  
 Division/Project \_\_\_\_\_ Rated Capacity \_\_\_\_\_  
 Crane Serial # \_\_\_\_\_ Month \_\_\_\_\_

Date	Disposition of Crane	Inspector (Print Name & Initial)
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
31		

NOTE: If crane inspection is okay, then enter (OK) on the appropriate line and sign the inspector block. If crane has defect, then enter defect. When the defect is repaired, then sign the inspector block (as appropriate).

(See Next Page)



## CRANES AND OTHER LOAD LIFTING EQUIPMENT

(This side to be used for information guidance on what to check for daily inspection)  
DAILY HYDRO CRANE AND OVERHEAD CRANE INSPECTION RECORD

### Checklist

<input type="checkbox"/>	• Check all functional mechanism for maladjustment	<input type="checkbox"/>	No unusual noises present
<input type="checkbox"/>	Crane controls (properly identified & functional)	<input type="checkbox"/>	Tires in good condition
<input type="checkbox"/>	Boom angle indicator (operable)	<input type="checkbox"/>	All lights in proper operating condition
<input type="checkbox"/>	Hoist motor (smooth take-up)	<input type="checkbox"/>	Fire extinguisher available
<input type="checkbox"/>	Hoist brake holds (no slippage)	<input type="checkbox"/>	Electric cables in proper condition
<input type="checkbox"/>	Hydraulic leaks on hose		
<input type="checkbox"/>	Oil leaks		
<input type="checkbox"/>	Trolley movement & wheels		
<input type="checkbox"/>	• Check limit switch without lead on hook		
<input type="checkbox"/>	Anti-two-block device		
<input type="checkbox"/>	• Check load hooks		
<input type="checkbox"/>	Deformation (spreading – bent/twisted)		
<input type="checkbox"/>	Cracks		
<input type="checkbox"/>	Check safety latch		
<input type="checkbox"/>	• Check hoist cable		
<input type="checkbox"/>	Abrasion		
<input type="checkbox"/>	Flat spots		
<input type="checkbox"/>	Kinks/Cuts		
<input type="checkbox"/>	Bird cages		
<input type="checkbox"/>	Broken wires/broken strands (3 wire maxes per one strand & 6 max per entire wire rope)		
<input type="checkbox"/>	Twisting		
<b>Safe Operation - Crane Drivers and Banksmen</b>			
<input type="checkbox"/>	Check lubrication		
<input type="checkbox"/>	• Check sheaves on load block		
<input type="checkbox"/>	Wire rope imprints		
<input type="checkbox"/>	Proper size for wire rope	<input type="checkbox"/>	Sheave guards in place
<input type="checkbox"/>	Cracks, chips		
<input type="checkbox"/>	Rolls freely, lubricated		
<input type="checkbox"/>	• Check slings (Wire rope and synthetic)		
<input type="checkbox"/>	Bird cages	<input type="checkbox"/>	Cuts/Tears
<input type="checkbox"/>	Cuts/Kinks	<input type="checkbox"/>	Punctures
<input type="checkbox"/>	Flat spots/twisting	<input type="checkbox"/>	Torn stitching
<input type="checkbox"/>	Broken Wires (3 max per strand & 6 max per entire rope)		
<input type="checkbox"/>	Other defects that may cause doubt as to the sling's integrity.		
<input type="checkbox"/>	Check sling eyes for excessive wear strength.		

NOTE: REPORT ALL DAMAGE/DEFECTS TO PROJECT MANAGEMENT IF FURTHER INSPECTION IS REQUIRED.





**INSPECTION OF CRANE**

VEHICLE NO. \_\_\_\_\_ DATE: \_\_\_\_\_

ITEM	ACCEPTABLE	UNACCEPTABLE	N/A	REMARKS
1. TIRES, RIMS, LUGS, WHEELS				
2. CRAWLER TRACKS				
3. BRAKES				
4. HORN (CRANE & TRUCK)				
5. LIGHTS (CRANE & TRUCK)				
6. STEERING				
7. TRUCK FRAME				
8. GLASS (CRANE & TRUCK)				
9. MACHINERY FRAME				
10. BOOM				
11. CABLES (BOOM & HOIST)				
12. SHEAVES				
13. WIRE ROPE CABLES/PENDANTS				
14. HOODS-HEADACHE BALL				
15. LOAD BLOCKS				
16. GUIDE ROLLERS (BOOM/TROLLEY)				
17. BOOM HOIST				
18. BOOM HOIST BRAKES				
19. BOOM & TROLLEY LUBRICATION				
20. CABLE CLAMPS-SOCKETS				
21. HADLES – GRAB IRONS				
22. STEPS & LADDERS				
23. GUARDS				
24. FIRE EXTINGUISHER				
25. PLATFORM, DECKING, ETC				
26. LOOSE BELTS-COTTER PINS				
27. LOAD LIMIT CHARTS				
28. BOOM ANGLE INDICATOR				
29. FUEL TANK & LINES				
30. EXHAUST SYSTEM				
31. EMERGENCY KILL SWITCH				
32. PROPER OPERATING PERMITS				
33. BACK-UP ALARM				
34. ELECTRICAL CABLE				
35. LIMIT SWITCHES				
36. ELECTRIC HOIST MOTOR				
37. SMOOTH TAKE-UP				
38. HYDRAULIC HOSES				

Inspection of the above items by company personnel does not relieve subcontractor from the responsibility of maintaining safe equipment.

INSPECTOR: _		WITNESSED	
BY		WITNESSED	
BY			



## LOCKOUT AND TAGGING PROCEDURES

### A. PURPOSE

This procedure establishes the safe lockout and tagging methods to be used by personnel working for Company and subcontractor personnel.

### B. APPLICABILITY

The section applies to electrical equipment, valves, or equipment capable of activation during maintenance and/or modifications which may present a hazard to personnel and/or damage to equipment.

### C. POLICY

A standard lockout and tagging procedure shall be utilized to assure accountability and control during operations which require lockout and/or tagout of equipment/systems to provide a greater level of employee protection.

### D. REFERENCE

1. 29 CFR 1910
2. 29 CFR 1926.417, "Lock Out and Tagging of Circuits"

### E. RESPONSIBILITY

1. The contractor is responsible for the following:
  - Identifying the personnel who are authorized to act as lockout/tagging.
  - Controlling and maintaining accountability of tags/locks.
  - Approving the removal of locks/tags from items if keys are lost.
  - Controlling and requiring the use of padlocks for system isolation.
  - Coordinating system isolation activities that effect subcontractors as applicable.
  - Maintaining a log for controlling and tracking lockout and tagging activities (see Attachment 1) and checking the log on a regular basis for the status of outstanding tags/locks.



2. The lockout/tagging authority is responsible for the following:
  - Making or receiving requests for lockout and tagging (system/equipment clearance).
  - Processing requests and coordinating the lockout and tagging activities.
  - Making appropriate log entries for the requested lockout/tagging.
  - Assuring that system status and configuration is appropriate for lockout and tagging.
  - Ensuring receipt of tags and locks when work or test is complete.
  - Making appropriate log entries to release the equipment/system.
3. Supervisors (foreman) are responsible for.
  - Educating their employees in the proper methods of locking out and tagging.
  - Assuring that the equipment has the capability of being locked out once identified.
  - Checking on various jobs in progress to verify that they are properly locked out and tagged.
  - Administrating appropriate disciplinary action for violations of the Lockout/Tagout Procedure.
4. All Employees are responsible for:
  - Promoting the use of lockout procedures for themselves and their fellow workers.
  - Reading, understanding and having the lockout procedures available at all times.
  - Making sure that equipment is properly locked out with his/her assigned lock before beginning work on the equipment.
  - Obtaining clearance from operations, maintenance, or any other appropriate personnel



before proceeding with work, if not previously scheduled and notifying same when his/her work is completed and he/she is leaving the area.

**F. DEFINITIONS**

1. Requesters:	Personnel from various departments who request that a system or component be isolated.
2. Tagged Out:	When the valves or start-stop switch has been properly tagged. "Tagged Out" does not necessarily mean padlocked."
3. Locked Out:	Means the use of devices, positive methods and procedures, which effectively prevent unexpected or inadvertent movement of the machine or materials. All locks must be accompanied by a tag describing the work being performed and the reason for the "lockout".
4. Out of service	An out-of-service tag will be used to identify equipment that has been temporarily or permanently removed from service, and while displayed, there is not work being performed on the equipment. An out-of-service tag will not be used in place of a lock or danger tag for the purpose of lockout

**G. TAGGING AND SYSTEM CONTROL**

1. All tags shall be numerically sequenced or personally identified and logged out for system/equipment isolation. Log and tag information shall include system designation, requestor's name, system/equipment status (valve open/closed, etc.) and date.
2. Padlocks – The use of padlocks is controlled by the project lockout and tagging authority. Padlocks must be use when there is a potential for danger to personnel or equipment. When padlocks are use to "lock out" a particular system or component they must be accompanied by a "Danger Do Not Operate" tag. After the tag and lock have been installed, the key is maintained by the requester. Padlocks should be used when work or test activities require personnel to perform work downstream of high voltage disconnect



switch gear, extreme pressures and/or hazardous materials.

3. Everyone working on a piece of equipment requiring lockout will use his/her individual lock (or danger tag if not possible to lock out).

#### **H. LOST KEY(S) OR ABSENCE OF REQUESTOR**

If a locked and/or tagged system must be released but the key cannot be found the lockout and tagging authority can authorize removal of the locks and tags. But first, the following must be adhered to:

1. Ensure that releasing boundaries will not harm personnel or equipment.
2. Verify that it is essential to remove the locks and tags.
3. Verify that all reasonable effort has been expended to recover the key(s).
4. Verify that the requestor (or supervisor) has been notified and has acknowledged that the locked out and tagged system can be release.
5. Note circumstances in the log.

**NOTE:** Each employee who has locked out equipment is responsible for removing his/her lock when the job is finished or he/she has been released from the job. If an employee cannot be reached to remove a lock/tag and equipment must be started, his/her supervisor, after thoroughly checking equipment, area, and conditions, will have the lock(s) removed after determining that the equipment can safely be started.

#### **I. PROCEDURES FOR ISOLATION**

1. General
  - a. Machinery or equipment capable of movement shall be stopped and the power source de-energized or disengaged. Where necessary, the moveable parts shall be physically blocked to prevent inadvertent movement during servicing or adjusting.
  - b. Any electrical equipment undergoing service, repair, or adjustment shall be DE-ENERGIZE and locked out.
  - c. Every prime mover or power driver machine shall be locked out or positively sealed in the off position during maintenance work.



Where lockable controls are not available, compliance with this section shall be met through the use of positive means such as de-energizing or disconnecting the equipment from its power source, or other positive action which will prevent inadvertent movement of the equipment. In all cases, signed and dated tags of an appropriate type shall be affixed to the controls of the machine or equipment during repair work.

- d. During repair or maintenance, equipment, machines, and/or prime movers shall be effectively blocked, locked, or otherwise secure to prevent advertent movement.
  - e. Each department lockout and tagging authority shall provide tags, padlocks, and chains which may be required to complete and identify lockout conditions.
  - f. One machine or equipment where repair, adjustment, or testing cannot be performed with the prime mover or energy source disconnect, such operations may be performed under the following conditions:
    - 1. The operating station where the machine may be activated shall be under the control of a qualified operator at all times.
    - 2. All participants in the repair, adjustment, etc. shall be in clear view of the control operator or in positive communication with him
    - 3. All participants must be beyond reach of equipment which may present a hazard to them.
2. Electrical Equipment
- a. Lock out the main power source in the off position before commencing work on electrical components. Lock out control circuits only when it is impossible or impractical to lock out the main power source.
  - b. Make all lockouts with a padlock and tag. Each employee working on or exposed to the hazard shall add his/her



lock to the lockout. (Each lock must be noted in the appropriate log.)

- c. The control switch or valve shall be tested after the lockout has been made in order to assure that it cannot be operated.

### 3. Piping

Pipelines may be isolate by:

#### a. Misalignment

1. Pipelines may be misarranged by unbolting them at a flange and then re-bolting them in the misaligned position.
2. A “Danger” tag and a seal must also be attached to the pipeline.
3. Misalignment may be used for liquid lines, to enter vessels, etc. **IT SHOULD NOT BE USED ON GAS LINES.**

#### b. Blinding

1. Pipelines may be isolated by the use of blinds in the piping system at flanges.
2. On gas pipelines when “double block and bleeds” are not available for use, blinds shall be the primary method of isolation. When the blind is installed, sufficient bolts shall be replaced around the blind to keep it in place. The blind shall be rated no less than the operating pressure of the line. A “Danger” tag shall also be attached to the blind.



#### 4. Valves

##### a. “Double Block and Bleed” Procedures

1. Since blocked valves may leak by, the technique of the “double block and bleed” shall be used whenever possible.
2. When using “double and bleed” procedures, both valves shall be locked and tagged.
3. If ‘double block and bleed” cannot be used then a blind shall be use if possible. However, if blinding is impractical, a single block valve may be having to be utilized to isolate piping system.

##### b. Isolation by Valves

If it is necessary to isolate piping systems using valves, they shall be locked and tagged with “Danger” tag. Pneumatic or electrically operate valves shall have the activation systems on the valves disconnected.

##### c. Pneumatic Operated Valves

When pneumatic operated valves are used as block valves, the pneumatic systems shall have the makeup air system blocked and the bleed valve of the air system shall be left open and tagged with a “Danger” tag.

##### c. Motor Operated Valves

1. When motor operated valves are used as block valves, the motor operate





valves shall be locked into position by locking out the electrical activation switch and/or circuit breaker.

2. If these measures are not possible, the fuses for the system, if any, shall be pulled or the electrical leads to the motor operated valves disconnected and properly secured so no accidental contact can be made.
3. A “Danger” tag shall be attached to the disconnected electrical leads.

5. Block – out Procedures for Equipment

- a. Air-operated, gear-driven, hydraulically-operated units, or suspended parts of machine or equipment shall be physically blocked out to prevent movement.
- b. Steam, air, gas, hydraulic cylinders, etc. shall be blocked out.
- c. Gears and other mechanisms shall be blocked out.
- d. Blocks shall be placed under raised parts, lifts, or any equipment that might descend, slide, fall, or roll.
- e. Coiled springs, spring-loaded devices, and securing cams shall be released prior to commencement of work.
- f. Blocks or stands shall be utilized under raised vehicles, machines, or equipment to prevent failure or slippage of the jack or elevating device.

**J. ATTACHMENT(S)**

1. Lock/Tag Log (sample)



**CAUTION:** UNDER NO CIRCUMSTANCES IS ANYONE ALLOWED TO REMOVE A LOCK AND TAG OTHER THAN THE EMPLOYEE WHO INSTALLED THEM, UNLESS SPECIFICALLY AUTHORIZED IN WRITING TO DO SO BY THAT EMPLOYEE'S SUPERVISOR, AND THEN ONLY AFTER CAREFUL INSPECTION OF THE WORK AREA AND THE EQUIPMENT WHICH AS BEEN DE-ENERGIZED.

**LOCK/TAG LOG  
(SAMPLE)**

LOCK TAG NUMBER	EQUIPMENT ISOLATED	REASON FOR LOCK/TAG WORK TO BE PERFORMED	REQUESTER	INITIAL WHEN COMPLETE (REQUESTER)	ISSUED BY	DATE & TIME	DATE & TIME OF REMOVAL



## SUBCONTRACTOR SAFETY REQUIREMENTS

### A. PURPOSE

The purpose of this procedure is to ensure that subcontractor's obligations regarding safety are defined and adhered to.

### B. APPLICABILITY

All subcontractors are subject to the requirements of this procedure.

### C. POLICY

A subcontractor safety program will be established that utilizes those organizational and functional disciplines necessary to administer and implement an effective Safety Program. The Program shall emphasize the prevention of conditions adverse to safety and to assure prompt detection and correction of deficiencies.

### D. REFERENCES

1. As outlined under other sections of this manual

### E. RESPONSIBILITIES

1. The Contractor – Contractor safety officer shall monitor subcontractors to determine if the subcontractor is performing its activities with due regard for safety and impose meaningful sanctions in the event of a subcontractor's noncompliance with its safety obligations.
2. Subcontractors – Each subcontractor shall be contractually obligated to comply with all safety requirements.

### F. PROCEDURES

#### 1. WRITTEN SAFETY PROGRAM

Each subcontractor shall be notified in the bid documents of the requirement to include in their proposal a written safety program which includes detail commensurate with the work to be performed.

#### 2. SUBCONTRACTOR SAFETY REPRESENTATIVE

Each subcontractor shall appoint a qualified safety representative within five days of notice to proceed (NTP) acceptable to the Engineer. Each subcontractor shall hold regularly scheduled meetings to instruct its personnel on safe work practices and the requirements of the project.

#### 3. RECORDKEEPING REQUIREMENTS



Each subcontractor shall maintain accurate accident and injury reports and furnish accident/incident reports within 24 hours of any occurrence. All fatalities or serious injuries must be reported immediately. The subcontractor shall conduct a comprehensive accident investigation and submit a complete report within five working days.

4. NONCOMPLIANCE WITH SAFETY/HEALTH OR FIRE REQUIREMENTS

If the subcontractor fails to correct the unsafe conditions, the following courses of action shall be taken:

- a. Back charging: Correction of the unsafe condition and back charging the subcontractor.
- b. Removal of Personnel: The subcontractor shall remove from the project anyone unfit or working in violation of the provisions of the subcontract.
- c. Optional Termination: All or part of the subcontract may be terminated for inadequate performance (safety).

5. EMERGENCY PROCEDURES

The subcontractor shall familiarize all supervisors with the emergency procedures developed for the project so that they may provide the leadership required to cope with serious injuries, fires and similar situations.

6. FIRE PROTECTION AND PREVENTION

The subcontractor shall familiarize all supervisors with the emergency procedures developed for the project so that they may provide the leadership required to cope with serious injuries, fires and similar situations.



## ASSURED EQUIPMENT GROUNDING PROGRAM

The following program will be followed without changes, modifications or exceptions:

- A. This program must remain on this job site and be available for inspection at any time by the Engineer.
- B. The person(s) designated to carry out this program shall be named by the contractor and made known to the Engineer.
- C. Power Hand Tools, Pipe Threading Machines, Table & Radial Arm Saws, Etc.
  - 1. Before any electrically powered tool is used for the first time on this job, it will be checked to see that the cord and plug are in good condition; that all three prongs (except on double insulated tools) are intact; and, that there are no exposed wires at the plug. Make sure there are no breaks in the cord and that it is properly attached to the tool.
  - 2. Using proper testing equipment (ohmmeter, continuity tester, etc.), make sure that the case of a tool is in electrical contact with ground prong. Check to see that neither of the other two prongs are in electrical contact with any part of the tool or its case. Make sure that switch works properly and shuts off the motor when released. If a tool requires guard(s), make sure the guard is in place and works properly.
  - 3. A proper log shall be kept on site and updated. Said log shall include all information pertaining to any particular tool such as description, serial number, date of testing, date or repairs, etc.
- D. Receptacles
  - 1. Check each receptacle to ensure the cover plate is in place and the box is in good condition prior to use. See that the receptacle is not cracked or broken, that no wires are exposed and the wires to the box is properly connected.
  - 2. Use a tester (such as Woodhead 7040) to determine that there is a good ground.
  - 3. Mark the receptacle with the current coding color or sign the attached to the receptacle.
  - 4. Enter the date and results of the test on the log with the name of the person doing the testing.
- E. Extension Cords



1. Each extension cord must be checked before it is put into use for the first time.
2. Check male and female ends to make sure the cord is properly connected at the ends. Make sure that there is an insulator on the end of the plug if it is not of the “dead front” type. Ensure that there are no bare or exposed wires or screws.
3. Check to see that there are no breaks in the insulation or any exposed wires throughout the length of the cord. Any splices in the cord must be properly made and must furnish protection equal to the original insulation.
4. Use a tester to make sure you have a good ground wire and that other wires are electrically continuous.
5. If the cord checks out okay, fill in the proper columns on the log and sign the log. Color code the extension cord or power tag it for current color coding
6. If a cord does not check out okay, remove it from the project so it cannot be used.

F. Daily Visual Inspections

1. Each employee will be trained to visually check for external damage or defects in each piece of electrical equipment before it is used for the first time each day. Cords will be checked to see that there are no breaks in the insulation; they are properly attached to plugs; plugs are not broken; ends are insulated and that there are no exposed wires or screws.
2. All electrically powered tools will be visually inspected to see that all three prongs are intact; cord is properly attached to the tool; there are no bare wires or screws and that the ends of plugs are covered if not of the “dead front” type of construction.
3. Before using a receptacle, it shall be visually inspected to insure it is free of defects.

G. Schedule of Inspections

1. The above inspections are to be made before the tool or equipment is used for the first time on a project. Once every three months thereafter, each cord, plug and electrically powered tool or receptacle will be inspected by the person designated as “competent” to perform the inspection function. Results will be recorded on the project log.



2. Cords and receptacles will either be color coded for the appropriate quarter or tagged. The person doing the inspection will date and sign the tag. Enter the date and name on the log.
3. All fixed temporary wiring or receptacles, not exposed to hazards and damage, must be inspected every six months. Results of all inspections must be entered on the inspection check list ((log).

H. Test Verification

1. All equipment connected by a cord and/or a plug shall be tested for ground wire continuity with a volt-ohm meter or a continuity tester.
2. Tests shall be documented by means of color coding. The following color-coding system is suggested to verify that testing is current and that all receptacles, portable cords, and tools have been inspected and tested as required.

COLOR CODING SCHEME - QUARTERLY

January - March	White
April - June	Green
July- September	Red
October – December	Orange

COLOR CODING SCHEME – 6 MONTHS

January - June	White
July - December	Red

3. All receptacles, cords, and tools shall be marked with the tape used to designate the period for which the inspections and tests were conducted.







## EXCAVATION AND TRENCHING PROGRAM

### A. PURPOSE

To ensure all work in/or around an excavation or trench is performed in accordance within generally accepted safety and health.

### B. APPLICABILITY

This procedure applies to all contractor and subcontractor employees supervising and performing work in/or around excavations and trenches.

### C. REFERENCES

1. 29 CFR 1926.650
2. 29 CFR 1926.651
3. 29 CFR 1926.652

### D. RESPONSIBILITIES

The contractor shall ensure that all excavation and trenching work performed by employees or subcontractors under his or her control is executed in accordance with this procedure.

Each person performing the duties of the “competent person” shall be trained in the referenced codes and experienced in excavation and trenching.

### E. DEFINITIONS

Competent Person - A “competent person” as one who is capable of identifying existing and predictable hazards in the surroundings and work conditions which are unsanitary, hazardous, or dangerous to employees. The “competent person” must also have the authorization to take prompt corrective measures to eliminate unsatisfactory conditions.

Protective Systems – All excavations and trenches five feet or deeper, the “competent person” (with the aid of a civil engineer or soils specialist) shall determine protective system which is a method of protecting employees from cave-ins, such as material that can roll, fall or collapse from adjacent structures.

### F. PROCEDURE

1. All surface encumbrances that are located as to create a hazard to employees shall be removed or supported as necessary to safeguard the employees.
2. The estimated location of utility installations such as sewers, telephone, fuel, electric, water lines or any other



underground installations that may reasonably be expected to be encountered during excavation work are to be determined prior to opening the excavation.

3. Governmental authorities or private property owners are to be contacted within an established or customary response time and advised of the proposed work and asked to establish a location of utility and underground installations prior to the start of any actual excavation.
4. When an excavation operation approaches the estimated location of underground installations, the exact location of the installation is to be determined in a safe manner.
5. While the excavation is open, all underground installations are to be protected, supported, or removed as necessary to safeguard employees.
6. Access and Egress
  - a. Structural ramps that are used solely by employees as a means of access or egress from excavations are to be designed by a “competent person”.
  - b. Structural ramps used for access or egress of equipment are to be designed by a “competent person” qualified in structural design and constructed in accordance with that design.
7. Means of Egress from a Trench or Excavation

A stairway, ladder, ramp or other safe means of is to be located in a trench or excavation that is four feet or more in depth, so as to require no more than twenty-five feet of lateral travel for the employees.
8. Employees exposed to public vehicular traffic are to be provided with and shall wear a warning vest and other suitable garments marked with or made of reflectorized or high visibility material.
9. No employee is to be permitted underneath loads handled by lifting or digging equipment. Employees are to be required to stand away from any vehicle being loaded or unloaded to avoid being struck by any of the spillage or falling materials.



10. When mobile equipment is operated adjacent to an excavation, or when such equipment is required to approach the edge of an excavation and the operator does not have a clear, direct view of the excavation edge, a warning system is to be utilized. Warning systems can be barricades, hand or mechanical signals, stop logs; and, if at all possible, they should be away from the excavation.

11. Hazardous Atmospheres

Where an oxygen deficient atmosphere (atmospheres containing 19.5% oxygen or less) or a hazardous atmosphere exists or could reasonably be expected to exist such as in excavations in landfill areas or excavations in areas where hazardous substances are stored nearby, or excavations in areas such as waste treatment plants, the atmosphere in the excavation shall be tested before employees enter any excavation greater than four feet in depth. All confined space entry procedures are to be followed.

12. Water Accumulation

- a. Employees shall not work in excavations in which there is accumulated water, or excavation in which water is accumulating unless adequate precautions have been taken to protect employees against the hazards posed by a water accumulation. The precautions necessary to protect the employees adequately may vary with each situation. These precautions may include special support or shield systems to protect from cave-ins, water removal to control the level of accumulating water and/or the use of safety harness and life line.
- b. If water is controlled or prevented from accumulating by the use of water removal equipment such as a well point system, the water removal equipment in operation shall be monitored by a "competent person" to ensure proper operation.
- c. If excavation work interrupts natural drainage of surface water such as streams, diversions, ditches or dikes,



other suitable means are to be used to prevent surface water from entering the excavation and to provide adequate drainage of the area adjacent to the excavation.

13. Adjacent Structures

- a. Where the stability of adjoining buildings, walls or other structures is endangered by excavation operations, support systems such as shoring, bracing or underpinning shall be provided to ensure stability of the structures for the protection of employees.
- b. Excavation below the level of the base or footing of any foundation or retaining wall that could be reasonably expected to pose a hazard to employees is not to be permitted except when:
  - A support system such as underpinning is provided to ensure the safety of employees and the stability of the structure.
  - The excavation is in stable rock.
  - A professional engineer has approved the determination that such excavation work will not pose a hazard to employees.

14. Protection of Employees from Loose Rock or Soil

Adequate protection shall be provided to protect employees from the loose rock or soil that can pose a hazard by falling or rolling from an excavation face. Such protections should consist of scaling to remove loose material, installation of protected barricades in intervals as necessary on the face to stop and contain falling material; or other means that provide equivalent protection. Examples of this protection can be either sheeting or a rolled chain-linked fencing that is pinned to the top and bottom of the excavation or trench and rolled from the top to bottom to prevent material or rock from sliding into the excavation.



15. Employees shall be protected from materials or equipment that can pose a hazard by falling or rolling into the excavation. Protection is to be provided by placing and keeping materials or equipment at least two feet from the edge of excavations, or by the use of retaining devices that are sufficient to prevent materials or equipment from falling or rolling into the excavations.

16. Inspections

a. Daily inspections of excavations, the adjacent areas, and protective systems are to be made by a competent person for evidence of a situation that could result in possible cave-in. Where there is indication of failure of protected systems, hazardous atmospheres or other hazardous conditions, an inspection is to be conducted by a “competent person” prior to the start of work and as needed throughout the shift.

(See Attachment 1 for the excavation and trenching checklist)

b. Where a “competent person” finds evidence of a situation that could result in a possible cave-in, indications of failure or protective systems, hazardous atmospheres or other hazardous conditions, exposed employees are to be removed from the hazardous area until necessary precautions have been taken to ensure their safety.

17. Fall Protection

a. Where employees or equipment are permitted to cross over excavations, walkways or bridges with standard guardrail shall be provided.

b. Adequate barrier physical protection shall be provided at all remotely located excavations.

## **LOCATING BURIED SERVICES**



## **Legal Requirements**

All statutory provisions applicable to locating buried services shall be strictly adhered to.

## **Hazards**

The following are common hazards encountered when buried services are struck or damaged.

- a) The greatest risk of injury lies in contacting electricity cables. Although some people are electrocuted, the majority suffers major burns from the explosive arcing of the damaged cable.
- b) Damage to a gas pipe or high-pressure fuel line may result in a leak leading to a major fire, explosion or people being overcome by fumes.
- c) Damage to water mains may result in an excavation being flooded with consequent undermining and collapse.
- d) Damaging sewer pipes carries the double risk of toxic or flammable gases that may be present in a foul sewer or the risk of infection from substances in the sewer.
- e) The cost of damage to such cables can be astronomic due to the cost of the cable itself and the inconvenience cost, particularly telecommunication fibre optic cables.

## **Procedures to Be Adopted:**

### **1) Statutory Authorities**

The statutory authorities must be consulted prior to any excavation work commencing so that drawings can be made available showing the location of services on site. It must be appreciated that the drawings provided will only give the approximate line and depth of services as:

- a) Cables may be found snaked within the width of the original cable trench, even though marked as straight lines on the drawings.
- b) The depth of services shown on drawings may be incorrect due to re-grading of the surface after the services were laid.
- c) Services may have been moved without the authority or knowledge of their owners.



- d) Not all services, i.e. street lighting cables, are necessarily marked on the drawings provided. The existence of such services must be assumed even if not shown on the drawings.

Therefore, any drawings made available shall be used only as a guideline for Locating Buried Services. It is the contractor's responsibility to seek and obtain required drawing from the various authorities such as MEW, MOC, etc. It is also the contractor's responsibility to verify correctness of the documents furnished by the various authorities.

## 2) Visual Survey

A visual survey of the area should be made to discover any manholes and stopcock covers, hydrants, buried valves and other access or contact points to buried services. Covers should be lifted and a check made to confirm that the services are as indicated on the cover. The buried services connected under the covers must be compared with the information supplied by the authority, and that information noted on the drawings.

## 3) Locating Equipment

It is important that locating devices are used in conjunction with the information supplied by the statutory authorities to pinpoint services on site.

Locating devices may be classified as:

- a) Live cable detectors - These are receiving instruments which detect the existence of a magnetic field around a cable carrying current. These devices are simple to use, but they do not respond to unloaded or direct current cables and they may fail to detect lightly loaded low voltage cables, such as those used for street lighting, or well-balanced high voltage cables.
- b) VLF radiation detectors - These are receiving instruments that respond to very low frequency radio signals which may be picked up and re-emitted by cables and pipes. If VLF detection is used other metallic objects may re-radiate the signal and results may vary appreciably according to locality, lengths of buried cable or pipe and distance from the termination, and geographical orientation.
- c) Transmitter - receiver instruments - A tracing signal generated by the transmitter is induced into nearby metallic pipes and cables whose presence may then be detected at a distance by a receiver. This instrument can be used for locating sewers or ducts carrying telecommunication cables by introducing a radio transmitting drain probe.

**Note:** None of the above devices will locate a service, running in non-metallic material, i.e. some gas and water



mains, and fibre optic cables. A cable locator may be unable to distinguish between cables running close together and may represent them as a single cable. If two cables are cited one above the other it may not be possible to detect the lower cable.

- d) Impulse Radar Service - This service will locate gas and water mains running in non-metallic material, and fibre optic cables as long as they are running in ducts.

### **Service Routes**

Service routes when established must be clearly identified with paint on paved surfaces or with wooden pegs and tape in grass or unsurfaced areas. Steel pins, spikes or long pegs which could damage cables or services laid at shallow depths must not be used.

### **Safe Digging Practice**

Following the use of locating devices and the marking of service routes, excavation may proceed with trial holes as necessary to confirm the position of any service believed to lie in the area of excavation.

All cables and pipes should be isolated where possible. All cables and pipes must be treated as live until proved otherwise.

There should be NO "one man" operations at any time while locating buried services.

Using hand held power tools to break up paved surfaces often leads to accidents. Power tools should not be used within half a metre of the indicated line of a service buried in or below a paved surface. The service should be positively located by excavating trenches half a metre from the indicated line and digging carefully by hand under the paved surface. Where possible a locating device should be used as a depth guide down the side of the excavation. If the service cannot be found using this method, it should be assumed to be embedded within the paved surface.

Because of the difficulty in confirming depth, hand held power tools should never be used over the line of the service except where the cable has already been exposed by digging under the surface to be broken out and physical precautions taken to prevent the tool striking the service.

The half meter safety margin may be reduced in certain circumstances for example where congestion of buried services renders it impracticable, but only if the line of the service has been positively identified by drawings and confirmed by a locating device.

Once a service has been exposed, if it cannot be identified the statutory authorities should be called to site so a positive identification can be made.

Where services have been exposed, the relevant statutory authority should be contacted for advice on temporary support if necessary, i.e. where a cable exposed for more than 1 metre





crosses an excavation. Services must not be used as hand or foot holds by anyone climbing in and out of an excavation.

It is the contractor's responsibility to propose, for the approval of the Engineer and the relevant authorities, means of protection and support for all existing services.

If a service suffers damage, however slight, the concerned authority must be informed immediately and arrangements made to keep people clear until it has been repaired or otherwise made safe by the owners.

Smoking, naked flames and the use of electrically operated power tools are prohibited when locating gas mains as a leak could cause a fire or explosion.

"Treatment for Electrical Shock" notices should be provided and fixed adjacent to the area where cables are being located.

### **Hand Tools**

The use of spades and shovels is safer than forks or pick axes. When digging with spades to expose cables, they should be of the narrow tunnelling type.

Picks and forks may be used with care to free lumps of stone, etc., and break up hard layers of chalk or sandstone. Forks, where used, should have only four prongs, maximum 225 mm long. Picks must not be used in soft clay or other soft soils near to services. Hand tools should not be thrown or spiked into the ground, but eased in with gentle foot pressure.

Hand tools are available with approved insulated shafts, these must be used when locating cables.

### **Machines**

Where machine excavators are used in the possible vicinity of buried services, the work must be arranged so that everyone is kept well clear of the bucket while it is digging. If a cable is struck the driver should stay in the cab. If the driver has to leave the cab, he should jump clear otherwise electrocution may take place. No one should enter the excavation or touch the excavator until the cable owner has attended to make the cable safe.

### **Services Embedded in Concrete**

Where it is necessary to break away or disturb concrete in which services are embedded the services should be made dead or an alternative safe method of excavating agreed with the service owner before work starts.

### **Protective Equipment**



Insulated protective gloves, boots and mats should be used when locating cables. A range of fire protective clothing is available which will reduce the risk of burns from explosive arcing of damaged cables.

### **Excavations / Statutory Requirements**

Statutory requirements relating to excavations must be adhered to.



## EXCAVATION AND TRENCH CHECKLISTED

	WITHIN COMPLIANCE	NOT IN COMPLIANCE	CORRECTIVE ACTION
1. Has the excavation or trench been reviewed by a competent person? Have the safety requirements been established?			
2. Have the underground utilities been identified and located?			
3. Are adjacent surface encumbrances removed or barricaded?			
4. Has the protective system (shoring, benching, sloping, etc)? been selected and installed? Is it monitored daily?			
5. where are employees permitted to cross over excavations? Are walkways or bridges provided			
6. Are ramps and bridges signed by a competent person?			
7. Are stairways, ladders, ramps or other safe means of egress provided within 25 feet f every employee?			
8. Are stairways, ladders, ramps or other safe means of egress provided within high visibility vests?			
9. If mobile equipment must operate next to the excavation, are suitable barricades, flagging, stop logs, or beams, provided to prevent encroachment on bank edges?  Or excavating equipment?			
10. Is atmospheric monitoring (confined space program) conducted in excavation where hazardous atmospheres could reasonably be present?			
11. If the excavation trench is classified as a confined space, is the appropriate rescue equipment readily available?			
12. If there is a water hazard present, are adequate precautions in place to prevent flooding?			
13. If an adjacent structure (building foundations sidewalks roadway. Etc) are under mined by the excavation has a suitable support system been designed by a registered professional engineer?			
14. Employees must be protected from falling looks rock and soil. Is the soil at least two feet back from the edge?			
15. Are daily inspections of the excavation, the adjacent areas, and the protective system conducted by a competent person?			
16. Are completed excavation and trench checklists maintained in project files?			

DATE COMPLETE: \_\_\_\_\_ COMPETENT PERSON: \_\_\_\_\_ SIGNATURE: \_\_\_\_\_

PROJECT NAME \_\_\_\_\_ PROJECT NUMBER: \_\_\_\_\_ WEATHERCONDITIONS: \_\_\_\_\_



## FALL PREVENTION AND PROTECTION

### A. PURPOSE

To provide for maximum protection for all personnel against fall, and to use engineering and administrative controls to eliminate fall hazards through pre-task prevention.

### B. APPLICABILITY

This procedure applies to all personnel and shall be incorporated as a minimum safety requirement for all staff.

### C. POLICY

All personnel will be expected to comply with the procedure for personnel fall protection as a minimum.

### D. REFERENCE

1. 29 CFR 1926.500 – Fall Protection (Subpart M)

### E. RESPONSIBILITY

1. The Contractor – Responsible for the implementation and enforcement of the “Fall Prevention and Protection Program”.
2. Supervisors, general foremen - responsible for enforcing this program. Further responsibilities include pre-task planning with regard to job hazards. Pre-task instructions are to be given to each employee prior to the start of the work activity. Special emphasis shall be given to all work in elevated areas. Supervisors must analyze all elevated tasks for fall protection needs and ensure that adequate fall protection systems are provided. After analyzing the tasks, supervisors shall instruct personnel involve in the specifics of the fall protection measures to be used.

### F. DEFINITIONS

1. Anchorage – a secure point of attachment for lifelines, lanyards or deceleration devices.
2. Body Belt (safety belt) – a strap with means both for securing it about the waist and for attaching it to a lanyard, lifeline, or deceleration device.
3. Body Harness – straps which may be secured about the employee, in a manner that will distribute the fall arrest forces over, at least the thighs, pelvis, waist chest and shoulders with means for attaching it to other components of a personal fall an arrest system.
4. Connector – a device which is used to couple (connect) parts of the personal fall arrest system and positioning device systems together.



5. Controlled Access Zone (CAZ) – an area in which certain work (example: overhead bricklaying) may take place without the use of guardrail systems, personal fall arrest systems, or safety net systems an access to the zone is controlled.
6. Equivalent – alternative designs, materials, or methods to protect against a hazard will provide an equal or greater degree of safety for employees than the methods, materials, or design specified in the standard.
7. Failure – load refusal, breakage, or separating of component parts. Load refusal is the point where the ultimate strength is exceeded.
8. Guardrail System – a barrier erected to prevent employees from falling to lower levels.
9. Hole – a gap or void two inches or more in its least dimension, in a floor, roof, or other walking/working surface.
10. Leading Edge – the edge of a floor, roof, or form work for floor or other walking/working surface (such as the deck) which changes location as additional floor, roof, decking, or form work sections are placed, formed or constructed. A leading edge is considered to be in an “unprotected side and edge” during periods when it is not actively and continuously under construction.
11. Opening – a gap or void thirty inches or more high and eighteen inches or more wide, in a wall or partition, through which employees can fall to a lower level.
12. Personal Fall Arrest System – a system used to arrest an employee in a fall from a working level. It consists of an anchorage, connectors, a body belt or body harness, and may include a lanyard, deceleration device, lifeline, or suitable combinations of these. The use of body belt for fall arrest is not recommended.
13. Positioning Device System – a body belt or body harness rigged to allow an employee to be supported on an elevated vertical surface, such as a wall, and work with both hands free while leaning.
14. Safety-Monitoring System – a safety system in which a competent person is responsible for recognizing and warning employees of fall hazards.
15. Walking/Working Surface – any surface, whether horizontal or vertical on which an employee walks or works, including, but not limited to, floors, roofs, ramps, bridges, runways, form work and concrete reinforcing steel but not including ladders, vehicles, or trailers, on which employees must be located in order to perform their job duties.



## **G. GUIDELINES AND PROCEDURES**

1. Each project should be reviewed for potential fall exposures. JHA should be used in reviewing the aforementioned exposures. The following outline is provided for use when given the opportunity to provide input to the engineering design of a project when first planned or in the construction phase.
2. The following outline is to be reviewed to determine which elements may be available for utilization. In these situations, the following recommendations are not to represent a set of rules, but rather a set of guidelines.
  - a. Civil/Site Preparation
    - Trenching – minimize trenches to excessive depth, thus lessening the possibility of injury due to falls into open excavations. At excavations, install perimeter protection capable of meeting approved strength ratings for temporary restraint systems, (i.e. guardrail systems, fences, or barricades).
    - Elevated concrete structures – the design shall include access and egress points as well as the ability to secure lifelines. Imbeds can be added for attachment points.
    - Employees who are working six feet or more above lower levels must be protected by a guardrail system, safety nets, or personal fall arrest systems.
  - b. Structural Iron
    - Bent Sections – maximize the use of these.
    - Pre-Assembly – maximize the practice.
    - Stick Building – minimize this practice
    - Welded Joints – minimize this practice
    - Clip Cradles – install in areas where large members are to be landed in the air.
    - Pin Extractor - maximize the use of this technology.
    - Provide holes and/or retractable reels permitting attachment to steel while on the ground.



- Schedule stairways, ladders, grating, and landing steel to arrive in conjunction with structural steel to allow stairway erection to proceed at the same time as the main structure.
  - Dress out vertical columns on the ground with insulation, ladders, and platforms.
  - Install pipe (including testing), lighting and instrumentation, then erect in a vertical position where possible.
- c. Electrical
- Cable Trays – these should be designed where they are most easily accessible.
  - Minimize areas where new installation is in close proximity to existing “hot surfaces”.
  - Maximize running conduit in bundle.



## 2. PROCEDURE

- a. All personnel in elevated work situations six feet or greater will be required to wear an approved personal fall arrest system or be provided with a safety net, guardrail system or equivalent.
- b. Any situation in which an employee is subject to a fall, six feet or greater without permanent handrail or mid-rail protection, is considered elevated work and shall follow OSHA. Subpart M, 1926.500-Fall Protection.
- c. Maximum use of primary fall protection systems will be implemented. These include scaffolds, aerial lifts, personnel hoists, etc. These systems shall be equipped with complete working/walking surfaces, free of unprotected floor openings, guardrail systems, toe boards, and safe means of access. In cases where floor openings must be left open for work access, the appropriate guardrail systems and lifelines must be erected (see OSHA 1926.502 (b)).
- d. Personnel travelling or working in elevated areas where a fall exposure exists shall make use of secondary fall protection by securing their safety lanyard at all times to a structure, lifeline or approved fall arresting device capable of supporting 5,000 pounds. To ensure these all personnel shall use either the “Y” design lanyard with shock absorbing device or two straight lanyards with shock absorbing devices. One end of the “Y” or one straight lanyard shall be secured at all times providing 100% fall protection.
- e. Personnel working from or travelling in aerial lifts or personnel lifting devices shall properly secure their lanyard to that device.
- f. Personnel travelling in construction elevators are not required to secure safety lanyards.
- g. All fall protection devices are to be inspected on a daily basis before use for damage and/or deterioration. Defective equipment shall be removed from service and either destroyed or repaired. All fall protection devices are to undergo a documented inspection and will be factory inspected per manufacturer’s recommendations. No alterations to fall protection devices are allowed.
- h. Fall protection devices subjected to “shock loading” impose during a fall arrest shall be removed from service immediately.
- i. Fall protection devices and systems shall not be used for any other purpose other than employee safeguarding.
- j. All fall protection equipment required for the project shall conform to the Engineer and/or contractor authorized safety equipment list. Any





other brands, models, etc., shall be approved by the Engineer, in writing, prior to use as applicable.

### 3. **FALL PROTECTION DEVICES**

#### a. Primary Fall Protection Systems

These systems provide walking and working surfaces in elevated areas which are free from floor openings and are equipped with standard guardrail systems on all open sides and with closure apparatus for ladder openings or other points of access. These systems include, but are not limited to, scaffolds, pencil boards, aerial lifts, and other approved personnel hoisting devices.

1. Standard guardrails will consist of top rail material approximately 42 inches above the walking/working surface. In addition, a mid-rail of the same material will be installed at a height of approximately 21 inches above the surface. A 3 ½ inch minimum (tall) toe board shall be installed at the walking/working surface. The upright support post spacing shall not exceed eight feet and the entire system must be capable of supporting 200 pounds force in any direction with minimum deflection.
2. Floor openings/hole covers are to be used to close openings and holes in floors, platforms, and walkways. These covers must be capable of supporting without failure at least twice the weight of employees, equipment, and materials. In lieu of floor covers, guardrail systems and/or other means of secondary fall protection (i.e. lifelines) shall be erected.

Where covers are utilized, the cover must completely cover the opening/hole, secured against accidental displacement, and must be marked as follows:

**“FLOOR/ROOF OF OPENING”  
“DO NOT REMOVE”**

#### b. Personal Fall Arrest Systems

1. These systems shall be worn and used as a backup to primary fall protection systems and in the absence of primary fall protection systems.
2. Personal systems will not be used.
3. Subcontractors shall provide appropriate fall protection equipment to their employees.



4. Lanyards must be the shock absorbing type. The shock absorber end of the lanyard shall be attached to the D-Ring located on the middle back of the harness belt or between the shoulder blades.
5. D-Ring on the waist (side) of the harness may only be used for positioning and with rail type ladder climbing devices. Only approved work positioning lanyards will be used for positioning; a shock absorbing lanyard must also be secured in this event.
6. The “Y” type shock absorbing lanyard shall only be used with the full body harness.
7. All lanyards shall have the double-locking type snaps to prevent roll out, and shall have a minimum tensile strength of 5,000 pounds.

c. Warning Lines

1. Warning lines are points of attachment for fall protection and must be capable of supporting at least 5,000 pounds impact loading. Warning lines may be mounted either vertically or horizontally and are intend to provide mobility with fall protection to personnel working in elevated areas.
2. Horizontal warning lines must be made to support and withstand at least 5,000-pound impact. Alternate materials for specific cases must be approved prior to usage.
3. Cable clamps shall be of the appropriate size for the diameter of cable being use and there shall be a minimum of three clamps at each termination end for cable up to 7/16 inch in diameter. For ½ to ¾” diameter cable, four cable clamps shall be utilized. For cable requirements larger than ¾ inch, the Project Management Team shall be consulted.
4. Horizontal warning lines shall be positioned to provide points of attachment at waist level or higher to the personnel utilizing them.
5. Warning lines shall not be used for any purpose other than fall protection.
6. Horizontal warning lines shall be installed and maintained by a competent person(s).
7. Warning lines shall be flagged at not more than six-foot intervals with high visibility material.
8. Vertical warning lines are used for personal fall protect in where vertical mobility is require. They must be comprised of static



lifelines made of synthetic fiber rope or cable which is equipped with approved ropes grabs, or they may consist of self-retracting reel type lanyard/lifelines which are attached to a safety harness (see 1926.502(d) (11,12,13)).

9. Static rope grabs are required for personnel working from spider/sky climbers, two-point suspension scaffolds, or boatswains' chairs. these types of life lines can also be used to provide fall protection for other operations such as scaffold erection and structural steel erection where tie-off points are limited and vertical mobility is required.
10. Cable clamps for lifelines shall be painted to identify them as being for life line use only.
11. Safety nets shall be installed as close as practicable under the walking/working surface on which employees are working, but in no case more than 30 feet below such level. (Refer to 1926.502.).

### **3. LIFELINE PLACEMENT/INSTALLATION**

#### **a. Horizontal Lifelines**

1. Horizontal lifelines placed in skeletal steel structures shall be at least ½ inch cable and secured on each end by at least three cable clamps of proper size. Intermediate supports shall be adequate to minimize sag and vertical deflection under loading.
2. Priority shall be given to lifeline placement as structures are erected.
3. Lifelines shall be arranged to provide adequate mobility in all areas of the structure while maintaining 100% fall protection for personnel.
4. Personnel installing lifelines shall be protected from falls at all times by use of retractable lifelines or tie-off to structural steel, etc.
5. Softeners shall be used where lifelines contact sharp edges such as beam flanges. Softeners shall be secured in place to prevent accidental misplacement.

#### **b. Vertical lifelines/Retractable Lifelines**

1. Static rope lifelines shall be made of synthetic fiber rope and will be inspected prior to each use.



2. Static rope lifelines must be used with approved rope grabs for lanyard attachment.
3. Static rope lifelines must be anchored at the top by means capable of supporting 5,000 pounds impact loading.
4. Static rope lifelines/rope grabs will be placed for each person working from or riding in spider/sky climbers, two-point suspension scaffolds, or boatswains' chairs. Each person must have an individual lifeline, and the attachment point of the body harness shall be located in the center of the wearer's back.

c. Retractable Reel Lifelines

1. Retractable lifelines devices shall be capable of sustaining a minimum tensile load of 3,000 pounds applied to the device in the fully extended position.
2. Retractable lifeline devices shall be secured by means of carabineers, shackles and wire rope or synthetic slings. Tie wire, synthetic, or natural rope shall not be used to secure these devices.
3. Each retractable lifeline device shall be equipped with a rope tag line for extending the device to elevations below the point of attachment.
4. Retractable lifelines shall also be used to provide fall protection to structural iron workers during erection prior to installation of other fall protection systems.

**5. OTHER APPLICATIONS.**

a. Ladders

See related section in this guide.

b. Temporary Work Platforms/Walkways

Scaffolds and Pencil Boards.

1. All temporary platforms/walkways are to be equipped with solid decks free of openings and shall be equipped with a standard guardrail system.
2. Personnel working from temporary platforms or travelling on temporary catwalks shall have their safety lanyard



secured at all times to a lifeline or structure capable of supporting 5,000 pounds impact loading.

3. Every temporary work platform or walkway must be provided with a safe means of access/egress which allows personnel to remain tied off at all times. Retractable lifelines shall be used to achieve fall protection while ascending or descending access ladders to temporary work platforms or walkways.

c. Aerial Lifts

Personnel riding in or working from these lifts must secure their safety lanyard to the lift basket at all times.

d. Spyder/Sky Climbers and Boatswain Chairs

Personnel riding in or working from these devices shall each be provided an independent lifeline and rope grab to which their lanyard shall be secured at all times while aloft.

e. Crane Hoisted Personnel Baskets

Personnel riding in or working from personnel baskets must have their lanyard secured to the basket at all times when aloft. (Refer to 1926.550(g)).

f. Elevators

Personnel riding inside of enclosed elevator cars are not required to secure their safety lanyard.

g. Skeletal Steel/Open Structures

1. This section deals with fall protection when personnel are required to gain access to travel and work in skeletal steel/open structures such as pipe racks. This includes traveling on or working on any elevated surface which is not designed as a personnel work surface or walkway (e.g. Pipe cable tray, etc.).
2. Personnel working or traveling in elevated skeletal steel/open structures shall secure their lanyards to a lifeline or structure capable of supporting 5,000 pounds impact loading at all times (100% fall protection). This includes both horizontal and vertical travel.
3. Adequate lifeline systems will be erected when feasible in skeletal steel/open structures to allow 100% fall



protection for personnel working or traveling in these structures.

4. In lieu of lifelines, personnel may secure safety lanyards to substantial structural steel member, pipe, and pipe supports. Personnel shall avoid securing lanyards to cable tray, conduit, and screw pipe.

h. Permanent Structures/Stairs/Caged Ladders

1. All contractor employees and subcontractor personnel are required to wear an approved full-body safety harness with shock absorbing lanyards.
2. When personnel are working or traveling in incomplete permanent structures where fall exposure exists such as floor openings or open sided floors, then they must be properly tied off when within 6 feet of any fall exposure, or the proper guardrail or restraint system must be in place.
3. Priority shall be given to installation and securing of permanent floors and walking surfaces and all guardrails or other permanent fall protection devices.
4. Permanent stairs, when completed, shall be used to access or egress elevated work areas.

i. Structural Steel Erection

1. Personnel erecting structural steel must achieve 100% fall protection through use of safety harnesses/lanyards, retractable lifelines, aerial lifts, and guardrail systems.
2. Access to structural steel shall be obtained by use of ladders, aerial lifts, or other approved personnel hoisting devices. Climbing of structural steel members such as columns and diagonal braces shall not be allowed.
3. Prior to and during horizontal lifeline placement, structural personnel shall crawl (coon) steel members with lanyards tied around these members



## SCAFFOLD SAFETY

### A. PURPOSE

To provide for maximum protection for all personnel while using scaffolding on the project's site and to comply with Subpart L of the OSHA Construction Standards during erection and use of scaffolds.

### B. APPLICABILITY

This procedure applies to all personnel and shall be incorporated as a minimum safety requirement for all contractors and subcontractors.

### C. POLICY

All personnel working on the project will be expected to erect and use scaffolding meeting local and international Construction Standards as a minimum. When scaffolding cannot meet Subpart L then alternative means must be used to protect employees, the public, other personnel working on the scaffold or in the area of the scaffolding.

### D. REFERENCE.

1. 29 CFR 1926.450 (Subpart L)

### E. RESPONSIBILITY

1. The contractor's designated safety officer/representative shall be responsible for the implementation and enforcement of the "Scaffold Safety Program" on the project.
2. Other contractor site staff shall also be responsible for the proper implementation of this program.

### F. DEFINITIONS

1. Bearer – A horizontal member of a scaffold upon which the platform rests, and which may be supported by ledgers.
2. Boatswain's Chair – A seat supported by slings attached to a suspended rope, designed to accommodate one workman in a sitting position.
3. Brace – A tie that holds one scaffold member in a fixed position with respect to another member.
4. Bricklayers' Square Scaffold – A scaffold – consisting of wood squares which support a platform, limited to light and medium duty.
5. Carpenters' Bracket Scaffold – A scaffold consisting of wood or metal brackets supporting a platform.
6. Cleat – A structural block used at the end of a platform to prevent the platform from slipping off its supports.
7. Coupler – A device for locking together the component parts of a tubular metal scaffold (the material used for the couplers shall be of a structural



type, such as drop forged steel, malleable iron, or structural grade aluminum.

8. Crawling Board or Chicken Ladder – A plank with cleats spaced and secured at equal intervals, for use by a worker on roofs, not designed to carry any material.
9. Float or Ship Scaffold – A Scaffold hung from overhead supports by means of ropes a consisting of a substantial platform having diagonal bracing underneath resting upon and securely fastened to two parallel planked bears at right angles to the span.
10. Guardrail – A rail secured to uprights and erected along the expose sides and ends of platforms.
11. Heavy Duty Scaffold – A scaffold designed and constructed to carry a working load not to exceed 75 pounds per square foot.
12. Horse Scaffold – A scaffold designed and constructed to carry a working load not to exceed 75 pounds per square foot.
13. Interior Hung Scaffold – A scaffold suspended from the ceiling roof structure.
14. Ladder Jack Scaffold – A light duty scaffold support by brackets attached to ladders.
15. Light Duty Scaffold – A scaffold designed and constructed to carry a working load not to exceed 25 pounds per square foot.
16. Manually Propelled Mobile Scaffold – A portable rolling scaffold supported by casters.
17. Multiple-Point Suspension Scaffold – A scaffold having a continuous platform supported by bearers suspended by wire rope from overhead supports, so arranged and operated as to permit the rising or lowering of the platform to desire working positions.
18. Maximum Rate Load – The total of all loads including the working load, the weight of the scaffold, and such other loads as may be reasonably anticipated.
19. Medium Duty Scaffold – A scaffold designed and constructed to carry a working load not to exceed 50 pounds per square foot.
20. Midriff – A rail approximately midway between the guardrail and platform.
21. Putlog – A scaffold member upon which the platform rests.
22. Runner- The length wise horizontal bracing or bearing members or both.
23. Scaffold – Any temporary elevated platform and its supporting structure use for supporting workmen or materials, or both.
24. Toe board –A barrier secured along the sides and ends of a platform to guard.
25. Tube and coupler Scaffold – An assembly consisting of tubing which serves as posts, bearers, braces, ties, and runners, abase supporting the posts, and special couplers which serve to connect the up rights and to join the various members.
26. Tubular Welded Frame Scaffold – A sectional panel or frame metal scaffold substantially built up of prefabricated welded sections which consist of posts and horizontal be are or with inter mediate members.
27. Working Load – Load imposed by men, materials, and equipment.

## **G. PROCEDURE**





## 1.0 General Project Requirements

- a. Construction Standards require scaffolds be erected with adequate footing, anchorage, and bracing to support the maximum intended load. The scaffolds should be constructed to carry the maximum intended load without settling or displacement. No scaffold should be erected, moved, dismantle or altered except under the proper supervision of a “competent person”.
- b. Guardrails and toe boards should always be placed on all open sides of the scaffold which are more than ten feet above the ground. Use toe boards on all scaffolds to prevent tools from falling below. Scaffolds should support, without failure, at least four times the maximum intended load.
- c. The cross braces should be designed to provide maximum structural integrity, especially when constructing tower scaffolds. The cross braces are equally as important as guardrails, planking, footings, and anchorage. Oftentimes contractors ask themselves whether or not cross bracing is necessary. In most instances, it is better to cross brace the vertical members rather than risking collapse of the entire structure.

## 2.0 Erection of Scaffolds

- a. Welded-frame type scaffolds, “Safeway” and all tube and coupler-type scaffolds shall only be erected in accordance with Subpart L Appendix “A”.
- b. The maximum allowable load per walkthrough frame is 2500 pounds uniformly distributed, or 600 pounds concentrated center-point loading.
- c. Examine footing a set scaffold legs on baseplates placed on or sand or mud still adequate to support the maximum intended load, 1½ inches thick a 12 inches square minimum when not of concrete-type surface.
- d. When erecting a rolling scaffold, set wheels on lumber, if necessary, to keep from digging into ground or pavement. X-bracing should always be installed.
- e. Adjusting screws shall be installed only between baseplate and vertical frame section. They shall never be used together with casters. Adjusting screws shall not be extended more than 12 inches. All scaffolds will be erected plumb and level.
- f. On scaffolds over one frame high, the frames shall be placed one on top of the other with coupling or stacking pins to provide proper vertical alignment of the legs. Both the upper and lower frame will be secured to the stacking pin by a locking pin or wire.



- g. Scaffolds shall be properly braced by cross bracing or diagonal braces (or both) when necessary. All brace connections must be secure.
- h. When scaffold height exceeds three times the smallest base dimension, it must be secured to the building or structure at the second lift and every other lift thereafter. Running scaffold is to be anchored every 30 feet horizontally at the heights established in the preceding sentence. "Out-riggers" or guys may be used when it is impractical to secure scaffold to building or structure.
- i. All scaffold working platforms shall be equipped with a standard 42 inch-high rigidly secured (not wired) handrail, a midrail, and be completely decked with safety planks or manufactured scaffold decking and provided with rigidly secured toe boards. Planks of 2-inch scaffold grade lumber or laminated plywood shall only be used. All scaffold decking shall be cleated and/or secured. Overlaps shall not be cleated, as this would create a possible tripping hazard. All overlaps shall be secured at 12 inches, but not less than 6 inches.
- j. Scaffolds shall be provided with a screen between the toe board and the handrail, consisting of No 18-gauge U.S. Standard wire ½ inch mesh, or equivalent, or a canopy extending along the entire opening, such as fire blanket, where persons are required to work or pass under the scaffold.
- k. Access to working platforms shall be by ladder, attached separately to the scaffold, with a 12-inch maximum rung height.
- l. All casters used with scaffolds shall be equipped with a positive locking device to hold the scaffold in position. The 8-inch caster has a rated load capacity of 500 pounds. When casters are used, this capacity should be the load-limiting factor.
- m. Caster on rolling scaffolds shall be locked at all times while the scaffold is being erected or in use. Scaffolds shall not be moved while personnel remain on the scaffold. Tools or materials should either be removed from the platform or secured so they cannot fall or roll off when the scaffold is being moved.

### **3.0. Inspection**

- a. Before erecting and during its mantling, inspect all scaffold components must be carefully inspected. Those found with defects must be discarded immediately.



- b. Handrails, midrolls, cross-bracing, and steel tubing shall be inspected for indications where a welding arc has been struck or other damage incurred.
- c. Scaffold components shall be straight and free from bends kinks, dents and severe rusting.
- d. Scaffold frame weld zones shall be inspected for cracks and ends of tubing checked for splitting or cracking.
- e. Manufactured decking shall be inspected for loose bolt or rivet connections and bent, kinked, or dented frames. Plywood surfaces should be checked for softening due to rot or wear and peeling of laminated layers at edges.
- f. Safety planks should be checked for rot, cracks, cuts, and other external damage. Also, inspect tie rod or bolt and cleats.
- g. Each quick-connecting device, whether, cam, spring, threaded connection, or toggle pin arrangement, should be inspected to see that it operates properly.
- h. Casters, if used, should be inspected for smooth rolling surface, free turning, free acting swivel, and to be sure that the locking mechanism is in good working order.
- i. All scaffolds must be inspected weekly or after adverse weather or other conditions likely to affect its strength or stability. In addition, all scaffolds must be tagged to facilitate and control the inspection process

#### **4.0. Attachments**

Scaffold Inspection Guide

#### **5.0 General Usage**

- a. Personnel must wear personal fall arrest devices and be properly tied-off on all scaffolds where a fall arrests device and be properly tied-off on all scaffolds where a fall exposure exists.
- b. Do not climb on or work from any scaffold, handrail, midtrial, or brace member. Use the access ladder to get on and off of scaffold.
- c. Personnel involved in erection, altering, or dismantling scaffolding must be supervised by a competent person designate in writing.
- d. Scaffolds shall be erected plumb and on a sound foundation capable of supporting the scaffold an its intended lad without tipping or settling.



- e. Unstable objects such as barrels, boxes, loose bricks, or concrete blocks shall not be used to level or support scaffolds or planking.
- f. Work platforms shall be completely decked with scaffold grade planking. The planking shall be secured in place.
- g. Drawings a specification for all frame scaffolds over 125 feet in height above the base plates shall be designed by a professional engineer.
- h. Rolling scaffolds must be equipped with casters, with positive locking devices to hold the scaffold in place when in use.
- i. Casters shall not be used in conjunction with adjusting screws.
- j. Rolling scaffolds shall not be ridden by employees under any circumstances.

#### **6.0 SUSPENDED SCAFFOLDS**

- a. General hoists, platforms, anchorage systems, and supporting ropes shall be designed, erected, and used in accordance with manufacturer specifications and governmental requirements. Suspended scaffolds shall be erected by qualified personnel and inspected both before and during use by a “competent person”.
- b. All suspended scaffolds or platforms shall be equipped with separate vertical safety lines anchored independently if the scaffold system. Personnel shall be tied off to these vertical lines.

#### **H. TRAINING REQUIREMENTS**

- 1. Each employee who performs work while on a scaffold must be trained by a person qualified in the subject matter to recognize the hazards associated with the type of scaffold being used and to understand the procedures to control or minimize those hazards.
- 2. When the Engineer has reason to believe that an employee lacks the skill or understanding needed for safe working involving the erection, use or dismantling of scaffolds, the Engineer shall remove each such employee until the requisite proficiency is regained.



## **All Scaffold Structures**

Before commencing the erection of any scaffold structure, as defined above, the drawings and calculations must be approved by Engineer. Those must be prepared in accordance with local rules and regulations in addition to manufacturer's recommendations.

## **Imposed Loadings**

The following minimum loadings apply unless otherwise agreed with Engineer:

		<b><u>Max. Bay Length</u></b>
Masonry & Demolition	3.00 KN/m <sup>2</sup>	1.8 m
Bricklaying - (rendering, window fixing, etc.	2.50 KN/m <sup>2</sup>	2.0 m
Light Duty - (painting, stone cleaning)	1.50 KN/m <sup>2</sup>	2.4 m
• Inspection, cleaning, birdcage scaffolds	0.75 KM/m <sup>2</sup>	2.7 m

## **Aluminum Tube**

No aluminum scaffold tube shall be used on site except for proprietary mobile towers without the prior agreement of the Engineer.

## **Scaffolders**

All scaffolders should have sufficient experience in similar operations.

### **Basic Scaffolding Operations**

Erecting, adapting and dismantling:

- Independent, putlog and birdcage scaffolds and static and mobile towers.
- Beams to form gantries and openings, correctly braced.
- Hoist frameworks and guides.
- Protective fans.
- Stack scaffolds.
- Roof scaffolds.
- Proprietary systems.

Fixing wire netting to hoist framework or scaffold framework.

Fixing sheeting to scaffold framework.



Interpreting simple design layout drawing for scaffolding detailed above.

Applying knowledge of Construction Regulations to operations listed above.

### **Advanced Scaffolding Operations**

All work in list of Basic Operations.

Erecting, adapting and dismantling:

- Scaffolding to form truss-out scaffold.
- Slung scaffolds, including use of lifting equipment, wire ropes, chains and shackling.
- Raking and flying shores.
  - Other forms of designed structures, e.g. larger truss-outs, cantilevers, lifting structures, ramps and footbridges.
  - Scaffolding or standard props (including all bracing) to form a dead shore, including adjustable bases and fork heads.
- Manual rope /winch-operated boatswains' chairs and cradles.
  - Scaffolding and proprietary systems (including leveling to within reasonable tolerances) to support formwork as laid out in engineering scaffold drawing.

Interpreting scaffold drawings.

Applying knowledge of Construction Regulations to operations listed above.

### **Ladders and Working Platforms**

Ladders which form part of a scaffold should be thoroughly inspected at the same time as the scaffold.

Damaged or defective ladders are to be taken out of use immediately. A ladder must overrun its landing place by a minimum of 1.066 m, securely tied, have a firm level footing and set at the correct angle (approx. 70° to horizontal). The lashing together of ladders to provide extra length is not permitted.

### **Working Platforms**

All working platforms over a height of 2 m and erected on independent tied, birdcage, putlog face and design scaffolds shall be a minimum width of 3 boards (635 mm) and have guardrails and toe-boards.

When working platforms are used for men and for the deposit of materials the following regulations apply:

- 4 boards wide (863 mm) with a passage of at least 2 boards (431 mm) for safe access. This passage must be increased to 3 boards (635 mm) if barrows are used.



- 5 boards wide (1.066 m) is considered to be the normal requirement for bricklaying purposes.
- 6 boards wide (1.295 m) if used by masons. Platforms of this width must be specially designed.

Note:

A minimum width of 2 boards (431 mm) is necessary when required for access only.

The space between the edge of the platform and the face of the building must be as small as practicable and in no case more than 305 mm without the provision of internal guardrails and toe-boards.

Where materials are stacked upon working platforms and could fall between the underside of the guardrail and the top of the toe-board this area must be protected by brick-guards or other suitable material. This requirement will also apply if a person is working in a position which is below the height of the guardrail.

Guardrails must be erected to a height of between 914 mm to 1.143 m and have toe-boards to a minimum height of 152 mm. The opening between the underside of the guardrail and the top of the toe-board must not exceed 762 mm (except where noted above).

Scaffold boards must not overlap their supports by more than four times the thickness, be in good condition, and supported at centers not greater than:

- 990 mm for 32 mm boards
- 1.524 m for 38 mm boards
- 2.591 m for 50 mm boards

## **Powered Working Platforms**

Operators must receive training in the use of these platforms. Care must be taken to ensure the stability of this equipment and manufacturers' instructions strictly adhered to. Particular attention must be given to the suitability of the ground and use of outriggers.

The safe working load of the platform must never be exceeded and the equipment must be isolated when not in use.

## **SCAFFOLD BOARDS**

### **Introduction**

Every year in the Construction Industry several operatives are seriously injured, sometimes fatally, as a result of scaffold boards failing in use. Failure of a board may be due to material limitations, but many failures can be attributed to misuse of the board on site.

### **Safety Policy**

It is mandatory that the following requirements for the care, maintenance and use of scaffold boards are implemented on site.



- 1) Only boards satisfying B.S. 2482:1981 or a more demanding specification should be used and only in a manner complying with the Code of Practice B.S. 5973:1981.
- 2) Boards must be clean prior to stacking and use on site.
- 3) Boards must be stacked flat and raised from the ground with cross battens.
- 4) End hoops, or other means of end protection must be fitted and be in good condition.
- 5) Boards with split ends may be cut down to form boards of reduced length. The end hoops must be re-fixed.
- 6) Boards with decay or other defects and warped boards must not be used.
- 7) Boards must not be used to assist vehicles over soft ground.
- 8) Boards must not be used as ramps or platforms over long spans, even when close to the ground where there is little risk of serious injury on site, as this may overstress the board and cause it to fail later in a different situation.
- 9) Boards must not be allowed to fall to the ground on their ends when dismantling a scaffold.
- 10) Boards must be inspected after each job. Boards showing any signs of ill treatment and abuse must be discarded.
- 11) Boards must never be repaired in order to extend their life.
- 12) Boards must never be used as work benches. (Possible damage from hand held power saws, etc.)





SCAFFOLD INSPECTION GUIDE

**Production**

- \_\_\_\_\_ Base plates installed
- \_\_\_\_\_ Ground packed & level
- \_\_\_\_\_ Concrete level
- \_\_\_\_\_ Base jacks needed
- \_\_\_\_\_ Standards placed in center mudsills

**Standards**

- \_\_\_\_\_ Constructed on the outside
- \_\_\_\_\_ Of the ledger when possible
- \_\_\_\_\_ Plumb to full height
- \_\_\_\_\_ Spacing meets load requirements
- \_\_\_\_\_ Requirements (6,6" s pan max)

**Ledgers**

- \_\_\_\_\_ Leveled horizontally
- \_\_\_\_\_ Fixed inside standards when Possible
- \_\_\_\_\_ Right angle couplers
- \_\_\_\_\_ Height between ledgers will 6' max

**Bearers**

- \_\_\_\_\_ Leveled horizontally
- \_\_\_\_\_ Butted against standards
- \_\_\_\_\_ Right angle couplers

**Platform**

- \_\_\_\_\_ Fully decked (1' max gap between planks)
- \_\_\_\_\_ Toe boards required
- \_\_\_\_\_ 6' min long: a straight path along
- \_\_\_\_\_ Over hang of bearer's ledgers secured
- \_\_\_\_\_ Plank overlap is 12' & properly secured
- \_\_\_\_\_ Plank width will be maintained at
- \_\_\_\_\_ 9' min long: a straight path along
- \_\_\_\_\_ The entire length

**Sway Brace**

- \_\_\_\_\_ Fixed to standards
- \_\_\_\_\_ Start at bottom
- \_\_\_\_\_ 43' angles

**Ledger Brace**

- \_\_\_\_\_ Every other pair of standards
- \_\_\_\_\_ One every lift

**Guard/Handrails**

- \_\_\_\_\_ Necessary above
- \_\_\_\_\_ Inside of standards when possible
- \_\_\_\_\_ 36-42" max height from working surface
- \_\_\_\_\_ All connections made & secure

**Ties**

- \_\_\_\_\_ Every 30° horizontally
- \_\_\_\_\_ Every 25' vertically

**Deformities**

- \_\_\_\_\_ Sinking
- \_\_\_\_\_ Overload
- \_\_\_\_\_ Snow & ice
- \_\_\_\_\_ Out of plumb

**Ladder Access**

- \_\_\_\_\_ Scaffold is provided with safe
- \_\_\_\_\_ Ladders staggered every 20'
- \_\_\_\_\_ Ladders height is measured Platform to platform
- \_\_\_\_\_ Continuous ladders connecting
- \_\_\_\_\_ Platform measuring between 20' & 30' without cage protection
- \_\_\_\_\_ Require fall protection
- \_\_\_\_\_ Ladder extends 36' above top
- \_\_\_\_\_ Handrail on top platform when possible or safe access is provided
- \_\_\_\_\_ Through handrail
- \_\_\_\_\_ Only when it is possible to step
- \_\_\_\_\_ Directly off the ladder onto a
- \_\_\_\_\_ Platforms, the ladder must extend
- \_\_\_\_\_ 42' above the platform
- \_\_\_\_\_ Broken/bent structural members
- \_\_\_\_\_ Handrails missing
- \_\_\_\_\_ Loose ladders
- \_\_\_\_\_ Loose handrails
- \_\_\_\_\_ Missing toe boards

**Scaffold Status**

**Signs**

- \_\_\_\_\_ DO NOT USE signs to be used
- \_\_\_\_\_ When scaffolds are left



45° angles

Unattended during  
construction  
Being dismantle, or  
incomplete

**Mobile Scaffold**

All casters will be pinned to  
Scaffold buck legs on all scaffolds  
4 feet wide or less  
Cannot be used on surface 3° out of  
level



## STAIRWAYS AND LADDERS

### A. PURPOSE

The purpose of this procedure is to provide for a structured approach to the construction and use of stairways and ladders site. This approach will be consistent with required standards and good construction practices.

### B. APPLICABILITY

This procedure applies to all personnel and shall be incorporated as a minimum safety requirement for all staff working on site.

### C. POLICY

Personnel performing work on project sites are expected to construct and use ladders and stairways in accordance with this procedure, as well as general safety orders as applicable.

### D. REFERENCE.

1. 29 CFR 1926.1050 to .1053 inclusive (subpart X).
2. 29 CFR 1910.27 “Fixed Ladders”
3. 29 CFR 1910.24 “Fixed Industrial Stairs”

### E. RESPONSIBILITY

1. The contractor shall have the responsibility for the implementation and enforcement of the “Stairway and Ladder Safety Program.”
2. A contractor designated person(s) shall have the responsibility for the construction and installation of all ladders and stairways on the project.
3. Contractor supervisors shall ensure all personnel are trained in the construction and use of stairways and ladders (as applicable) prior to engaging in any project activities.

### F. DEFINITIONS

1. Cleat – means a ladder cross piece or rectangular cross section place on edge upon which a person may step while ascending or descending a ladder.
2. Equivalent – means alternative designs, materials, or methods that the employer can demonstrate will provide an equal or greater degree of safety for employees than the method or items specified in the Standard.



3. Failure – means load refusal, breakage, or separation of component parts. Load refusal is the point where the structural members lose their ability to carry the loads.
4. Fixed ladder – means a rail used to provide employees with a hand hold for support.
5. Hand rails – means a ladder that is fabricated by employees, typically at the construction site, and is not commercially manufacture.
6. Job-made ladder – means a ladder that is fabricated by employees, typically at the construction site, and is not commercially manufactured.
7. Lower levels – means those areas to which an employee can fall from a stairway or ladder.
8. Maximum intended load – means the total load of all employees, equipment, tools, materials, transmitted loads, and other loads anticipate to be applied to a ladder component at any one time.
9. Nosing – means that portion of a tread projecting beyond the face of the riser immediately below.
10. Point of access – means all areas used by employees for work-related passage from one area or level to another.
11. Portable ladder – means all areas used by employees for work-related passage from one area or level to another.
12. Riser height – means the vertical distance from the top of a tread to the top of the next higher tread or platform/landing or the distance from the top of the platform/landing to the top of the next higher tread or platform/landing.
13. Stair-rail system – means a vertical barrier erected along the unprotected sides and edges of a stairway to prevent employees from falling to lower levels.

**G. GENERAL REQUIREMENTS**

1. A stairway or ladder shall be provided at all personnel points of access where there is a break in elevation of 19 inches (48 cm) or more, and no ramp, runway, slop embankment, or personnel hoist is provided.
2. A double-cleated ladder or two or more separate ladders shall be provided when ladders are the only means of access or exit



from a working area for 25 or more employees, or when a ladder is to serve simultaneous two-way traffic.

3. When a building or structure has only one point of access between levels, that point of access shall be kept clear to permit free passage of employees, or when a ladder is to serve simultaneous two-way traffic.

## **H. STAIRWAYS**

1. The contractor shall provide and install all stairway and ladder fall protection systems required by this procedure and shall comply with all other pertinent requirements of this procedure before employees begin the work that necessitates the installation and use of stairways, ladders, and their respective fall protection systems.
2. Stairways that will not be permanent part of the structure on which construction work is being performed shall have landing of not less than 30 inches (76 cm) in the direction of travel and extend at least 22 inches (56 cm) in width at every 12 feet (3.7 m) or less of vertical rise.
3. Stairs shall be installed between 30 deg. From horizontal.
4. Where doors or gates open directly on a stairway, a platform shall be provided, and the swing of the door shall not reduce the effective width of the platform to less than 20 inches (51 cm).
5. Metal pan landings and metal pan treads, when used, shall be secure in place before filling with concrete or other material.
6. All parts of stairways shall be free of hazardous projections, such as protruding nails.
7. Slippery condition on stairways shall be eliminated before the stairways are used to reach other levels.
8. Except during stairway construction, foot traffic is prohibited on skeleton metal stairs where permanent treads and/or landings are to be installed at a later date, unless the stairs are fitted with secured temporary treads and landings long enough to cover the entire tread and/or landing area.



9. Treads for temporary service shall be made of wood or other solid material, and shall be installed the full width and depth of the stair.
10. Stairways having four or more risers or rising more than 30 inches (76 cm), whichever is less, shall be equipped with:
  - a. At least one handrail: an
  - b. One stair rail system along each unprotected side or edge
11. Winding and spiral stairways shall be equipped with a handrail off set sufficiently to prevent walking on those portions of the stairways where the tread width is less than six inches (15 cm).
12. Midrails, screens, mesh, intermediate vertical members, or equivalent intermediate structural members shall be provided between the top rail of the stair rail system and the stairway steps.
13. Midrails, when used, shall be located at the height midway between the top edge of the stair rail system and the stairway steps.
14. Screens or mesh, when used, shall extend from the top rail to the stairway step, and along the entire opening between top rail system.
15. When intermediate vertical members, such as balusters, are used between posts, they shall not be more than 19 inches (48 cm) apart.
16. Other structural members, when used, shall be installed such that there are no openings in the stair rail system that are more than 19 inches.
17. Handrails and the top rails of stair rail systems shall be capable of withstanding, without failure, a force of at least 200 pounds applied within two inches (5 cm) of the top edge, in any downward or outward direction, at any point along the top edge.
18. The height of handrails shall not be more than 37 inches (94 cm) nor less than 30 inches (76 cm) from the upper surface of the handrail to the surface of the tread, in line with the face of the riser at the forward edge of the tread.
19. When the top edge of a stair rail system also serves as a handrail, the height of the top edge shall be not more than 37 inches (94 cm) nor less than 36 inches (91 cm).



inches (91.5 cm) from the upper surface of the of the tread, in line with the surface of the riser at the forward edge of the tread, in line with the surface of the riser at the forward edge of the tread.

20. Stair rail systems and handrails are to be so surfaced as to prevent injury from punctures or lacerations, and to prevent snagging of clothing.
21. Handrails shall provide an adequate handhold for grasping them to avoid falling. The ends of stair rail system and handrails shall be constructed so as not to constitute a projection hazard. Handrails that will not be a permanent part of the structure being build to shall have a minimum clearance of three inches (8 cm) between the handrail a wall, stair rail systems, and other objects.
22. Protected sides and edges of stairway landings shall be provided.

## **I. LADDERS**

The following requirements apply to all ladders as indicated, including job-made ladders.

Ladders shall be capable of supporting the following loads without failure:

1. Each self-supporting portable ladder. At least four times the maximum intended load, except that each extra-heavy-duty type. The ability of a ladder to sustain the loads indicated in this paragraph shall be determined by applying or transmitting the requisite load to the ladder in a downward vertical direction.
2. Each portable ladder that is not self-supporting: At least four times the maximum intended load, except that each extra-heavy-duty type 1A metal or plastic ladder shall sustain at least 3.3 times the maximum intended load. The ability of ladder to sustain the loads indicate in this paragraph shall be determined by applying or transmitting the requisite load to the ladder in a downward vertical direction when the ladder is place at an angle of 75½ degrees from the horizontal.
3. Each fixed ladder: At least two loads of 250 pounds (114 kg) each, concentrated between any two consecutive attachments plus anticipated loads caused by ice buildup, winds, rigging, and impact loads resulting from the use of ladder safety devices. Each step or rung shall be capable of supporting a single concentrate load of at least 250 pounds (114 kg) applied in the middle of the step or rung.



4. Ladder rungs, cleats, and steps shall be parallel, level, and uniformly spaced when the ladder is in position for use.
5. Rungs, cleats, and steps of portable ladders (except as provided below) and fixed ladders (including individual-rung/step ladders) shall not be spaced less than 10 inches (25 cm) apart, nor more than 14 inches (36 cm) apart, as measured between center lines of the rungs, cleats and steps.
6. Rungs, cleats and steps of step stools shall be not less than eight inches (20 cm) apart, nor more than 12 inches (31 cm) apart, as measured between center lines of the rungs, cleats, and steps.
7. Rungs, cleats, and steps of the base section of extension trestle ladders shall not be less than eight inches (20 cm) nor more than 18 inches (46 cm) apart, as measured between center lines of the rungs, cleats, and steps.
8. The rung spacing on the extension of the extension trestle ladder shall be not less than six inches (15 cm) nor more than 12 inches (31 cm), as measured between center lines of the rungs, cleats, and steps.
9. The minimum clear distance between the sides of individual-rung/step ladders and the minimum clear distance between the side rails of other fixed ladders shall be 16 inches. (41 cm).
10. The minimum clear distance between side rails for all portable ladders shall be 11½ inches (29 cm).
11. The rungs and steps of fixed metal ladders shall be shaped such that employees' feet cannot slide off the end of the rungs.
12. The rungs and steps of fixed metal ladders shall be corrugate, knurled, dimpled, coated with skid-resistant material, or otherwise treated to minimize slipping.
13. Ladders shall not be ties or fastened together to provide longer sections unless they are specifically designed for such use.
14. A metal spreader or locking device shall be provided on each stepladder to hold the front and back sections in an open position when the ladder is being used.
15. When splicing is required to obtain a given length of side rail, the resulting side rail must be at least equivalent in strength to one-piece side rail made of the same material.





16. Expect when portable ladders are used to gain access to fixed ladders (such as those on utility towers, billboards, or other structures where the bottom of the fixed ladder is elevated to limit access), when two or more separate ladders are used to reach an elevated work area, the ladders shall be offset with a platform or landing between the ladders.
17. Ladder components shall be surfaced so as to prevent injury from punctures or lacerations, and to prevent snagging of clothing.
18. Wood ladders shall not be coated with any opaque covering, except for identification or warning labels which may be placed on one face only of a side rail.

**J. FIXE LADDERS**

1. The minimum perpendicular clearance between fixed ladder rungs, cleats, and steps, and any obstruction behind the ladder shall be seven inches (18 cm), except in the case of an elevator pit ladder for which a minimum perpendicular clearance of 4½ inches (11 cm) is required.
2. When avoidable obstructions are encountered, the minimum perpendicular clearance between the centerline of fixed ladder rungs, cleats, and steps, and the obstruction on the climbing side of the ladder may be reduced to 24 inches (61 cm), provided that a deflection device is installed to guide employees around the obstruction.
3. Fixed ladders without cages or wells shall have a clear width to the nearest permanent object of at least 15 inches (30 cm) on each side of the centerline of the ladder is at a distance greater than 24 feet (7.3 m) above lower level.
4. Fixed ladders shall be provided with cages, well, ladders safety devices, or self-retracting lifelines where the length of climb is less the 24 feet (7.3 m) above lower level.
5. The inside of the cage shall be clear of projections.
6. Horizontal bands shall be space not more than four feet (1.2 m) on center vertically; vertical bars shall be spaced at intervals not more than 9½ inches (24 cm) on center horizontally.
7. Wells for fixed ladders shall conform to all of the following:
  - a. They shall completely encircle the ladder;
  - b. They shall be free of projections;



- c. Their inside face on the climbing side of the ladder shall extend not less than 27 inches (68 cm) nor more than 30 inches (76 cm) from the centerline of the step or rung; and
  - d. The inside clear width shall be at least 30 inches (76 cm).
8. Ladder safety devices and related support systems for fixed ladders shall conform to all of the following:
- a. They shall be capable of withstanding without failure a drop test consisting of an 18-inch (41 cm) drop of a 500-pound (226 kg) weight;
  - b. They shall permit the employee using the device to ascend or descend without continually having to hold, push, or pull any part of the device, leaving both hands free for climbing;
  - c. They shall be activated within two feet (.61m) after a fall occurs, and limit the descending velocity of an employee to seven feet/sec. (2.1m/sec.) or less; and
  - d. The connection between the carrier or lifeline and the point of attachment to the body belt or harness shall not exceed nine inches (23 cm) in length.
9. The mounting of ladder safety devices for fixed ladders shall conform to the following:
- a. Mountings for rigid carriers shall be attached at each end of the carrier; with intermediate mountings, as necessary, spaced along the entire length of the carrier; to provide the strength necessary to stop fall; or
  - b. Mountings for flexible carriers shall be attached at each end of the carrier. When the system is exposed to wind, cable guides for flexible carriers shall be installed at a minimum spacing of 25 feet (7.6 m) and maximum spacing of 40 feet (12.2 m) along the entire length of the carrier, to prevent wind damage to the system.

**K. PORTABLE – INCLUDING JOB MADE**

- 1. When portable ladders are used for access to an upper landing surface., the ladder side rails shall extend at least three feet (.9 m) above the upper landing surface to which the ladder is used to gain access. However, when such an extension is not possible because of the ladder's length, the ladder shall be secured at its top to a rigid support that will



not deflect, and a grasping device, such as a grab rail, shall be provided to assist employees in mounting and dismounting the ladder. In no case shall the extension be such that ladder deflecting under a load would, by itself, cause the ladder to slip off its support.

2. Ladders shall be maintained free of oil, grease, and other slipping hazards.
3. Ladders shall not be loaded beyond the maximum intended load for which they were built, nor beyond their manufacturer's rated capacity.
4. Ladders shall be used only for the purpose for which they were designed.
5. Non-self-supporting ladders shall be used at an angle such that the horizontal distance from the top support to the foot of the ladders is approximately one-quarter of the working length of the ladder (the distance along the ladder between the foot and the top support).
6. Wooden job-made ladders with splice side rails shall be used at an angle such that the horizontal distance is one-eighth the working length of the ladder.
7. Fixed ladders shall be used at a pitch no greater than 90 degrees from the horizontal, as measured to the back side of the ladder.
8. Ladders shall be used only on stable and level surfaces unless secured to prevent accidental displacement.
9. Ladders shall not be used on slippery surfaces unless secured or provided with slip-resistant feet to prevent accidental displacement. Slip-resistant feet shall not be used as a substitute for care in placing, lashing, or holding a ladder that is used upon slippery surfaces including, but not limited to, flat metal or concrete surfaces that are constructed so they cannot be prevented from becoming slippery.
10. Ladders placed in any locations where they can be displaced by workplace activities or traffic, such as in passageways, doorways, or driveways, shall be secured to prevent accidental displacement, or a



barricade shall be use to keep the activities or traffic away from the ladder. The area around the top and bottom of the ladders shall be kept clear.

11. The top of a non-self –supporting ladder shall be placed with the two rails support equally unless it is equipped with a single support attachment.
12. Ladders shall not be moved, shifted, or extended while occupied.
13. Ladders shall have nonconductive side rails if they are used where the employee or the ladder could contact expose energized electrical equipment.
14. The top or second-to-the-top step of a stepladder shall not be used as a step.
15. Cross-bracing on there are section of stepladders shall not be used for climbing unless the ladders are designed and provided with steps for climbing on both front a rear section.
16. Ladders shall be inspected by a competent person for visible defects on a periodic basis.
17. Portable ladders with structural defects, such as, but not limited to, broken or missing rungs, cleats, or steps, broken or split rails, corroded components, or other faulty or effective components, shall either be immediately marked in a manner that readily identifies them as defective, or be tagged with “Do Not Use” or similar language. Such equipment shall be withdrawn from service until repaired.
18. Fixed ladders with structural defects, such as, but not limited to, broken or missing rungs, cleats, or steps, broken or split tails, or corroded components, shall be withdrawn from service until repaired. The requirement to withdraw a defective ladder from service is satisfied if the ladder is immediately tagged with “Do Not Use”.
19. Ladder repairs shall restore the ladder to a condition meeting its original design criteria, before the ladder is returned to use. Refer to manufacturer’s recommendations for repairing or splicing ladder parts.
20. Single-rail ladders shall not be used.



21. When ascending or descending a ladder, the user shall face the ladder. Each employee shall use at least one hand to grasp the ladder when progressing up and/or down the ladder.
22. An employee shall not carry any object or load that could cause the employee to lose balance and fall.



## PERSONAL PROTECTIVE EQUIPMENT

### A. PURPOSE

To provide a means for the in-depth evaluation of equipment needed to protect against hazards in the workplace.

Every contractor must provide his employees who may be exposed to a risk to their health or safety with suitable personal protective equipment.

### B. APPLICABILITY

This procedure applies to all personnel as a minimum safety requirement for all staff working on the project.

### C. POLICY

The Company shall use an in-depth evaluation process to set a standard operating procedure for personnel, then train employees on the protective limitations of personal protective personal equipment and on its proper use and maintenance.

Personal Protective Equipment will not be considered suitable unless:

- It is appropriate for the risk or risks involved and the conditions at the place where exposure to the risk may occur.
- It takes account of the state of health of the person who may wear it.
- It is capable of fitting the wearer correctly.
- It is effective to prevent or adequately control the risks involved without increasing the overall risk.
- It is designed and manufactured to the applicable standard for that item of personal protective equipment.

### D. REFERENCE

1. 29 CFR 1926.95 (Subpart E)
2. 29 CFR 1926.100, "Head Protection"
3. 29 CFR 1926.101, "Hearing Protection"
4. 29 CFR 1926.102, "Eye and Face Protection"
5. 29 CFR 1926.103, "Respiratory Protection"
6. 29 CFR 1926.107, "Definitions"
7. 29 CFR 1910.134, "Respiratory Protection"
8. Safety Procedures Manual, Job Hazard Analysis
9. Safety Procedures Manual, Respiratory Protection Procedure



10. Safety Procedures Manual, Fall Prevention and Protection Procedure

**E. RESPONSIBILITY**

1. Each contractor or his safety representative is responsible for the implementation of this procedure.
2. Contractor's supervisory staff shall ensure compliance with this procedure on the project. They are responsible for enforcement of this procedure.
3. Supervisors, superintendents, general foremen and foremen are responsible for day-to-day implementation of this procedure.

**F. DEFINITIONS**

1. Contaminant – means any material which by reason of its action upon, within, or to a person is likely to cause physical harm.
2. “O.D.” – means optical density and refers to the light refractive characteristics of a lens.
3. “Radiant Energy” – means energy that travels out ward in all directions from its sources.

**G. INTERACTION**

1. Personal protective equipment should not be used as a substitute for engineering, work practice, an/or administrative controls. Personal protective equipment should be used in conjunction with these controls to provide for employee safety and health in the workplace. Personal protective equipment includes all clothing and other work accessories designed to create barrier against workplace hazards.
2. Using personal protective equipment requires hazard awareness and training on the part of the user. Employees must be aware that the equipment does not eliminate the hazard. If the equipment fails, exposure will occur. To reduce the possibility of failure, equipment must be properly fitted and maintained in a clean and serviceable condition.
3. Selection of the proper personal protective equipment for a job is important. Employees must understand the equipment's purposes and its limitations., The equipment must not be altered or removed even though an employee may find it uncomfortable.



4. Personal protective equipment that has been previously used should be disinfected before being issued to another employee. Even when each employee is assigned protective equipment for extended periods, it is recommended that such equipment be cleaned and disinfected regularly.

## **H. HEAD PROTECTION**

1. Head injuries are caused by falling or flying objects, or by bumping the head against a fixed object. Protective hats are also used to protect against electrical shock.
2. The standards for protective hats are contained in ANSI Requirements for Industrial Head Protection, Z89.1-1969, and ANSI Requirements for Industrial Protective Helmets for Electrical Workers, Z89.2-1971.
3. Each type and class of head protectors is intended to provide protection against specified hazardous conditions. An understanding of these condition will help in selecting the right hat for the particular situation.
4. Safety Helmets must be issued to all site personnel and worn where there is a foreseeable risk of head injury. Color coding is highly recommended to distinguish between different trades, contractors, etc. senior staff wear white helmets, safety wears red helmets, labor wears blue, etc. Other colors may be assigned to visitors, suppliers, as deemed appropriate by the Engineer.  
To enable control over and to personalize safety helmets it is recommended that a number or name be stenciled on the helmet. This will assist in reducing loss and theft of helmets.
5. For industrial purpose, three classes are recognized.
  - a. Class A – general service, limited voltage protection:
  - b. Class B – utility service, high voltage helmets; and
  - c. Class C – special service, no voltage protection, and impact protection only.
6. Hats and caps under **Class A** are intended for protection against impact hazard a low voltage. They are used in mining, construction, shipbuilding, tunneling, lumbering and manufacturing.
7. **Class B** utility service hats and caps protect the wearer's head from impact and penetration by falling or flying objects and from high-voltage shock a burn. They are used extensively by electrical workers.





8. The safety hat or cap in Class C is designed specifically for light weight comforts and impact protection. This class is usually manufactured from aluminum and offers no dielectric protection. Class C helmets are used in certain construction and manufacturing occupations, oil fields, refineries and chemical plants where there is no danger from electrical hazards or corrosion. They also are used on occasions where there is a possibility of bumping the head against a fixed object.
9. Materials used in helmets should be water-resistant and slow burning, each helmet consists essentially of a shell and suspension. Ventilation is provided by a space between the headband and the shell. Each helmet should be accompanied by instructions explaining the proper method of adjusting and replacing the suspension and headband.
10. The wearer should be able to identify the type of helmet by looking inside the shell for the manufacturer, ANSI designation and class. For example:  
  
Manufacturer's Name  
ANSI Z89.1-1969(or later year)  
Class A
11. Headbands are adjustable in  $\frac{1}{8}$  inch size increments. When the headband is adjusted to the right size, it provides sufficient clearance between the shell and the headband. The removable or replaceable type sweatbands should cover at least the forehead portion of the headband. The shell should be one-piece seamless construction and designed to resist the impact of a blow from falling material. The internal cradle of the headband and sweatband forms the suspension. Any part that comes into contact with the wearer's head must not be irritating to normal skin.
12. Manufacturers should be consulted with regard to paint or cleaning materials for their helmets because some paints a thinner my damage the shell and reduce protection by physically weakening it or negating the electrical resistance.
13. A common method of cleaning shells is dipping them in hot water (approximately 140° F) containing a good detergent for at least a minute. Shells should then be scrubbed and rinsed in clear hot water. After rinsing, the shell should be carefully inspected for any signs of damage.
14. All components, shells, suspensions, headbands, sweatbands and any accessories should be visually inspected daily for



signs of dents, cracks penetration or any other damage that might reduce the degree of safety originally provided.

15. Users are cautioned that if unusual conditions occur (such as higher or lower extreme temperatures than describe in the standards), or if there are signs of abuse or mutilation of the helmet or any component, the margin of safety may be reduced. If damage is suspected, helmets should be replaced or representative samples tested in accordance with procedures contained in ANSI Z89.1-1986.
16. Helmets should not be stored or carried on the rear-window shelf of an automobile since sunlight and extreme heat may adversely affect the degree of protection.

## **I. EYE AND FACE PROTECTION**

1. Eye and face protection equipment is required where there is a reasonable probability of preventing injury when such equipment is used. The contractor must provide a type of protection suitable for work to be performed and employees must use the protectors. These stipulations apply to supervisors and management personnel as well as labor and technicians. They also apply to visitors while they are in hazardous areas.
2. Suitable eye protectors must be provided where there is a potential for eye injury from machines, flying objects, glare, liquids, injurious radiation or a combination of these. Protectors must meet the following minimum requirements:
  - a. Adequately protect against the particular hazards for which they are designed.
  - b. Be reasonably comfortable when worn under the designed conditions.
  - c. Fit snugly without interfering with the movements or vision of the wearer.
  - d. Be durable.
  - e. Be capable of being disinfected and be easily cleaned.
  - f. Be kept clean and in good repair.
3. It is recommended that emergency eyewashes be placed in all hazardous locations.
4. Each eye, face or face-and-eye protector is designed for a particular hazard. In selecting the protector, consideration should be given to the kind and degree of hazard, and the protector should be selected on that basis. Where a choice



of protectors is given, and the degree of protection is required is not an important issue, worker comfort may be a deciding factor.

5. Persons using corrective spectacles and those who are required to wear eye protection must wear face shields, goggles or spectacles of one of the following types:
  - a. Spectacles with protective lenses providing optical correction.
  - b. Goggles worn over corrective spectacles without disturbing the adjustment of the spectacles.
  - c. Goggles that incorporate corrective lenses mounted behind the protective lenses.
6. Monogoggles shall be worn when:
  - a. Chipping, busting or breaking concrete, brick or ceramics.
  - b. Performing all powered grinding (preferred in lieu of safety glasses due to grinding dust exposure).
  - c. Handling corrosive liquids or solvents (chemical goggles).
  - d. Handling pump hose or operating vibrator during concrete placement.
  - e. While running skill-saw or other types of cut-off saws (due to dust levels).
  - f. While applying most types of insulation.
6. Face shields provide face protection only. Face shields by themselves do not meet the requirements for approved eye protection. Therefor, safety glasses an/or monogoggles must be worn in conduction with face shields.
7. Face shields must be worn when:
  - a. Pouring and/or handling molten material (such as lead or tar)
  - b. Cadwelding.
  - c. Performing all powered grinding, chipping or buffing operations or running large cut-off-saws.
8. Welding and Burning
  - a. Only approved lens of #10 or greater shall be used for are welding. Welding hoods should have clear lens on both sides of the filter.



- b. An approved burning goggle with no less than a #4 filter plate with safety lenses on both sides of the filter.

NOTE: The above requirement will also depend on the arc current, but for minimum protection #4 an #10 are recommended.

- 9. When limitations or precaution are indicated by the manufacturer, they should be transmitted to the user and strictly observed.
- 10. Safety spectacles require special frames. Combinations of normal street wear frames with safety lenses are not in compliance.
- 11. Fitting of goggles and safety spectacles should be done by some one skilled in the procedure. Prescription safety spectacles should be fitted only qualified optical personnel.
- 12. It is essential that the lenses of eye protection be kept clean. Continuous vision through dirty lenses can cause eye strain, which is often an excuse for not wearing the eye protectors. Daily inspection and cleaning of the eye protector with soap and hot water, or with a cleaning solution and tissue, is recommended.
- 13. Pitted lenses, like dirty lenses, can be a source of reduced vision. They should be replaced. Deep scratches or excessive pitted lenses are apt to break more readily. Slack, wore-out, sweat-soaked, twisted headbands do not hold the eye protectors' improper position. Visual inspection can determine when the headband elasticity is reduced to a point beyond proper function.
- 14. Goggles should be kept in a case when not in use. Spectacles, in particular, should be given the same care as one's own glasses, since the frame, nose pads, and temples can be damaged by rough usage.
- 15. Several methods for disinfecting equipment for eye protection are acceptable. The most effective method is to disassemble the goggles or spectacles and thoroughly clean all parts with soap and warm water. Carefully rinse all traces of soap and replace defective parts with new ones. Swab thoroughly or completely immerse all parts for 10 minutes in a solution of germicidal deodorant fungicide. Remove parts from solution and suspend in a clean place for air drying at room temperature or with heated air. Do not rinse after removing parts from the solution because this will remove the germicidal residue which retains its effectiveness after drying. The dry parts or items should be placed in a clean, dust-proof container, such as a box, bag, or plastic envelope to protect them until reissue.

## **J. HEARING CONSERVATION PROGRAM**

Hearing protection devices are the first line of defense against noise in environments where engineering controls have not reduced employee exposure to safe levels. Hearing protective devices can prevent significant hearing loss, but only if they are used properly. The most popular hearing protection devices are earplugs which are



inserted into the ear canal to provide a seal against the canal walls. Earmuffs enclose the entire external ears inside rigid cups. The inside of the muff cup is lined with acoustic foam and the perimeter of the cup is fitted with a cushion that seals against the head around the ear by the force of the headband.

This section covers control of noise levels, minimum requirements for the protection of hearing, and typical exposures that exist on construction sites.

1. Limits of Exposure
  - a. Maximum permissible "A" scale exposure is 90 decibels for eight hours. The time /noise factor, however, allows higher exposures (up to 115 BA) for brief periods, as outlined below:

<u>dBA</u>	<u>Duration (Hours per Day)</u>
90	8
92	6
95	4
97	3
100	2
102	1½
105	1
110	½
115	¼ or less

- b. It should be noted that noise levels drop radically as distance from the source increases; therefore, remote location of noisy equipment is desirable.

2. Engineering controls

- a. Lapse time meters can be installed on any shop machine which has questionable noise levels. This is an economical way to provide evidence of time exposure. (Be sure the meter is wired directly into the service which causes the noise, not to an auxiliary motor or blower).
  - b. Time and dBA level affect the permissible exposure. Machines such as compressors and gasoline driven welders should be remotely located to reduce exposure to those times when it is necessary to stop, start, or otherwise adjust the machine.
  - c. Portable disc grinders (air or electric) produce unacceptable noises when used on large pipe and steel plate. Operator hearing protection is required. Employees in the area may require hearing protection, depending on the distance from source (approximately 15 to 20 feet).
  - d. The general background noises of construction are within acceptable levels. Most shop tools produce noise within acceptable levels. Those



which usually do not, are used intermittently, and the length of exposure minimizes concern.

- e. Noise surveys of all shops and fabrication facilities should be conducted at least annually to assure compliance.
- f. Areas where noise exceeds the permissible 24-hour exposure shall be clearly identified, as marked with the appropriate signs.

### 3. Hearing Protection

- a. All zones on a construction site with noise levels above 85 dBA shall be identified. Such excessive noise zones shall be marked or otherwise designated by a proprietary area where hearing protection is required.
- b. All employees who enter or work in zones with exposures above 85 dBA shall be required to wear appropriate hearing protection (ear muffs or ear plugs).
- c. All personnel will be instructed regarding availability and proper use of hearing protection.

### 4. Noise Control Guidelines

- a. Impulse or impact noise (noise peaks repeated in the intervals of one Second or more) shall not exceed 140 dBA sound pressure level.
- b. Portable power equipment (saws, impact wrenches, grinders, jackhammers, etc) may emit noise in excess of 85 dBA. Hearing protection shall be required for employees using this equipment, as well as for others in the immediate area.
- c. The exposure of employees who work more than eight hours in areas where the noise level exceeds 85 dBA shall be evaluate to determine if the exposure exceeds the level permitted by the standard.
- d. The following are examples of equipment that should be evaluated to determine maximum exposure without protection.

#### Equipment

Portable Grinder (air and electric)  
Media Abrasive Cut-of Saw  
Table Saw  
Planer  
Air Compressors  
Gasoline Welding Machines  
Air Chipping Guns, Breakers, and Impact Tools  
Cranes, Cherry Pickers, Front End Loaders, and similar  
Equipment



Bobcat Front En Loader  
 Skid Loader  
 Arc Gouging  
 Buffing Operations, Chain Saws  
 All Pneumatic Tools  
 Sandblasting

- Any noise producing equipment not listed above that is found to be producing a noise level in excess of 90 dBA.
- e. Pre-formed or molded earplugs should be individually fitted. Waxed cotton, foam, or fiberglass wool earplugs are self-forming. When properly inserted, they work as well as most molded earplugs, but you must ensure that the type of earplugs fit snugly inside of your ear canal for the best protection. Some earplugs are disposable (to be used one time and then thrown away). The non-disposable (to be used onetime and then thrown away). The non-disposable type should be cleaned after each use for proper protection. **Plain cotton is ineffective as protection against hazardous noise.**
- f. Earmuffs need to make a perfect seal around the ear to be effective. Glasses, long sideburns, long hair and facial movements such as chewing, can reduce protection. Special equipment is available for use with glasses or beards.

**EQUIPMENT MEDIAN NOISE LEVELS**

<b>EQUIPMENT OR OPERATION</b>	<b>MEDIAN NOISE LEVELS (dBA)</b>
ARC GOUGING	115
CHAIN SAW	107
CHERRY PICKER (FULL THROTTLE)	95
CONCRETE PUMPER	98
D-8 DOZER OPERATOR WITHOUT CAB	100
FRONT END LOADER WITHOUT CAB	95
GRINDING OPERATIONS	100
HYDROBLASTING	101
IMPACT WRENCH OPERATOR	102
AIR COMPRESSOR (FULL THROTTLE)	100
LABORER USING BLOWPIPE	102
PNEUMATIC CHIPPING HAMMER	105
SANDBLASTING (UNDER HOOD)	95
SKILL SAW	105
TABLE SAW	97
TAMPER OPERATOR	98
3 INCH SUMP PUMP (WITHOUT MUFFLER)	103
WELDING MACHINE (FULL THROTTLE)	100

**K. RESPIRATORY PROTECTION**



Regulations concerning the control of those occupational disease caused by breathing air contaminated with harmful dusts, fogs, fumes mists, gases, smokes, spray, vapors, or in oxygen-deficient environments can be found in Title 29 CFR Part 1910.134. Selection of a respirator should be made according to the guidelines in American National Standard Practices for Respiratory Protection Z88.2-1980.

### 1. General

- a. Respiratory protective equipment is required for protection against chemical exposure which exceeds recommended exposure limits. This procedure addresses the different types of equipment available, their selection, employee training and responsibility.
- b. In control of occupational diseases cause by breathing air contamination, the primary objective shall be to prevent atmospheric contamination as far as feasible by acceptable engineering and work practice control measures.

### 2. Requirements

Use of equipment approved by the National Institute of Occupational Safety & Health (NIOSH) and/or the Mine Safety & Health Administration (MSHA).

- a. Train workers as to need, use, sanitary care, and limitations of respirators including instruction on how to fit and test the respirator.
- b. Provide users an opportunity to wear the equipment.
- c. Monthly inspection of equipment stored for emergency use.
- d. Written operating procedures governing election and use.
- e. Monitoring of overall program to assure respirators are used safely.

### 2. Responsibilities

The Contractor's Supervisors (superintendent/general foreman/foreman) are responsible for maintaining and effective respiratory protection program.

This includes:

- a. The proper use, inspection, care, and storage of the assigned protective equipment in accordance with the instructions and training received.
- b. Coordinating information and response received from employees concerning any malfunction of the equipment that the employee has experienced.
- c. Assuring that an adequate respirator to face fit is achieved each time the respirator is worn by personnel performing the required "fit check".

### 3. Respirator Selection and Employee Qualifications





- a. Different types of respiratory protective equipment are available that offer protection against various breathing hazards. The following factors are considered in selecting a respirator.
  - Nature and extent of hazard
  - Contaminant(s) present
  - Warning properties
  - Concentration of the contaminant(s)
  - Characteristics and limitations of the available respirators
  - Expected activity of the workers.
- b. Prior to use of any respirator, a pulmonary function test, physical examination and a historical medical statement shall be required. Absence of these requirements renders and employee ineligible for use of a respirator, and therefore, work in any area requiring a respirator.
- c. In addition to the medical requirements above, no employee shall use a respirator until they have been properly trained in the correct fit and use of the equipment.

#### 5. Use and Limitation

- a. An air-purifying respirator cannot be used for rescue work or for emergency work or any nature because any air-purifying respirator does not supply breathing air and therefore does not protect against possible oxygen deficiencies.
- b. The proper type of canister, cartridge or filter must be specifically selected for the atmosphere and conditions to be encountered. For gases and vapors, the maximum concentration for which the air purifying element is designed is specified by the manufacturer or listed on labels of cartridges and canisters.
- c. An effective seal must be obtained between the face piece and face to prevent inward leakage.
- d. If the temple bars of eyeglasses extend through the sealing edge of a full-face mask, a proper seal cannot be obtained. Eyeglasses with short temple bars or without temple bars may be taped to the wearers head. Full-face masks have been developed with systems for mounting corrective lenses inside the face piece.
- e. The wearer's eyeglasses or goggles should not interfere with a half mask face piece.
  - f. A heavy beard or side burns may interfere with obtaining a proper seal. Restrictions on facial hair are established for tasks requiring a respirator.

#### 6. Types of Respiratory Protective Equipment

Respirators fall into two broad categories, air supplied and air purifying.

- a. Air purifying respirators include:



- Chemical cartridge
  - Particulate or dust respirators (including disposable mask)
  - Canister mask
  - Special air purifying respirators
- b. Air supplied respirators include:
- Self-contained breathing apparatus (SCBA)
  - Air line breathing apparatus

#### **L. FOOT PROTECTION**

Appropriate foot protection is required for employees whose feet may be injured by hot, corrosive, poisonous or other substances; falling objects, or crushing or penetrating actions, or who are required to work in abnormally wet locations. Footwear that is defective or so in appropriate that its ordinary use creates the possibility of foot injuries shall not be worn. ANSIZ41 standards must be met for steel toed protection.

#### **M. Gloves**

Gloves of various designs provide protection against a range of industrial hazards, including:

- Cuts and abrasions.
- Extremes of temperature.
- Skin irritation and dermatitis.
- Contact with toxic or corrosive liquids.

Contractors assessments must identify the hazard and choose suitable gloves to provide the necessary protection.

#### **N. Body Protection**

Types of clothing used for body protection include:

- Overalls and aprons to protect against chemicals and other hazardous substances.
- Wet weather clothing.
- Cold weather clothing.
- Clothing to protect against machinery, i.e. chainsaws.
- High visibility clothing for road working.
- Life jackets and buoyancy aids.



Contractors' assessments must clearly identify the hazards and risks and provide suitable protective clothing.



## WORK OVER WATER

### A. PURPOSE

Working over, on, or near water presents a number of problems, in particular:

- The ever-present risk of persons falling into water.
- The complexity of the legal obligations, which can vary amongst the various authorities.

### B. APPLICABILITY

Detailed safe working procedures should be developed for each individual project in the light of prevailing conditions. This procedure is applicable to all personnel working on the projects on or near water.

### C. POLICY

Work carried out on, near or under water should always be reviewed and prepared for prior to start up of any such operation.

## LEGAL REQUIREMENTS

There are numerous laws and local requirements that can be applied by, for example, Port Authorities, Coast Guards, MEW, EPA, etc., depending on where the work is situated.

Local exceptions and seeming peculiarities in the application of the law, according to circumstances, conditions and area, give rise to a multitude of variation of requirements. Before starting any project that is over, on or near water and involves the use of almost any kind of craft, contractors are strongly advised to obtain the fullest information on local laws and conditions.

## HAZARDS

Any workplace over, on, or near water, presents a danger that persons might slip, fall or be swept off their feet by a rapid rise of tide, strong current, or swell from passing water traffic. Whether or not a person is injured by a fall, there is an immediate risk of drowning and/or being carried away by the current.

Risks from these hazards must be assessed and eliminated or reduced as far as possible. Precautions must be taken firstly to prevent persons from tripping, falling or being swept into the water and, secondly, if the worst happens, to ensure that they are rescued in the shortest possible time before they can come to any further harm. Safe working methods and emergency procedures should be set out in the Safety Plan and all persons involved must be given adequate instruction, training and supervision.

## GENERAL PRECAUTIONS

### Platforms, Gangways, etc.



Platforms and gangways must comply with the requirements of all Local Regulations. At all edges from which a person might fall into water, platforms, guardrails, barriers, etc. Complying with all Local Regulations are required.

Warning notices should be erected at all edges and boundaries near water and set so that they are easily seen and understood by operatives approaching the danger point.

Where platforms or gangways are erected above tidal water, decking boards should be secured so that they cannot become dislodged by rising water or high winds.

The provision of additional handholds is always advisable as a precaution in the event of storms.

Barges, pontoons, etc., used as working platforms, must be properly constructed and sufficiently stable to avoid tipping. Special attention must therefore be paid to good anchorage and ballasting; point loads near the edge should be avoided; due account should be taken of the variation of load at the different radii of crane jibs for the use of lifting appliances on barges and pontoons.

### **Ladders**

Ladders must be sound, of sufficient length and strength and be securely leashed to prevent slipping. Where ladders are permanently fitted to plant over water, they should be fitted with safety hoops.

### **Safety Nets and Safety Harnesses**

The use of safety nets should be considered. Safety nets should be properly secured and slung sufficiently far above high-water level for anyone caught in them to remain clear and so that free access of rescue craft is always possible. Manufacturers should be consulted on what type of net best suits the kind of work to be carried out and the prevailing conditions.

Safety harnesses must be used where appropriate.

### **Site Tidiness**

Site tidiness is of special importance in minimizing tripping hazards. Tools, ropes and other materials not in use should be stored away. Rubbish should be cleared up promptly. Materials awaiting use should be stacked compactly and, particularly on pontoons, not piled too high.

Slippery surfaces are extremely dangerous and should be treated immediately. Seaweed, sea-slime and bird droppings should be cleaned off. Oily or greasy surfaces should be gritted. Icy or frosty surfaces should be treated with industrial salt or sand.

Drip trays should be sand-filled and set beneath all machinery to prevent the development of oily, slippery surfaces and, especially on pontoons, to minimize fire hazards.

The water area near the work should be kept clear of flotsam. Boatmen should be instructed to report its presence and to clear where possible.

### **Illumination**



Illumination is essential for night work and at all time in shafts, dark corners and stairways. An even spread of light is required to avoid deceptive shadows and glare. The area floodlit should always include the immediate water surface; spotlights on swivels should be fixed at strategic points to assist in locating a person in the water.

Navigation lights may be needed on working places afloat or sited close to the shore; a check should be made with the appropriate authority. (*The installation of foghorns needs similar consideration*).

### **Weather Conditions**

The local weather forecast should be obtained and publicized at the beginning of each day's work, or shift. Rain, rising winds, fog, sea-mist, etc., are all potential dangers.

### **First Aid Equipment**

First Aid facilities should be available, in the charge of a first aider or appointed person, on pontoons, barges and near all landing places. A suitable stretcher and resuscitation equipment, of the portable type, should be readily accessible to the main working area over water and to normal landing places.

### **Protective Clothing and Equipment**

Suitable protective clothing and equipment must be provided and worn as required. In particular, the following will be required:

#### ***Safety Helmets***

Safety helmets should be worn at all times, since anyone struck on the head and then falling into water is at special risk.

#### ***Footwear***

Types with non-slip soles should be worn. Rubber and thigh boots, once filled with water, act as deadweight.

#### ***Personal Buoyancy Equipment***

Life-jackets or buoyancy aids should be worn where there is a foreseeable risk of drowning when working on or near water.

**A life-jacket** is a personal safety device which, when fully inflated (*if inflatable*), will provide sufficient buoyancy to turn and support even an unconscious person faces upwards within five seconds (*ten seconds if automatically inflated*). The persons' head will be supported with the mouth and nose well clear of the water.

Some people are reluctant to wear life-jackets as they find them bulky and restrictive. However, either an automatically inflatable life-jacket or a type which is inflated by a manual pull-cord should overcome these problems. These are usually compact and allow for a full range of movement.

**Buoyancy aids** are worn to provide extra buoyancy to assist a conscious person in keeping afloat. However, they will not turn over an unconscious person from a face down position.



A wide range of life-jackets and buoyancy aids is available and selection will depend on such matters as the type of water conditions, the work being undertaken and the protective clothing being worn.

## **MEANS OF ACCESS - WATER TRANSPORT**

The Regulations must require the safe transport of any person conveyed by water to or from his place of work.

Passenger-carrying craft must be surveyed at least once a year and a certificate obtained. Boats are only allowed to operate within a stipulated number of passengers according to size.

There are several classifications of craft according to purpose with a schedule of life-saving and fire-fighting appliances laid down for each.

### **Rescue Equipment**

#### ***Lifebuoys and Rescue Lines***

Approved lifebuoys, or rescue lines, should be set at intervals along the workings.

Lifebuoys, which are normally 765 mm outside diameter, should be fitted with a 30 m buoyant lifeline, knotted at every 3 m to assist handhold; i.e. long enough to allow for the state of the tide, height of working place above water, or for the person being carried downstream by a current. They may be constructed of either cork with canvas covering, or of polyurethane foam with a rigid PVC cover. Both types are effective in salt or fresh water. If night work is carried out, self-ignition lights should be fitted.

Various types of rescue lines are available.

Lifebuoys or rescue lines should be thrown as near as possible to a person in the water; if any tide is running, they should be thrown on the upstream side.

Daily checks should be made to ensure that lifebuoys and rescue lines are still; in their proper place and that no repair work is required as a result of vandalism or other interference.

#### ***Grab Lines***

Grab lines, attached to the working place, or at other places downstream, and long enough to allow for the normal rise and fall in tide, can be supplied to give a person something to grab in an emergency. They should be of buoyant type with a marker float at the free end. Trailing ends of undue length should be avoided so that there is no risk of boats being fouled.

Daily checks should be made to ensure that they are still in a position and that their condition is sound.

#### ***Rescue Boat***



The rescue boat should be properly made and of sufficient length and beam to afford reasonable stability. Where conditions merit, there is much to be said for inflatable craft, since they provide a better chance of getting a person aboard without injury. For work in tidal water or fast flowing river water, a power-driven craft is essential - with a fixed self-starting device on the motor. Engines of powered craft, when not patrolling, should be run several times a day to ensure full efficiency.

All rescue boats should carry three oars or paddles to cater for losing one overboard. Rowlocks should be removable and on retaining lines so that they can hang from the side without being lost.

Boats should be fitted with grab lines and carry at least one approved life buoy. Boathook, baler, anchor and line should be standard equipment. Two-way communication between boat and shore is always advisable. If night work is to take place, a powerful spotlight should be fitted.

Rescue boats should be manned continuously - and on patrol whilst work is in progress - by experienced boatmen who are qualified first aiders. If possible, there should be two persons to a boat so that one is free to attend to the person in the water. Boatmen should always wear suitable buoyancy aids.

Whether first aid treatment can be given on the rescue boat, will depend on its size and the state of the rescued person. Boats should at least carry sterile wound dressings and some bandages, a sucker for clearing a person's airway, and blankets. All first aid equipment on board should have waterproof protection.

### **RESCUE PROCEDURE**

It is essential that:

- the number of persons at work is periodically checked to ensure that no one is missing;
- operatives work in pairs so that there is always one to raise the alarm;
- each person is trained in what to do in the event of an emergency.

The rescue procedure should consist of:

- a set routine for raising the alarm;
- a set drill to provide rescue facilities;
- a set routine for getting persons to hospital whether for check-up through immersion in water (*possibly polluted*), or for treatment as the result of injury.

The first requirement should always be to get the rescued person, if only slightly hurt, to the nearest point where assistance is available as quickly as possible. Therefore, all other things being equal, the speediest and safest way of getting a person out of the water should be laid down. With small craft, for example, it may be possible to bring the person inboard over the stern; with a larger, powered craft this will not be feasible because of the danger of fouling revolving propeller blades.

Various circumstances may combine to make a straight-forward lifting operation out of the water impossible - the person might be too heavy, fully clothed, in state of panic, or injured to the extent that it would be unwise to manhandle him. In cases like this, the





following practice has much to commend it; the person is maneuvered to port or starboard near the bow, and a line, with hook and eye, is passed under the arms to secure him to the boat - in this position he can be towed to the nearest landing point; the movement of the boat drawing the head clear of the water so that breathing can remain unimpaired and the person is kept clear of revolving propellers.



## WORK UNDER WATER

### A. PURPOSE

Any diving operation must be properly planned prior to start. All precautions must be taken depending on conditions at the work site.

A method statement must be prepared and approved in advance.

Only trained divers/personnel must be used in any underwater operation.

### B. APPLICABILITY

Detailed safe working procedures should be developed for each individual project in the light of prevailing conditions. This procedure is applicable to all personnel working on the projects on or near water.

### C. POLICY

Work carried out on, near or under water should always be reviewed and prepared for prior to start up of any such operation. This procedure is applicable to contractors as well as subcontractors working on the Project.

### General

- Any diving operation must be properly planned prior to start. All precautions must be taken depending on conditions at the work site.
- A method statement must be prepared and approved in advance.
- Only trained divers/personnel must be used in any underwater operation.

### People Involved in Diving Operations

- As with any other operation, people are the key to safety.
- The people involved must be competent:
  1. Physically – to react correctly and quickly in any situation.
  2. Mentally – to understand and apply established rules, regulations and safe practice.
  3. Emotionally – to withstand stress and prevent mistakes.
- The people involved must also be experienced in diving and the operation to be carried out under water.



## **Operations Planning**

- The success of any diving operation is a direct outcome of careful and thorough planning.
- The planning must start with defining the objectives of the dive. This is followed by identification of the operational tasks and collection of relevant data.
- Appropriate equipment and supplies must be selected. This is in addition to the selection of a qualified dive team.
- Items to consider during planning include the following: environmental conditions, support facilities, shipping hazards, the availability of emergency assistance, and weather conditions.
- The diving technique must be selected. Those include: SCUBA diving, surface-supplied lightweight gear, enclosed space diving gear, etc.
- Other techniques such as oxygen, mixed gas, and saturation diving may also be considered.

## **Diving Boat Safety**

- All personnel involved in the operation of diving boats, barges, floats, and other types of small craft must understand the basic safety precautions involved with work in water.
- An initial inspection of the boat or craft is required to determine its suitability for the intended task and operating environment.
- The boat must be fully operational with all the required safety gear. This is in addition to being equipped with the proper diving gear.
- The boat must be equipped with suitable and functional communications gear including radios, underwater communications, and walkie-talkies. Those must be fully tested and certified.
- Other communication equipment must also be kept on board and are operational such as flags, sound signals, flares, etc.
- Navigational equipment must also be provided and checked for proper functioning.
- Diving supplies must be properly stowed and does not block access to the various boat equipment and gear such as fire extinguishers, engine spaces, communication gear, first aid kit, etc.
- A plan must be prepared for boat handling. This plan must include dropping of and picking up divers, towing divers, emergency procedures, handling divers lines during descent, ascent, raising and lowering tools and gear, etc.
- A checklist of the above items and any others must be prepared and used in advance of any operation to verify compliance with the basic safety rules and regulations.

## **Diving Safety and Planning:**



- The mission must be analyzed for safety ensuring that the mission objective is defined.
- Potential hazards must be identified and analyzed such as exposure of personnel to extreme conditions, delays or disruption caused by weather, water entry and exit, handling of equipment, maintaining location, diving depths, dangerous marine life, bottom obstructions, dangerous bottom conditions, marine traffic, contamination of dive site, etc.
- Other hazards that must be taken into consideration include decompression sickness, communications problems, drowning, injuries entrapment, entanglement, explosives, etc.
- Personnel chosen must be qualified for the tasks to be executed. A full dive team must be carefully selected to cover all the tasks required to ensure a safe and successful dive.
- The dive equipment must be adequate for the type and depth of dive. This includes all support equipment and tools such as boats, cranes, winches, floats, etc which must be operable and under the control of trained personnel. Maintenance records must be kept on all equipment.
- Emergency equipment must be provided such as suitable communications equipment, recompression chamber, first aid kit, oxygen tanks, emergency transportation, etc.
- An emergency procedure must be established which should include information such as the nearest medical facility, task assignment to the various personnel, distress signals and call signs, etc.

### **Dangerous Marine Animals**

- Dangerous marine animals belong to one of three major categories as follows:
  1. Predatory biting animals. Those include sharks, killer whales, barracudas, eels, and sea lions.
  2. Venomous stinging animals. Those include venomous fish such as catfish, toadfish, surgeonfish, ratfish, spiny dogfish, etc. Other types include the stonefish, zebrafish, stingrays, jellyfish, octopuses, sea snakes, etc.
  3. Animals that are poisonous when eaten. This is fish poisoning caused by eating the flesh of a fish that has eaten a toxin product, microorganism, the din-flagellate, Gambier-discus toxics.
- All those involved with work under water must be trained and are able to identify the above dangers.
- Special training is also required for prevention of the above.
- First aid training is essential along with special first aid kits on board any boats/craft involved in work under water.
- Any person affected by the above must be immediately transported to a medical facility for treatment. A record of any first aid treatment administered to a victim must accompany him to the medical facility.



## WORK IN SHAFTS

### A. PURPOSE

This section refers to work in all shafts where there is a potential to fall more than one storey, i.e.:

- Riser shafts – with or without walls
- Lift shafts – with or without walls
- Tower crane voids through a building
- Work over atria.

### B. APPLICABILITY

This procedure applies to all work carried out on the Project whether by contractors, subcontractors, or suppliers.

### C. POLICY and PRECAUTIONS

Many fatal and life damaging accidents have occurred in shafts. Some were fatalities to scaffolders involved in erecting or dismantling safety platforms. For these reasons the following approach must be adhered to:

1. No scaffolder is to erect or remove a scaffold or covering in or over a shaft without the aid of a safety harness at all times. This is an absolute requirement and must be agreed with the contractor before work commences. A similar rule applies to all other workers where there is no guarded working platform.
2. No lone working is to be carried out in or over shafts.
3. No work will be carried out in or over shafts without the presence on site of a competent manager who is familiar with safe operating practices and who will inspect the operation.
4. Scaffolds erected within shafts must be constructed in full compliance with the approved plans by the Engineer and in accordance with manufacturer recommendations and requirements. This requires, as a minimum, double handrails and toe-boards at each boarded lift where the gap between the scaffold and the wall is greater than 75 mm. Where this is impossible to achieve, a fully detailed risk assessment and method statement (*including sketches*) must be agreed and enforced which includes the full time use of safety harnesses. Scaffolds must be braced or tied to the walls so there is no sway in any direction. A swaying scaffold can cause a worker to fall or trip even where the scaffold itself cannot overturn.



5. Lighting in shafts must be carefully considered both during erection of scaffolds and for the ongoing work. 20 lux is required for erecting the scaffold, 200 lux for task operations. The safe means of providing this lighting must be arranged by the contractor before any work commences.
6. One trade must not work above another in a shaft. When there is any possibility of this happening then a permit system must be introduced. Contractors' arrangements must be understood and organized to prevent this possibility.
7. Hard hat rules must be strictly enforced in shafts at all times.
8. It is possible to walk under some shafts at ground level. In such cases physical barriers (*not just tape*) and warning signs must be erected.
9. Entrances to shafts are sometimes poorly guarded and lit. Lift shafts and major risers should be provided with a lockable temporary or permanent doors. Where scaffold barriers are used as a short-term measure a minimum of 3 rails to a height of 1.5 m, plus a toe-board, must be solidly fixed. A minimum lighting level of 20 lux must be provided and maintained at the entrance to every shaft at every floor level whether or not any work is taking place.
10. Carpenters or others fixing doors to shafts may work only if using harnesses unless there is a platform inside.



## INSTALLATION OF LIFTS

### A. PUSPOSE

Lift installation is a special operation entailing high risk and extensive work in shafts. This operation must always be carried out by experienced and specialists in this field.

### B. APPLICABILITY

This procedure applies to all operation of this nature carried out on site whether in enclosed shafts other conditions.

### C. POLICY

A detailed method statement must be prepared and approved by the Engineer prior to start of work on site.

#### a) Safe System of Work

1. Warning Notices must be displayed at all levels where the equipment is being installed.
2. During the installation and testing of all equipment there must be a suitably delegated person in attendance by the specialist firm. Engineers representing the subcontractor and concerned with the technical installation of such equipment must also be in attendance at all times. Emergency and/or master switches for operating such equipment must be easily accessible and understood by all those persons in attendance.
3. On no account must equipment be operated or on TEST without an engineer of the specialist firm of subcontractor being in attendance.
4. Once the lift shaft is handed over to the lift installers, they are to be consulted prior to meeting any request of another contractor requiring access into the shaft.
5. Do not allow any other trade into the lift shaft whilst a lift is being installed.
6. Lift installers tools and installing equipment are not to be stored in the lift pit.
7. Lifts must not be operated on test unless all accesses are locked off.



8. In the event of a lift jamming, any attempt to free or wind down the lift must only be carried out by a specialist engineer.
9. All access doorways at various floor levels of shaft to be securely fenced with scaffold tube or similar and a toe board fitted. Barriers may only be removed at the request of the lift installer to install the doors. An alternative barrier must be erected during installation of the doors to prevent unauthorized access. Once the doors are installed, they must be kept locked shut until lift handover.

**b) Method Statement**

A typical method statement must cater for all the above points. As an example, it must include the following:

1. Erect guides and hydraulic rams. Position in shaft via use of chain tackle, slung to lifting beam at head of shaft.
2. Fit pump room equipment, access via lift shaft or stairway as necessary.
3. Connect hydraulic pipework from rams to tank.
4. Fit landing entrances and doors
5. Trunk, tube and wire shaft/pump room
6. Pressure hydraulic system utilizing 3 phase power. Position hydraulic rams for pulling suspension chains over hydraulic ram wheels.
7. Position chain tackle over mid point of car, to assist in handling car steelwork.

**Scaffolding Removed**

8. Position and fit bottom suspension and car floor frame in shaft at buffer height.
9. Connect suspension chains to anchorage points on car bottom frame and make off ends to eyebolts on ram bases.
10. Build lift car
11. Tube and wire car
12. Test safety circuits for car top control and mobilize lift via hydraulic drive.

**Mobile Lift**





13. Fit and set top and bottom limit switches
14. Fit all guards, clean down and paint
15. Set up and test

c) Points for Site Management to Check

During and after installation.

1. Check the hours worked by the lift installers are not excessive.
2. Adequate supervision must be provided if work continues beyond normal site hours.
3. If barriers across lift openings have to be removed for lift installers access, then further barriers must be provided clear of the working area.
4. All lifting appliances should have a current valid test certificate. Lift cages should only be slung from a lifting beam positioned centrally over the cage.
5. All lifting appliances must be marked with Safe Working Load.
6. Check block and tackles for correct slinging.
7. If the pull on a block and tackle gets difficult - STOP - and find out why.
8. check that the fail-safe system has not been by-passed and that the automatic braking system is fully effective, when the lift cage is used as a working platform. These can be demonstrated.
9. Scaffold alterations must not be made by the lift installer.
10. Lift scaffold must be checked weekly and the result entered in the scaffold register.
11. Check that all platforms are a minimum of 3 boards wide with guard rails and toe boards where necessary.
12. The level of scaffolding immediately below the working level must be as fully boarded as possible, so that any fall is restricted to a maximum of 2m. This is necessary as the



working level needs to have clear spaces for access to guides, and hence creates a hazard.

13. Temporary lighting must be adequate and fully maintained throughout the lift installation.
14. Lifting installers MUST wear safety helmets.
15. Check that the lift pit is not more than 1m deep - if so erect warning notices and barriers.
16. Under no circumstances are lift installers to ride on the roof of a cage unless an emergency stop switch is fitted and tested on top of the car.
17. In the case of wall-climber lifts, safety harnesses must be worn and secured when working on the top of the cab.



## RUBBISH CHUTES

### A. PURPOSE

The disposal of rubbish on projects needs to be fast and efficient to avoid access ways and places of work becoming blocked and therefore creating a safety hazard.

### B. APPLICABILITY

This procedure applies to all such operations carried out on the Project. It also covers works of subcontractors and vendors.

### C. POLICY

Proprietary rubbish chutes are available and when properly used and installed, provide a safe method of conveying rubbish from considerable heights with minimal risk. Use of such systems shall be in accordance with all applicable international and local standards and regulations.

### Hazards

The main hazards in the use of rubbish chutes arise from:

- Excessive loading on the building or scaffold either during normal use, or due to a blockage in the chute leading to failure on the scaffold, the chute itself, or its means of suspension.
- Poor design, materials used or maintenance of the chute components.
- Lack of protection to prevent scatter of materials at the delivery point.
- Unsafe methods of gaining access to clear blockages.
- Poor erection and dismantling procedures.

### Site Policy

When these chutes are being used, the following standards apply:

- 1) The chutes and related fittings must have been properly designed and constructed, including a factor of safety to allow for overloading due to blockage or excessive wind loading.



- 2) The chute must be supported along its length to cater for the maximum load, which might be carried in the event of a blockage, or excessive wing loading.
- 3) The chute manufacturer or suppliers' instructions on its installation, dismantling and use must be provided and strictly followed.
- 4) The chute sections, together with suspension fittings and attachments must be examined for defects before erection and inspected weekly thereafter.
- 5) The lifting appliance provided to lift the chute sections must have a current test/thorough examination certificate, and be inspected weekly.
- 6) The hopper at the upper end of the chute must be located and protected so that operatives using it are not liable to fall from the platform and guarded to prevent overspill from falling.
- 7) Suitable steps must be taken to prevent danger from the scatter of material at the bottom of the chute. This can be prevented by the use of tarpaulins connected to the bottom section of the chute and covering the muck away skip together with the provision of overhead protection and/or physical barriers to prevent access into the discharge zone.
- 8) To avoid blockages, there should always be a clear space of 1 meter below the bottom chute section.
- 9) Skips must not be allowed to become overfull as this may lead to a back up and overloading.
- 10) Notices must be provided explaining that no attempt is to be made to pass material down the chute which are:
  - Flammable or material soaked in flammable liquids;
  - Sufficiently hot to cause ignition of other materials or damage to the chute itself;
  - Any material designated a special waste, e.g. asbestos etc.;
  - Larger in any dimensions than the chutes internal diameter, long lengths to be cut into suitable lengths;
  - Liable to cause blockages, e.g. chicken wire etc.
- 11) A method statement including safe systems of work for the clearing of blockages and maintenance must be established and implemented. Safe means of access and a safe place of work must be provided for these operations.
- 12) It is recommended that warning lights are placed at entrances to the chute to indicate when it is safe/unsafe to use the chute.
- 13) A competent person must be appointed to be specifically responsible for chute operations i.e. to ensure all guardrails and barriers are in place and



that skips are not overfilled, to inform site management in the event of a blockage and to prevent further use of the chute until the blockage is cleared.



## SAFETY OFFICER

### A. PURPOSE

The section establishes the issues pertaining to the assignment of a safety officer on the Project such as qualifications, duties, etc.

### B. APPLICABILITY

The contents of this section apply to the contractor as well as subcontractors working on the Project.

### C. POLICY

The section shall be applicable and adhered to on all projects to ensure that adequate safety measures are applied and enforced on the Project.

### D. PERSONAL QUALIFICATION

Good written and verbal communication skills; strong analytical skills; ability to work with all levels of management from chief executive officer down to first line supervisors.

A strong publication and presentation record are desired,

#### Knowledge of:

- Principles of safety engineering
- General Industry Safety Orders and related governmental regulations
- Construction, operating, maintenance, and environmental hazards
- Accident prevention program concepts
- Knowledge of: engineering principles, methods and techniques as applied to industrial safety;
- Laws and rules governing industrial insurance and safety requirements; materials selection and testing.

#### Ability to:

- Work effectively with various levels of multi-national personnel
- Train employees in safety methods
- Recognize hazardous conditions and unsafe acts
- Prepare written reports



- Communicate effectively in training sessions
- Ability to: arrive at equitable decisions based on facts and engineering principles;
- use sound independent judgment on difficult safety engineering problems;
- understand and interpret safety regulations for various industrial fields,
- determine from engineering drawings what safety precautions are necessary to prevent accidents;
- Establish and maintain effective working relationships with labor and management.
- Provide overall guidance, direction, supervision, and technical leadership to personnel.
- Enforce and implement the safety plan.

**Special Physical Requirements:**

- Ability to stand, walk, bend, crawl, reach overhead, crouch, kneel, balance, push, pull and safely lift and carry weights up to 20 Kg.
- Agility to maneuver in confined places
- Ability to do physical work under conditions involving temperature extremes

**E. EDUCATIONAL REQUIREMENTS**

A bachelor's degree in some phase of occupational safety is preferred or in engineering with additional specialization in the areas of occupational safety, industrial hygiene. This should include exposure to areas such as Industrial safety techniques, or fire protection courses at a recognized college or university.

**OR**

five years of professional experience in engineering, safety inspection, safety education, or industrial hygiene.

Additional qualifying experience such as safety training, experience in similar duties, etc.

**F. DESCRIPTION OF WORK**

- Evaluation and analysis of injury causation.
- Design and implementation of injury/accident prevention programs.
- Professional input to training programs.



- Interpretation of laws and standards relating to occupational safety.
- Compilation of management information on accident costs and recommendations to management for control programs.
- Perform the less complex technical duties associated with the accident prevention program.
- Train non-supervisory personnel in safety procedures and techniques such as correct lifting and turning.
- Assist supervisors in conducting safety audits and in evaluating methods and procedures used in the work environment.
- Assist operating departments in determining whether equipment being used conforms to safety requirements.
- Attend construction meetings and audits construction activities to ensure compliance with applicable regulations.
- Refer non-routine hazards detected during site visitations to the proper authorities.
- Review and make recommendations for changes in safety manuals and handbooks.
- Compile reports regarding evaluation of methods and procedures.
- Assist in conducting surveys and compiling statistical data on accident occurrences.
- Provides technical information to employees regarding any health hazardous materials such as asbestos.
- Implement the accident prevention program in selected sites.
- Conducts site safety audits;
- Makes recommendations for compliance with regulations pertaining to occupational and environmental safety, health, and fire prevention
- Writes State safety regulations and handbooks
- Supervises and coordinates the activities of the work team.
- Performs surveys of employers' work places and advises on methods and procedures to eliminate hazardous conditions and practices;
- Supervises, coordinates and manages the training of staff.





- Coordinates with the Project Manager all safety related matters.
- Makes surveys of plants and other places of work to eliminate hazardous conditions and practices;
- Prepares and gives talks to labor, management or other groups on matters pertaining to safety;
- Prepare and conduct safety induction for all staff working on site prior to being allowed to work on site.



## DEMOLITION SAFETY

### A. PURPOSE

Demolition forms one of the most dangerous operations within construction. Accidents occurring during demolition are more likely to be severe or fatal than in any other activity. Significantly such accidents, resulting in death or major injury, are commonly the result of a premature collapse of building and structures or falls of personnel from work places and access routes. These invariably stem from a lack of planning resulting in operatives devising their own methods of work and means of access.

### B. APPLICABILITY

No demolition is to take place without a written Method Statement having been submitted by the contractor and approved by the Engineer. A copy of all Method Statements is to be forwarded to the Engineer including all design criteria for safety evaluation. All methods proposed by the contractor are to conform to the requirements of the Contract, Kuwait Municipality, Kuwait Fire Brigade, the Public Environmental Authority, and any other governmental authorities.

Prior to work commencing, the Method Statement is to be discussed in accordance with the above stated and agreed with the contractor by the Engineer.

### C. POLICIES

1. The Engineer shall implement the requirements of the Safety plan as with any new works, but additionally, the following will also apply:
2. The demolition contractor shall comply with the requirements of the approved method statement.
3. The Contractor's designated Safety Officer will carry out a Safety and Temporary Works study, prior to the start of the works, to account and submit to the Engineer the following:
  - Method and sequence of demolition.
  - Public protection.
  - Termination/isolation/diversion of services.
  - Stability of any remaining structures or part structures.
  - The stability of adjacent structures which may have been affected by demolition works.
  - The safety and stability of any ground works or excavations that may be present and are to be inherited.
  - The presence of any substances that may be hazardous to health.
  - The general standard of safety being maintained on site.



- Copies of statutory notifications and any required permits.
- Demolition Contractors method statement and details of safe systems of work.

#### 4. **STATUTORY NOTIFICATIONS**

Local Authority - A written notification and/or work permit prior to demolition specifying the Building and Scope of Works.

Subsequent to the Local Authority notification and/or permit, demolition may only proceed.

**N.B.** A copy of the Local Authority notification and/or permit must be given to:

- The Engineer
- The Contractor's site staff / Project Manger
- The occupier of any adjacent building

#### 5. **SAFETY LEGISLATION**

All safety legislation that applies to construction activity is applicable in the area of demolition and the standard required is exactly the same.

#### 6. **ILLEGAL DEMOLITION TECHNIQUE**

As an example, men standing on the tops of walls or chimneys to demolish them cannot be considered as having a safe place of work. Either scaffolding or powered access platforms are required or remote mechanical demolition employed.

Similarly, no work may be carried out underneath demolition activities regardless of type of work.

#### 7. **PROCEDURES**

##### 7.1 **Pre-construction Stage**

Prospective contractors must ensure that they obtain information with sufficient detail to allow identification of any structural problems and the risks associated with any flammable or hazardous substance.

- A. Contractor to notify the concerned authorities, the Engineer, owners of adjacent property and obtain required permits/authorizations.
- B. Contractor to advise the Engineer on demolition methods and safe systems of demolition and construction.



- C. Contractor shall make an initial search for information regarding the building/facility to be demolished, including:
- The presence of adjoining or adjacent properties (*where noise, dust or vibration might restrict the method of demolition*).
  - The type of structure and its key elements.
  - The condition of structural members and the contribution of floors, roofs, walls, etc. to overall stability.
  - The need for temporary works or shoring.
  - Confined spaces, such as old tanks or process vessels.
  - Overhead or underground services.
  - Health hazards, such as asbestos lagging, lead dust or paint, residues from previous processes, or contaminated land.
  - Suitable access for the proposed method of demolition and vehicle access for the removal of waste.
- Any information obtained will be made available to rendering subcontractors without any guarantee of completeness.
- D. The contractor shall dismantle and keep at appropriate storage any items to be salvaged for retention.

## **7.2 Subcontract or Trades Contract Out-to-Tender Stage**

The following information will be provided to tendering subcontractors or trades contractors by the Contractor:

- The results of the initial search detailed in 7.1.C above.
- Detailed drawings defining the scope of the demolition works.
- Architectural items for salvage/retention.
- The program of works and details of any interface with other contractors.
- The outline Method Statement.

## **7.3 Subcontractor/Trades Contractor Selection Stage**

- A. Prospective demolition contractors must be given access to the whole site in order to make their own initial demolition survey. They must verify the correctness of any information provided by the Contractor.
- B. Prospective demolition contractors should produce an outline method statement detailing:
- Identification of hazards.
  - Precautions to combat hazards.
  - Protection of public and work force.
  - Removal of hazardous materials.



- Preferred demolition procedure.
  - Restrictions on methods in sensitive areas due to noise or vibration.
- C. The outline Method Statement should be based on a formal demolition survey undertaken by competent persons. The following aspects should be considered in the survey:
- Structural survey establishing type and method of construction and subsequent demolition.
  - The need for temporary works or shoring.
  - Structural deterioration.
  - Structural effects on and weatherproofing of adjacent properties.
  - The presence of asbestos.
  - The presence of lead dust, paint, process residues, contaminated land.
  - Flammable substances, chemicals, exposure to disease.
  - Isolation of services.
- D. The preferred demolition procedure should define as fully as possible at this stage, the methods, techniques and other items detailed fully in Section 8 - Method Statements. Appropriate plant and equipment should be identified.
- E. The sub/trades contractor will be required to furnish the Contractor / the Engineer with a copy of its Safety Policy and with its organization chart naming competent persons responsible for Safety Policy, Engineering, Method Statements, Contracts Manager, Site Supervisor, Safety Officer or representative.
- F. The selection of demolition contractor should incorporate in addition to Items A - E above, the known safety record and attitude of the company.

#### **7.4 Sub/Trades Contractor Appointed Demolition Planning Stage**

- A. The demolition contractor or his subcontractor to give notice of asbestos removal operations.
- B. The Contractor shall include for satisfying requirements for Contractors Safety Policy and Procedures Manual.
- C. The demolition contractor may be issued with a copy of this safety outline, by the Engineer.
- D. The demolition contractor must make a full survey of the building to be demolished and produce a detailed written



Method Statement complete with any temporary works schemes and associated calculations.

- E. The detailed Method Statement will be assessed by the Engineer as advised by the nominated Safety Advisor against the checklist given in Section 8.
- F. Temporary works design will be sent to the Engineer for comment and approval with adequate proof and confirmation of its suitability for the proposed works.
- G. A meeting will be convened involving the demolition contractor, to clarify and agree the Method Statement.
- H. The requirements for the reporting of accidents must be communicated in writing.

### **7.5 Demolition Stage**

- A. Demolition must proceed in strict accordance with the approved Method Statement.
- B. A weekly meeting, chaired by the Engineer, will be held involving the demolition contractor at which progress and the safety of the works will be discussed. The demolition contractor's Safety Officer should be present.
- C. The demolition contractor will appoint a named supervisor to be responsible for the safety of the structure and work force.
- D. A full-time Safety officer will be provided by the demolition contractor.
- E. Induction, training and weekly toolbox safety meetings will be provided by the demolition contractor for his work force.
- F. At all times, adequate working platforms will be provided. Standing on items to be demolished will not be allowed.
- G. Where temporary works are required, these must be installed to a prepared design sent to the Engineer for comment and must not be loaded until they are checked by a competent person on behalf of the demolition contractor.

## **8. METHOD STATEMENTS**



## Preferred Method of Work

Demolition should, when possible, involve methods, which make it unnecessary for persons to work at heights. If this cannot be achieved, methods such as deliberate controlled collapse, which minimises work at heights and limits exposure to such danger, should be employed.

The use of a balling machine, heavy duty grab, pusher arm or shears, can make working at heights unnecessary, but the contractor must ensure that sufficient area is available for their safe use and that the equipment is capable of performing the required duty.

Other demolition methods will involve work at heights to some extent and contractors must ensure that, when work cannot be safely carried out from part of the building or structure, working platforms are provided. Such platforms can be made up from tube and fittings or proprietary systems, or can be provided by means of man-riding skips or mobile power-operated work platforms. Where it is not practicable to provide such platforms, safety nets or safety harnesses should be used.

The outline method statement should include details of appropriate measures to ensure safe working at heights.

The following items constitute a basic check list which is to be used to assess contractors Method Statements. All sections are to be considered unless specifically precluded from the demolition package: -

- A. SUPERVISION
  - Named person to be in immediate control of all demolition and other hazardous operations.
  - Nominated person to be present on site full-time.
  
- B. METHOD OF DEMOLITION
  - Piecemeal - i.e. Gradual reduction in height of structure.
  - Controlled collapse - Explosion or wire rope pull.
  
- C. TECHNIQUE
  - Mechanical:
    - Hydraulic push/grab arm
    - Drop ball
    - Hydraulic shear
    - Hydraulic hammer
    - Small skid steer machines
    - Other
  - Manual:
    - Compressed air tools
    - Hand tools
  - Specialist:
    - Drilling or sawing
    - Bursting - Gas or hydraulic
  - Other
  
- D. SEQUENCE



Is sequencing critical?  
What sequence is indicated, is it satisfactory?  
Can non-structural demolition proceed safely ahead of structural demolition?

E. ACCESS

Are access provisions for men and plant indicated?  
Does it cover all phases of contract?  
What are provisions for existing stairways, scaffolding, hoists, or ladders

F. WORKING PLATFORMS

Is allowance made for guard rails to exposed edges, holes, shafts and excavations?  
Will scaffolds, mobile towers or hydraulic platforms be used?

G. PLANT AND TOOLS

What, if any are indicated and in what number?  
- Cranes  
- Tracked Machines  
- Wheel Machines  
- Trucks/Dumpers  
- Compressors  
- Skid steer Machines  
- Oxy/Gas Equipment  
Is the access suitable?  
Are floor loadings known?  
What are machine weights and ground pressures?

H. TEMPORARY WORKS

Is temporary support required to:  
- Adjoining buildings or structures?  
- Retained elements?  
- Unstable structures prior to demolition?  
Have associated drawings and calculations been checked by Engineer?

I. PRE-WEAKENING

Specific details and calculations must be given for all weakening operations associated with controlled collapses.  
Have Engineering Department given comments?

J. PROTECTIONS

What provision is made for the protection of personnel and the public:  
- Fans  
- Scaffolds  
- Debris netting or sheeting  
- Covered walkways





- Crash Decks
- Exclusion zones
- Road/footpath closures
- Other

Do these extend outside the site boundary, if so method of control?

**K. SECURITY**

- Are hoardings required?
- Who supplies, erects and maintains?
- Have licenses been obtained?
- Is provision made for secure gates?
- Who supplies, installs and maintains bulkhead lighting?

If hoarding impractical, is provision made to:

- Fences excavations
- Secure flammable gases and fuel
- Block doorways etc.
- Remove ladders
- Isolate services

During out of hours periods?

**L. SERVICES**

- How will existing services be:
- Identified
- Removed
- Terminated
- Isolated
- Diverted
- Protected

Are temporary services requirements given?

**M. FLAMMABLES**

- Are flammable residue materials present on site?
- Are these: -
- Liquid
- Gas
- Solid

Do tanks, pits or vessels require:

- Draining
- Purging
- Degassing

Is a specialist contractor to be employed?

Has the petroleum officer been consulted where required?

**N. HOT-WORKS**

- Are flash-back arrestors fitted to oxy/gas equipment?



Will hot work permits be necessary?  
Is provision made for a standby fireman?  
Are fire precautions adequate?

**O. FIRES**

Will contractor burn materials on site?  
Do Local Authority restrictions apply?  
Are fire precautions adequate?

**P. ASBESTOS**

Is asbestos present on site?  
How is presence and type of asbestos to be identified?  
Who is to remove, encapsulate or protect?  
Is the contractor licensed for asbestos removal?  
Has the Environmental Public Authority been given notice of works involving asbestos insulation & coatings?

Have you obtained current copies of manuals for working with either asbestos coatings and lagging or tile and sheet materials?

A separate method statement will be required for asbestos removal works. This method statement must take into consideration removal, handling, special protection equipment, transporting, disposal, authority approvals for dumping, etc.

**Q. HAZARDOUS COMPOUNDS**

How are these to be identified and removed?  
- Lead - paint and sheet  
- Zinc  
- Refrigerants  
- Radioactive materials  
- Chemicals  
- Process Residuals  
- Contaminated soil  
- Other

**R. CONFINED SPACES**

Will works be undertaken in confined spaces?

How will the atmosphere be monitored for-?  
- Oxygen deficiency  
- Hydrogen sulphide  
- Methane

Will specialist escape/rescue equipment and breathing apparatus be necessary?

**S. PROTECTIVE EQUIPMENT**



Have the following been allowed for where appropriate:

- Respirators
  - Disposable
  - Half mask
  - Full face filtered
  - Full face positive pressure

Safety helmets

Overalls

Boots/Waders

Safety Harnesses

Inertia Block Fall Arrestors

Goggles - Clear/tinted

T. DEBRIS CONTROL

What method is indicated to move debris:

- Chutes
  - Internal voids/lift shafts
  - Holes cut in slab
  - External
  - Conveyers
  - Loaders
  - Bobcats
  - Barrows
  - Skips
  - Rollover buckets
  - Free fall
  - Bagged

How will doors, windows and access to nominated chutes formed from voids etc. be protected?

How will debris be removed from site?

U. DUST EMISSIONS

Will dust emissions be a problem.?

How will it be controlled:

- Water spray - static
- Jet spray - mobile
- Enclosure

V. TRANSPORT

What vehicles?

Is access/egress adequate?

Wheel wash area provided?

Specified routes necessary?

Any police or Local Authority restrictions?

W. NOISE

What noise levels anticipated?

Can they be controlled by?



- Alternative methods
  - Alternative machinery
  - Suppression
  - Time limitations
- What is the Local Authority's requirement?

X. **VIBRATION**

What vibration levels are anticipated?

How can they be controlled?

Are there vibration sensitive installations in the vicinity, such as hospitals, computer or research centres?

9. **HEALTH AND SAFETY PLAN**

The contractor must develop the initial health and safety plan so that it incorporates the approach to be adopted for managing health and safety during demolition. The measures to be taken resulting from these assessments should be contained in a detailed method statement, which should form part of the health and safety plan. The method statement should include such matters as:

- 1) The sequence and method of demolition, with details on means of access, working platforms and plant and equipment requirements.
- 2) Specific details of any pre-weakening of structures, or use of explosives.
- 3) Arrangements for the protection of persons employed on site and members of the public.
- 4) Details of the removal or making safe of electric, gas or other services.
- 5) Details of temporary services, which are available, or will be required.
- 6) Methods of dealing with flammable materials and gases which may remain from previous processes or storage.
- 7) Methods of determining the presence of hazardous substances, the means of disposal of such substances and the requirements for any protective equipment.
- 8) Arrangements for controlling transport used for the removal of waste.
- 9) Identifying persons with special responsibilities for the control and co-ordination of safety arrangements.

Guidance on the above matters is given in the paragraphs, which follow.

10. **GENERAL CONSIDERATIONS AND PRECAUTIONS**

**Protection of the Public**



Demolition is frequently carried out in heavily populated areas and particularly high standards of site protection; safe systems of work and effective supervision are therefore needed.

Where reasonably practicable, a fence should be erected to enclose all demolition operations. The fence should be not less than 2m high and should not be capable of being easily climbed. Access gates should be secured outside working hours.

Where it is not reasonably practicable to erect a perimeter fence, appropriate precautions must be taken. Outside working hours, debris at ground level should be cleared, excavations should be fenced, vehicles and plant should be effectively immobilised and electricity and gas supplies isolated or enclosed in locked compounds; ladders providing access from ground level should be removed and stored in a secure place.

The provision of debris fans and facade netting may be necessary to prevent persons being struck by falling objects. Such fans must not be used for access of allowed to become loaded with debris.

## 11. **RESTRICTED AREAS AND SAFE DISTANCES**

Areas affected by each phase of the work, to which access will need to be restricted or made safe, should be set out in the method statement. Restrictions and control may be necessary during:

- The dropping of debris.
- The operation of demolition plant.
- Pre-weakening activities.
- Deliberate collapse or pulling over of buildings.

During debris dropping, a radius of 6m, or half the drop height (*whichever is the greater*), should be used to determine the restricted area to be kept clear.

Similarly, a space of 6m minimum width from the face of the building to be demolished should be allowed for the operation of cranes, grabs, balling machines, pusher arms and similar equipment. If wire rope pulling is used, a distance of three quarters of the exposed length of pull rope should be allowed on either side of the rope and also behind the winch or pulling vehicle.

When tall structures are being felled, a distance of not less than one and a half times the total height should be allowed along the proposed line of fall to cater for parts coming free in flight, or bouncing and rolling on impact. Structures should be felled into clear areas. On slender structures, a 20-degree arc either side of the line of fall should be clear of obstructions and an area of radius not less than one and a half times the total height should be cleared of persons before the actual felling.

## 12. **HEALTH HAZARDS**



Health hazards in demolition arise primarily from substances which are inhaled or ingested, or which can react with or be absorbed through the skin. Noise and vibration are also hazardous to health.

In case of contaminants, risks to health must be assessed by the contractor and appropriate control measures introduced. In demolition, it may not be practicable to control these hazards by means such as exhaust ventilation and emphasis should therefore be placed on the following:

- Using processes which do not generate hazardous dust and fumes.
- Segregation of workers.
- Operating work permit systems to reduce the numbers exposed to risk.
- Ensuring that suitable personal protective equipment is provided and used.
- Ensuring that airborne hazards do not escape from the site to affect members of the public.

The following paragraphs identify some of those likely to be encountered in demolition.

### **Lead**

Lead as a toxic dust or fume arises from such demolition jobs as the cutting and burning of steelworks covered with lead-based paint and the handling of old petrol tanks from filling stations.

Instruction, information and training on the risks from lead must be given to employees and suitable washing and changing facilities must be provided.

In demolition, it is essential to identify any lead paint or lead-containing material before operations begin. If adequate information is not readily available, a sample of the paint or material should be analysed to determine the lead content. The cutting of steelwork often has to be carried out within the confines of a building, where the dust and fume has little chance to disperse and there is a risk of a very rapid absorption of lead. Under these circumstances, exposure should be assessed as significant. Even if such work is carried out in the open air, high concentration of the dust or fume may be inhaled before it has had a chance to disperse if the work is carried out close to the operative's breathing zone.

Where information on lead-in-air concentrations from a particular type of work is lacking, air monitoring should be carried out. Assessment should be made when exposure is likely to be at a maximum level. Monitoring may not be necessary for work where there is a clear need for the wearing of respiratory protective equipment, but, if other persons are working or likely to be in the vicinity, air monitoring may still be needed to ensure that such persons are not exposed to risk.



Where persons are likely to be exposed to high concentrations of lead, suitable approved respiratory protective equipment must be provided and used. Arrangements should be made for such equipment to be cleaned and stored at the end of each shift, and to be regularly maintained.

Respiratory protection should be selected from the list of approved equipment, according to the highest concentration of airborne lead to which the operative is likely to be exposed. The selection should also take into account the acceptability of the equipment to the wearer, bearing in mind the nature of the job and the length of time the protection will need to be worn.

Contamination must not be allowed to spread outside the site and it is essential that clothing which has been used for protection against lead is not taken into an operative's home or living quarters. Changing facilities should be provided, together with arrangements for storing personal clothing, not worn during working hours, in a place where it is not liable to be contaminated by lead.

Washing facilities, i.e. bowls, hot water, soap, nail brush and towels, should be provided as near as possible to the workplace, for example in portable buildings or vans, so that operatives can wash their hands and faces before eating, drinking or smoking. Showers or baths should also be provided for operatives' use before leaving site if there is likely to be exposure to a high degree of lead contamination. Regular and thorough cleaning of washing facilities is essential to prevent the spread of contamination.

The hazards of lead contamination should be explained to any employees who are exposed to lead. Such employees should be informed of the extent of the exposure, the precautions being taken by the employer and the precautions which employees themselves should take.

### **Asbestos**

Asbestos dust will be generated whenever demolition involves work on asbestos in sprayed coatings, thermal and acoustic insulation materials, fire resistant walls and partitions, asbestos cement sheets, or flooring materials.

Contractors should be thoroughly familiar with relevant legislation on asbestos. Asbestos insulation or coating should be removed by specialist contractors only where possible before any other demolition work is started. Clients should ensure that contractors have relevant experience and knowledge of the necessary precautions.

### **PCBs**

PCBs (*Polychlorinated Biphenyls*) are toxic substances which were used as dielectric filler fluids in electrical transformers and capacitors and are still used in some refrigeration and heating equipment.



In demolition it is important to identify equipment containing PCBs, either from labels, or by enquiries from manufacturers or former owners. Where equipment is to be removed or transported, leakage of PCB fluid is always a danger and checks for leakage at welds or flanges must be made. If equipment is to be dismantled or broken up, it is essential that the fluid is removed first.

Drainage of PCB fluid must be carried out in an open or well-ventilated area and full protective clothing including respirator and chemical type eye protection, must be worn.

Waste PCB fluid must not be disposed of by pouring into drains, on to land, or by burning other than in a licensed incinerator.

### **Entry into Confined Spaces**

Tanks and other vessels may contain toxic gases and vapours from their previous use, or residues which produce toxic or flammable vapours if heated, for example during cutting. Water in a tank may have caused corrosion and a reduction of the level of oxygen in the tank. It is essential, therefore, that any confined space is ventilated and the atmosphere tested, before it is entered or any demolition work is permitted.

Entry to and work in confined spaces should be controlled by pre-planned “permit” systems and backed up by a rescue procedure.

### **Noise**

Demolition plant, such as compressors and concrete breakers, frequently create noise “levels” in excess of 100 dB(A). Jobs likely to expose workers to an hour noise dose above 90 dB(A) should be identified and arrangements made to ensure that ear muffs or plugs are provided and worn. Machines, where appropriate, should be marked with a prominent notice to warn that operators should wear ear protection.

Ear protection must be suitable for the circumstances, supervision and training in its care and use must be provided and there must be adequate facilities for its maintenance and storage.

### **Vibration**

Pneumatic drills and breakers are among many hand held tools likely to give rise to vibration. Keeping warm with waterproof and wind resistant clothes and gloves, and restricting the time which individual workers operate such tools, can reduce the risk of serious disability.

Plant and tools should be selected, as far as possible, to minimise the harmful effects of vibration or jolting motions.





## PILING

### A. PURPOSE

Piling operations can give rise to different hazards dependent upon the type of piling being undertaken. Certain hazards are, however, generally common on all types of piling and the following gives both the general precautions to be taken and the special precautions relating to the different types of piling.

### B. RESPONSIBILITIES

Piling contractors should be requested to provide an appropriate written method statement. It is essential that induction training and information specific to the method statement is provided to piling operatives.

### C. PROCEDURE

- Prior to piling, all underground services in the area should be located and rendered safe. It is important to consult the statutory authorities for the area on these matters. A check should also be carried out to ensure that there are no cellars, underground watercourses or ground conditions, etc., which could create hazards during the operation. Where the site is contaminated, consideration must be given to the type of piling used.
- Cranes must be selected to suit project requirements.
- Automatic safe load indicators (*ASLIs*) are not required to be fitted on piling rigs when used for normal piling operations. Likewise, an *ASLI* is not required when a rig is being used to erect another rig, provided that the weight of components is accurately known and does not exceed 75% of the safe working load (*SWL*) of the rig. However, if a rig with *SWL* of more than one ton is used for general lifting operations, such as the loading and transport of materials on site, it must be fitted with an *ASLI*.
- A firm level base of adequate bearing value must be provided, or crane mats used.
- There is a risk of the cores of pendant/bridle ropes fracturing due to shock landing. These ropes should be opened up and the cores carefully examined at 3 monthly intervals, as a minimum.
- Any crane used for raising or lowering men must be fitted with a dead man's handle and the descent must be effectively controlled; the latter is currently achieved by power lowering. Properly constructed man-carrying cages, which are unable to spin or tip, must be used. The cages should be regularly and carefully inspected.



- Records of test and thorough examination must be held for all lifting appliances and gear, which must be adequate for the job, paying particular attention to the risk of damage to gear by sharp edges.
- All persons working on piling operations must wear suitable helmets with chinstraps. Ear and eye protection must be provided and worn where necessary.
- Piling machine operators must be trained, competent, medically fit and authorized by site management to operate the machine.
- When piling from a pontoon or adjacent to water, personnel should wear life jackets. Rescue equipment (*e.g. a safety boat and lifebuoys with lifelines attached*) must be kept ready for immediate use and enough men must know how to use it.

#### **D. Materials Handling**

- a) When splitting bundles of sheet piles, chocks should be used. If large quantities of piles are handled, the use of purpose-made strops and grips is advised.
- b) Piles should not be stacked too high or in a cantilever position. Spacers and chocks should be used where necessary. Tubular piles should not be stacked more than four high and should be properly chocked.
- c) When lifting piles or piling hammers, hand lines should be used to control the load. It is important that due consideration is given to wind speed during these operations.

#### **Bored Piling**

- a) Spoil from boreholes should be kept clear of access to the borehole, which, after completion, should be fitted with a cover or other suitable protection. As an alternative to a cover it is common practice to back fill or to leave the auger in the borehole.
- b) Persons are not permitted to enter any borehole less than 750 mm in diameter.
- c) Where it is necessary for any person to enter a borehole, special precautions must be taken. It must be ensured that no toxic or flammable substance/gas is present in the borehole and that the air is fit to breathe. Where necessary, a proper ventilation system or suitable breathing apparatus must be provided. No person should remain in the hole for more than one hour at a time.
- d) Descent into a borehole should be by means of suitable open skips adapted for personnel excavating and clearing out under-reams, and fitted with an anti-spin device; by bosun's chairs complying with BS 2830 or by roofed safety cages for inspection purposed. In all cases, men working down a hole must wear safety harnesses. Neither the person working near the entrance nor the person



descending into the hole should carry any loose tools. Lifting and lowering should be by means of properly constructed cranes, winches, sheerleg's or other appliances suitable for the purposes, and properly maintained. The power source of the lifting appliance should be kept running the whole time someone is below ground.

- e) It is advisable that at least the top 2 meters of a borehole should be sleeved. If there is any risk of unstable material in the borehole, further lining tubes must be inserted prior to any person descending into it.
- f) A banksman must be in attendance at all times when any person is lowered into a borehole. He should be in such a position that he can observe the man in the borehole. If necessary, he should wear a safety harness and line.
- g) Operatives engaged in this work should be trained and competent in rescue from deep boreholes. Emergency rescue drills supervised by a competent person should be carried out at the start of operations and at regular intervals thereafter. A set of printed rescue drill instructions should be issued and displayed at each site. All rescue equipment should be tested regularly to ensure that it is in good working order and capable of reaching to the maximum depth of the borehole.
- h) Supervisors should be trained in methods of gas detection, respiratory resuscitation, first aid and the use and maintenance of breathing apparatus.
- i) Adequate lighting and a means of communication must be provided where any person is required to be lowered into a borehole.

### **Piling Augers**

- a) All machinery should be in good condition and no lifting apparatus should be used unless there are in existence current records of test and thorough examination.
- b) All control levers on the piling rig should be clearly marked to indicate their purpose and mode of operation.
- c) Persons must stand well clear of the auger both when drilling and when discharging spoil.
- d) If the secondary rope is used as a crane (*i.e. to lift casings into place*) then there must be an approved automatic safe load indicator fitted into the system.
- e) When ropes are subject to heavy wear, they must be frequently inspected and changed as necessary.

### **Tripods**



- a) No tripod should be used unless the rig is tested and the legs marked. The numbers on the items must coincide with the numbers on the test and examination records.
- b) Ropes should be secured with suitable fastenings, e.g. bulldog clips. Where appropriate, properly constructed saddles or hard eyes should be used. **KNOTS MUST NOT BE TIED IN ANY ROPE USED FOR LIFTING.** The base plates should be adequate and secured to prevent any accidental movement of the rig.
- c) The tripod legs must not be overspread or overloaded.
- d) Only the correct pins should be used in the sheerlegs.
- e) The safe working load must be clearly marked in the winch, and records kept of test and thorough examination.
- f) All parts of the winch should be effectively guarded.
- g) Constant attention must be paid to the condition of rope, which should be changed as soon as it becomes necessary.
- h) When a rope/chain block is being used to extract the casings, the capacity of the block must not exceed the capacity of the rig.
- i) Under no circumstances must there be less than 2 full turns of the rope on the winch drum at any time.

### **Piling Operations**

When piling operations are to take place on the project, the following items must be implemented:

- a) The piling contractor must produce a detailed method statement including proposed safe systems of work which must be agreed by the Engineer prior to work commencing on site. The method statement must comply with all local statutory requirements
- b) Any access ramps used by piling rigs must be constructed from well compacted materials capable of withstanding the loads. The gradient permitted for the ramp must also be taken into consideration and the minimum width is to be the width of the rig plus 1.0m each side. The sides of the ramp must be battered to an angle of 30 degrees to the horizontal. Rigs must back down ramps.
- c) When traveling on site, the rig is not permitted to carry any load suspended from the crane hook, i.e. piling casings. The agreed method statement must indicate the method of transporting pile casings around site.



- d) Conduct a search of existing drawings and a physical on the ground to ensure there are no traps, such as manholes, for the rig. Check the suitability of the ground to support the rig and if necessary, lay a piling mat.
- e) All underground services must be clearly marked and kept away from. Minimum clearance must be maintained in accordance with local requirements.
- f) The rig driver and banksman/slinger must be experienced in the type of work to be carried out.



## MOBILE ACCESS SCAFFOLDS

### A. PURPOSE

Mobile access scaffolds provide a safe means of access for high level works where the nature or duration of the work makes it inappropriate to provide traditional scaffolding.

### B APPLICABILITY

This procedure applies to all contractors as well as subcontractors and/or suppliers working on site.

### C. REFERENCE

All mobile access scaffolds must conform to the following legal and advisory standards when assembled:

- B.S.5973:1981 Code of Practice for Access and Working Scaffolds.
- Prefabricated Aluminum Scaffolding Manufacturers Assoc. Code of Practice.
- Local regulations such as KFD, Kuwait Municipality, etc.
- Manufacturer's requirements and recommendations.

### Erection and Dismantling (Competent Person)

Mobile access towers constructed from steel scaffold tubes and fittings are to be erected/dismantled by competent scaffolders.

Prefabricated mobile access towers are to be erected in accordance with the manufacturer's instructions by competent operatives. All such towers whether bought or hired must be accompanied by the manufacturer's instructions.

### Ground Surface

Towers should only be used on suitable surfaces such as concrete, tarmac or similar. Where ground conditions are soft, sloping or uneven, towers are to be set on boards or other rigid packing, which will provide a firm base. Towers may need to be tied to fixed positions to prevent shifting.

### Stability of Towers

The height to which a free-standing mobile tower may be erected is calculated as a ratio between the height of the working platform above the ground and the minimum base dimension.



<u>Condition of Use</u>	<u>Height/Base Ratio</u>
Within enclosed buildings or where not subjected to wind force	3.5: 1
External to buildings or exposed conditions subject to wind force	3: 1

In addition to the above, all instructions shall be in accordance with the manufacturer's requirements.

The use of outriggers or stabilizers will enable the minimum base dimension to be increased to that additional height can be obtained within the height/base ratio. Above these heights the tower must be tied rigidly to a structure. Ties for aluminum towers are to be connected to both inner and outer standards, grouped in pairs and repeated at intervals not greater than the maximum free-standing height.

Where the scaffold cannot be tied to the structure, the Engineer's approval is to be sought as to the use of guy ropes, ground anchors or ballast weights.

## **Loadings**

### **Safe Working Loads**

For towers constructed from steel tube and fittings a S.W.L. of 1.5 KN/m<sup>2</sup> is not to be exceeded. For proprietary steel or aluminum towers, the manufacturer's S.W.L. is not to be exceeded.

### **Other Horizontal Loads**

When work from the platform of a mobile tower required either a pushing or pulling action this should not exceed 20 kg, and should be avoided where possible.

### **Vertical Loads (Eccentric)**

Towers must not be used for heavy lifts outside the base area.

## **Means of Access**

Access to towers constructed from steel tube and fittings will normally be provided via a ladder securely lashed vertically to the narrowest side of the tower. Where possible this is to be to the inside of the tower frame.

Proprietary steel or aluminum alloy towers have a variety of means of access, these being:



- Integral diagonal stairway. As well as providing access this will form part of the bracing of the tower.
- Ladder units which slip onto the end frame or inclined ladders, securely fixed, inside the scaffold frame.
- Climbing a ladder section which is incorporated within the end frame. Such ladder section will have rungs no more than 300 mm apart with stiles not more than 480 mm apart. Climbing horizontal; members of other types of end frame is not to be accepted as a safe means of access.
- Access is from the inside of the tower frame to avoid eccentric loading of the tower.
- Working platforms are to be provided with trap doors to facilitate access. Where the vertical distance between the ground and working platform exceeds 9.0 m (30') an intermediate platform with guardrails must be provided. Minimum platform width 600 mm or 3 boards.

## **Components**

### **Working Platforms**

Working platforms are to be fully boarded and complete with guardrails and toe-boards. Where on a double width aluminum alloy tower a single width platform only is used, it must have guardrails and toe-boards to suit. Mobile towers are to have only one working platform.

Minimum platform width 600 mm or 3 boards.

### **Bracing**

Towers erected from steel tubes and fittings will incorporate normal ledger and diagonal bracing. Ensure that the diagonal bracings oppose each other on each elevation or the tower may tend to twist and lose rigidity.

Proprietary steel and aluminum alloy towers must be braced in accordance with the manufacturer's instructions and at the correct phase of assembly.

### **Wheels and Castors**

Wheels and castors must be a minimum of 125 mm in diameter, free running, fitted with effective brakes and capable of being securely fixed to the standard.

Whilst in use, wheels on mobile towers must be locked and aligned outwards from the tower to increase to a maximum the base area of the tower.

Each wheel/castor must be marked with its safe working load and therefore be matched with the loading to be imposed.

### **Adjustable Legs**





Where legs are adjustable it is solely to ensure that the structure is erected vertically. The adjustment mechanism is not designed to provide additional height to the tower and is to be kept to a minimum.

### **Outriggers and Stabilizers**

These are used to increase the effective base area of a tower in order to gain height from the height/base ratio and are fitted at 135° to each side of the tower.

Outriggers are fitted with wheels or castors and should be used on towers which will be moved frequently. Stabilizers have self aligning feet and are used on towers which are moved less frequently.

### **Moving Towers**

Towers must **NEVER** be moved with men or materials upon the platform and may only be moved by applying a horizontal force at or near the base.

Prior to moving a tower, ensure that the route to the new desired location is free of obstructions. In particular ensure any holes, pits, ducts or gratings are securely covered and that also **no overhead obstructions such as electric cables or beams are present.**

When towers are to be moved and outriggers with adjustable feet are fitted, they must first be raised to a minimum height (12 mm) to allow movement. However, the tower must be reduced in height to not more than 2.5 times minimum base dimension.

### **Hazards**

Common faults that cause accidents with mobile towers are as follows:

- Height being too great relative to minimum base dimension.
- Failure to use or correctly use outriggers or stabilizers when required.
- Tower being used or moved on sloping, uneven or obstructed surfaces without attention to vertical alignment and stability.
- Towers not tied to a structure where necessary.
- Moving the tower from the working platform.
- Not ensuring pot holes and ducts, etc. are adequately covered before moving tower.
- Tower fouling overhead obstructions when moved.
- Tower inadequately braced to ensure rigidity.
- Guardrails and/or toe-boards not fitted.
- Unlocked wheels/castors when tower is in use.
- Exceeding the Safe Working Load.
- Eccentric loads such as lifting heavy materials outside the base area or persons climbing up the outside of the frame.
- Use of towers in windy/adverse weather conditions.



## **THE STORAGE AND USE OF L.P.G. AND HIGHLY FLAMMABLE LIQUIDS ON CONSTRUCTION SITES**

### **A. PURPOSE**

With the increased environmental concerns, extreme caution must be exercised with the subject of fuel storage at any site. The design and construction must ensure safe storage of fuel and similar materials on sites during and after construction.

### **B. APPLICABILITY**

This section applies to all related materials and storage facilities of said materials on site whether stationary or mobile.

### **C. REFERENCES**

In addition to international standards, all rules and regulations of the local authorities must be adhered to starting with the design stage of fuel storage tanks. As a minimum, the KFD and KNPC approvals must be obtained on all fuel storage tanks prior to construction. Other agencies such as the EPA must be consulted where applicable.

## **LIQUIFIED PETROLEUM GAS**

### **Introduction**

L.P.G. is defined as “commercial, butane, commercial propane and any mixture thereof”. These are petroleum products obtained from oil or gas wells or as a result of the processing of petroleum.

### **Hazards in the Use and Storage of L.P.G.**

Every year many incidents involving L.P.G. in industry occur in the construction section with the main dangers being:

- 1) The volume occupied by the pressurized liquid is some 250 times smaller than that occupied by the gas at the same temperature.
- 2) L.P.G. is colorless and odorless although an odorizing agent is added so as to enable detection of accidental escape of gas.
- 3) As L.P.G. is heavier than air at normal temperatures, any leakage will form a gas cloud and tend to fall through air to the lowest existing level and may become ignited at some considerable distance from the source.



- 4) L.P.G. vapor is flammable in air with lower and upper limits of flammability of approximately 2% and 10%. The gases are highly explosive when exposed to heat or flame and there is a risk of explosion if the cylinders are exposed to fire or overheating.
- 5) When the gas consumption rate of burner is greater than the evaporation rate within the cylinder the vapor pressure drops. This has an effect of cooling the cylinder wall. Condensation forms on the outside of the cylinder and subsequently freezes. Contact of the skin with liquid L.P.G. can result in severe frost burns.
- 6) L.P.G. can act as a simple asphyxiate by displacing air and so reducing the oxygen level in the respiratory atmosphere.

### Cylinders

All L.P.G. cylinders should be marked with the proof test pressure and the date that the test was made along with further identifications, if applicable, that the cylinder has been thoroughly examined and tested within the preceding five years.

### Storage of L.P.G. Cylinders

Only the minimum quantities necessary should be stored on sites.

When L.P.G. cylinders are not in use all cylinders shall be stored as follows:

- 1) Cylinders shall be stored in the open air protected from unauthorized access by a fence 2m high with two means of exits, via gates that open outwards and are not self-locking.
- 2) The floor of the store must be firm and level and at least 3m away from any cellars, drains, excavations or other hollows where vapor may collect.
- 3) It is advisable that the store is provided with a non-combustible roof to prevent cylinders being exposed to direct sunlight.
- 4) The store must not be situated near any source of heat.
- 5) Prominent notice stating **“HIGHLY FLAMMABLE L.P.G., NO SMOKING, NO NAKED LIGHTS”** will be clearly displayed on the L.P.G. store.
- 6) L.P.G. cylinders should be stored separately from oxygen cylinders, other flammable liquids, oxidizing materials such as sodium chlorate, and toxic or corrosive substances. Such materials should be kept at least 3m away from L.P.G. cylinders.
- 7) Cylinders whether full or empty must be stored with the valve uppermost and the valves turned to the closed position.



- 8) A fire point containing dry powder or air foam extinguishers shall be positioned adjacent to the L.P.G. store.

On sites where only small quantities of L.P.G. are stored (*less than 300 kg*) and it is not practicable to provide a store as above, cylinders may be kept in a lockable wire cage in a safe place in the open air. Only one exit will be necessary providing there is no risk of a person being trapped in the enclosure. All other items listed above relating to the L.P.G. store is to be adhered to.

### **Handling of L.P.G. Cylinders**

Good practice in handling, loading and unloading will minimize the risk of accidental gas leakage and consequently the major hazard, fire.

When cylinders are not in use, valve protection caps and plastic thread caps or plugs must be replaced to prevent damage and minimize leaks.

Whenever cylinders have to be moved, they should be moved in trolleys. It is dangerous to use the valve assembly for levering or lifting a cylinder into position. It is equally dangerous to throw or drop cylinders, as damage will occur to the base and control valve.

During the handling and movement of cylinders, all smoking must be prohibited.

### **General Precautions in the use of L.P.G.**

- 1) It is essential that when L.P.G. is in use all combustible material is removed from the area.
- 2) Fire fighting equipment is available where L.P.G. is being used.
- 3) Cylinders should be sited so they are not heated by the equipment being used.
- 4) Adequate ventilation is required to provide full combustion of the gas.
- 5) Regulators must be suitable for the gas and pressure in use.
- 6) Flexible hoses should only be used for final connections to the appliance. These should be as short as practicable and comply with BS 3212 and 5120. Where hoses could be damaged by abrasion, they should be of the steel braid reinforced construction type.
- 7) Only properly constructed and maintained equipment should be used. The instructions provided by the manufacturer or supplier must be followed.
- 8) L.P.G. cylinders are not to be stored or left in areas below ground overnight.

### **Hand Operated Tools (i.e. Blow Torches)**



When using hand tools, the supply cylinder shall be secured so as to prevent the cylinder being pulled over. Care must be taken to ensure that the flame from any hand tool is directed away from the supply cylinder.

### **Site Accommodation**

Cylinders and regulators shall be fixed outside the building, protected from frost or direct sunlight. The gas supply shall be taken in at low pressure through rigid piping (*copper or iron*), with a flexible connection to the cylinder.

All appliances must be fitted with an isolating tap and the burner must be protected from draughts, which might extinguish the flame.

### **Oxygen/Acetylene and Other Fuel Gases**

To reduce the risk of cylinders being involved in a fire, flash back arrestors must be fitted to the hoses on this equipment.

## **HIGHLY FLAMMABLE LIQUIDS**

### **Introduction**

Highly flammable liquids are found in increasing quantities on construction sites, being used as solvents in the composition of adhesives, finishing products and other materials. Such liquids are defined as having a flash point of less than 32°C (90°F) that will support combustion at 50°C (122°F).

### **Hazards**

When highly flammable liquids are exposed to the atmosphere, they give off vapors which are both **FLAMMABLE** and **TOXIC**. Such vapors are generally heavier than air and therefore are difficult to disperse.

### **Storage of Highly Flammable Liquids**

All flammable liquids are required to be stored in flameproof containers when not in use. A warning notice stating “**HIGHLY FLAMMABLE LIQUID, NO SMOKING, NO NAKED FLAME**” must clearly be displayed on the storage container.

A fire point containing a dry powder extinguisher should be provided adjacent the store.

### **Handling and Use**

The transfer of material from one container to another should always be carried out in the open air. Avoiding spillage will best be achieved by maintaining screw caps and the use of funnels, spouts or proprietary syphonic devices. Spillage must be immediately soaked up with dry sand, which should then be placed in a safe place in the open air.



Where highly flammable liquids are used in enclosed areas, ventilation is required at a rate of 60 cubic meters for every liter evaporated in order to prevent an explosion; where enforced ventilation is induced by means of mechanical air moving systems, care must be taken to ensure such appliances are properly earthed against static electricity.

Sources of ignition must be avoided; therefore, the banning of naked lights and smoking must be enforced.

### **Petrol Storage**

It is required that a license of bulk storage of petrol be obtained from the concerned authority.

Petrol must be stored in an approved container clearly marked “**PETROL HIGHLY FLAMMABLE**”.

### **FUEL STORAGE TANKS**

- As a basic rule, all tanks must be placed as far as possible from water drains.
- Fuel storage tanks must be constructed in accordance with recognized standards and codes. This is to be followed with testing to ensure quality standards are kept and complied with.
- Storage tanks must be compatible with the intended use, protected against corrosion, and clearly labeled with the product stored.
- Included within the design must be precautionary measures in case of leaks such as boundaries of sufficient size and capable to contain any leakage.
- The boundary walls must be constructed from materials compatible with the materials stored within the tank. This must be tested for leaks prior to putting the tank in use.
- Fuel tank design and construction must provide easy access for tank refueling and drainage. Similarly, it should provide enough access around tank to check for leaks and effect repairs were necessary.



## SAFE USE OF VEHICLES ON CONSTRUCTION SITES

### A. PURPOSE

Accidents happen each year due to persons either coming into contact with vehicles or vehicles over turning, the consequences can be serious injuries or fatalities occurring. The risks arising from the use of general vehicles & mobile plant must be taken into account at planning stage to prevent serious injury.

### B. APPLICABILITY

The requirements of this section apply to all motor vehicles:

- a. by the company or any of its subsidiaries
- b. Owned On hire to the company
- c. From any other source if used in connection with company activities

Examples of such vehicles are:

- 1) Trucks
- 2) Mini-bus
- 3) Dumpers & Dump trucks
- 4) Mobile crane (Tracked or Wheeled)
- 5) Fork lift trucks
- 6) Rollers
- 7) Excavators (Tracked or Wheeled)
- 8) Tractors, Loaders & Scrapers etc.

Accidents occur during loading and unloading, material movements, ground works and road works.

Construction vehicle accidents are preventable but this requires effective planning, organisation, control, monitoring and review of vehicle operations.

### Recommendations

The following highlights control measures to reduce the risks associated with construction vehicles.

#### Pedestrians

- ◆ Segregation of pedestrians from vehicle movement areas by installing a physical barrier between walkways & traffic routes



- ◆ Ensure adequate lighting & good visibility is provided at access points & any other crossing points
- ◆ Where vehicles are required to cross walkways then there may be a need to provide sufficient responsible persons to manage the pedestrians
- ◆ Suitable warning signs must be displayed to inform pedestrians of any risks

### Access routes

- Where possible provide separate access for vehicles & pedestrians
- Ensure that visiting drivers are made aware of the site layout & rules
- Where possible provide clear unrestricted visibility to access routes
- Vehicle & pedestrian access routes should be cleaned, maintained free of pot holes & constructed of either of a temporary or permanent hard surface
- Where possible plan for a one-way system or any other method to reduce the need for vehicles reversing
- If vehicles exit on to the public highway ensure good visibility is provided & the use of a banksman wearing a high visibility jacket/vest to manage pedestrians would greatly reduce the risks
- A wheel wash should be provided where there is a possibility of contamination of the public highway
- When planning vehicle routes consideration should be given to avoid sharp bends, narrow gaps, overhead obstructions, steep gradients & adverse cambers
- Close proximity of routes to shafts, holes, excavations, wells & water hazards should be avoided
- Protection should be provided to any permanent or temporary structures such as scaffolds & false work which might be damaged & made unsafe if struck by a vehicle
- Where overhead cables cross or are in close proximity to trafficked routes then protection must be provided

### Drivers

- Ensure drivers are trained and are licensed to use the specific vehicle they are required to operate
- If there is any doubt regarding a person's eligibility to operate or drive any form of transport or to the validity of its licence, registration or insurance cover the vehicle must not be used
- Drivers must ensure no passengers are carried on vehicles which do not have proper seats provided

### Maintenance





- ◆ All vehicles being used on site must be in good working order
- ◆ Plant & vehicles must be properly maintained. This must be done safely with consideration also given to the environmental impact caused by spills of fuels & oils
- ◆ Construction vehicles work in harsh environments. Therefore, an effective maintenance program must be in place to check for defects. Visual checks should be carried out daily prior to use, regular inspection and servicing schedules in accordance with the manufacturer's instructions should be established.
- ◆ All parties are to be made fully aware of their duties and held contractually liable for the responsibility of inspection and maintenance.
- ◆ A maintenance log to record works carried out on the vehicles.
- ◆ Drivers must be encouraged to report defects. All repairs are to be carried out in accordance with the manufacturer's instructions.

### Loads & Loading

- ◆ The delivery of hazardous loads to site should be reported in advance to ensure the driver is made aware of any specific risks that may affect the delivery. e.g.
  - a) Lorries carrying LPG gas should not be parked near scaffolding where there is the potential of falling objects striking them
  - b) Lorries delivering fuels or solvents may require additional fire precautions to be implemented
- ◆ Avoid having people on vehicles whilst loading / unloading. If not possible then a safe position must be provided
- ◆ Vehicles must not be overloaded and the loads should be distributed evenly
- ◆ Any materials projecting from the body of the vehicle should be indicated by a warning flag or sign
- ◆ Ensure all loads are secured to prevent instability during transportation
- ◆ Where vehicles are unloading into holes or trenches then vehicle stop blocks must be installed. The stop blocks must be of sufficient size as to prevent the vehicle driving over the top. With a method of anchoring the blocks to prevent movement during unloading of the vehicle. The positioning of the stop blocks must be a sufficient distance from the excavation as not to impose excessive loads to the excavation sides.
- ◆ Loads should only be placed on vehicles which are suitable for the task to be undertaken & in good working order
- ◆ A suitable means of access must be provided to high loads where there is a risk of falling



- ◆ It is essential to establish the size & weight of awkward loads prior to delivery on site. This is to enable suitable lifting equipment to be provided for a safe lift to be carried out. The majority of accidents during unloading are due to incorrect lifting equipment being used.

### Working Environment

The use of plant & other vehicles on construction sites can affect the surrounding environment in which they are working. The progression of the construction work means that site conditions can change on a daily basis, therefore because it was acceptable yesterday may not mean it is acceptable today. The following are items to be considered when planning works to be carried out.

- ◆ On completion of a pile installation a piling rig will be required to move to a new position, a site which has restricted access may require additional support to any pile bore which could affect the stability of the rig during movement.
- ◆ Below ground services may require additional protection where they are in the proximity of traffic routes
- ◆ Locate offices and welfare facilities and other areas of frequent pedestrian activity away from primary site traffic routes
- ◆ Adequate visibility for the driver is a key factor in the safe use of vehicles on site. Adequate visibility from the driving position is judged on the basis of risk and the state-of-the-art technology.
- ◆ All vehicles must have warning lights and alarms in good working order should reversing be required. A competent banksman must be in place to control the vehicle and he must ensure that he is in constant communication with the driver and should not put himself at risk by standing directly behind a reversing vehicle
- ◆ A designated clear access route for emergency vehicles should be established with procedures to ensure unobstructed passage can be maintained



## WOODWORKING MACHINERY

### A. PURPOSE

Many types of machines are in use around and in construction sites. Woodworking machinery must be used with extreme caution and only by trained personnel.

### B. APPLICABILITY

This section applies to all personnel involved with the use of woodworking machinery on site.

### C. General Requirements

- 1) The cutters of all woodworking machinery shall be guarded to the greatest extent that is practicable, having regard to the work being done.
- 2) With all circular saws there must be adequate protection beneath the saw bench in order that it becomes impossible for any person to gain access to any moving parts (*saw blades or machinery*) other than for maintenance purposes. The machinery must be stopped whilst any maintenance is carried out.
- 3) Every woodworking machine shall be secured to the ground on which it stands (*other than a hand-held machine*). The area around the saw should be flanked by guardrails to provide a compound.
- 4) An emergency stop button must be affixed to the saw so the operator can easily knock the saw off – preferably at knee level.
- 5) It is necessary to maintain a reasonable temperature in the area in which the woodworking machine is being used.
- 6) No person shall be employed on any kind of work at a woodworking machine unless he has received sufficient training.
- 7) Guards, push sticks must be used.
- 8) Persons shall report defects in machinery, guards, tidiness or condition of floors around the machine.
- 9) Circular Sawing Machines
  - Riving knives must be of a radius, which shall form an arc of a circle not exceeding the radius of the largest saw blade. Distance between saw teeth and riving knife not to exceed 12 mm.
  - Top guards must be adjustable to within 12 mm of the material being cut.
  - Every top guard shall have flanges extending beyond the roots of the saw teeth on both sides.



10) Sizes of Circular Saw Blades

- No saw blade shall be used for dividing material which has a diameter of less than six tenths of the diameter of the largest saw blade capable of being fitted into a saw bench.
- Notices shall be affixed to every circular sawing machine specifying the diameter of the smallest saw blade, which may be used in the machine.

11) Circular sawing machines shall not be used for:

- Rebating, tenoning, molding, grooving, unless the saw blade above the table is effectively guarded.
- Ripping, unless the teeth project through the upper surface.

12) Push Sticks Shall be provided and kept available for use at every circular sawing machine.

13) Removal of Material being Cut by Circular Sawing Machines

- The person assisting in the removal of material from a circular saw whilst being operated must stand at the delivery end.
- There must be a distance of 48" (1200 mm) between the discharge end of the table and the rear of the saw blade provided that this requirement shall not apply to moveable machines, which cannot accommodate a blade having a diameter of more than 18" (450 mm).

14) There must be sufficient and suitable lighting placed or shaded to prevent glare upon the operatives' eyes.

15) All practicable measures should be taken to reduce the noise level. In addition hearing protection must be provided.

16) Chain Saws

When using chain saws on site it is important that:

- Operators are trained and competent.
- Before using a check must be made to ensure that:
  - Guards are in position and in good repair;
  - The chain, guide bar and sprocket are undamaged;
  - All external fittings are secure;
  - The chain is sharp and the tension is in accordance with the manufacturer's instructions;
  - The lubrication system is working.
- Protective clothing – safety helmets, ear defenders, eye protection, close fitting clothing, gloves and chain saw operator boots must be worn.



## WORKING IN HOT WEATHER

### A. PURPOSE

Excessive heat is a major problem on construction sites in Kuwait. Cases of heat exhaustion can occur and or heat strokes can happen to anyone who is not cautious on an open construction area or in confined places. It is important to be able to identify the causes and the symptoms so that this problem can be avoided.

### B. HEAT STRESS

- Common forms of heat stress symptoms include headaches, breathing difficulties, or muscular cramps.
- The harmful effects of heat depend on air temperature, humidity, the amount of air movement, and radiant heat.
- In case of a heat stress being noticed on a person, this can be relieved by moving the person to a cool place. Fluids are usually given to the person affected while allowing them to rest. Salt tablets are recommended in places where there is a loss of fluids via sweating to compensate against excessive loss of minerals from the body.

### C. SUNBURN

- The problem is caused by the ultra violet rays in strong sunlight especially when working in open areas under direct sunlight.
- The dangers include blisters, darkened skin, and the long-term likelihood of skin cancer.:

### D. PROTECTION FROM SUNBURN

- Care must be taken when working outside in the summer, particularly in the peak-heat hours during the day.
- The best protection is to shade the skin from direct sunlight. It is important to cover the skin rather than exposing it to direct sunlight as seen on many construction sites. Exposing skin is to be avoided. Covering the head (wearing of a safety helmet) will provide protection as well.
- Those working outside must be encouraged to drink sufficient fluids preferably with salt tablets or other forms of minerals to compensate for loss of fluid from the body.



**E. FIRST AID**

- Any person feeling the symptoms of heat stress must immediately report to the first aid facility on site.
- People must be trained to identify such symptoms as heat stress or sun strokes and immediately move the affected person to a cool shaded area and administer first aid procedures.
- In case of persistence of symptoms, the affected person must be moved to a medical facility as soon as possible.



## **CHEMICAL SAFETY**

### **A. POLICY**

- Today there are very few jobs that do not involve the use of some chemicals.
- Office workers handle printer and copier inks and toners, production workers are exposed to processing chemicals and maintenance workers have a host of chemicals that they may work with day to day.
- It is essential to ensure these chemicals are used, stored, transported and labeled properly.

### **B. PROPER USE OF CHEMICALS**

- Chemicals present several types of hazards. Improper use or lack of understanding of the personal protective actions can result in employee injury, illness or property damage.
- Proper use includes knowing and using personal protective equipment. This equipment may be gloves, respirators, goggles, face shields, aprons or other chemical specific protective clothing. Prior to using same, the worker must be trained on how to check and use the protective clothing in addition to knowing the limitations of it.
- Many chemicals can react violently when exposed to other substances. People handling chemicals must be trained in advance of any usage of chemicals.

### **C. STORING CHEMICALS SAFELY**

- Hazardous chemicals must be properly stored when not in use.
- All containers should be checked to ensure vapors cannot escape.
- Flammable liquids may only be stored in approved flammable storage lockers.
- Bulk storage of flammable liquids may be in large drums. These dispensing points must have grounding straps for the drum units to ensure there is no static spark generated when filling smaller containers.
- Chemicals that are reactive with each other, such as acids and bases, must never be stored together.

### **D. TRANSPORTATION OF CHEMICALS**

- Only the smallest amount needed should be used at the worksite. Sometimes this means transferring chemicals from large to smaller containers. These smaller containers should have liquid tight lids and be approved for the specific chemicals.
- Although it is not required to label smaller containers if the contents will be under the control of the worker at all times and not stored at the worksite, it is best to always provide some identification of the contents.



- NEVER transfer chemicals into food or beverage containers such as soda bottles.
- Flammable liquid containers should be shatter proof... not glass.

**E. LABELING OF CHEMICALS**

- Chemicals must be properly labeled.
- Stored chemicals should have the label visible from the front.





## **FIRST AID AND WELFARE FACILITIES**

### **A. PURPOSE**

Proper first aid facilities on site are very important. They could mean saving a life on site or until professional paramedics arrive.

### **B. REFERENCES**

First aid facilities must be provided and equipped in accordance with the Ministry of Health and the Ministry of Social Affairs requirements.

### **C. RESPONSIBILITIES & REQUIREMENTS**

- The contractor shall be responsible to provide all the requirements of this section in accordance with international and local laws, rules, and regulations.
- Suitable trained staff must be provided to administer first aid procedures.
- A first aid facility must be adequately equipped for the type of project/work to be served by it.
- Provision of a first aid staff or a nursing staff must be done in accordance with the Ministry of Health requirements. This includes the number of staff who are properly trained to handle any anticipated accidents/injuries.
- Direct telephone access to hospitals and/or treatment centers must be readily available for such staff.
- First aid kits must be provided in sufficient numbers to adequately cover the site in addition to carrying proper supply of tools and consumables to serve their purpose.
- First aid facilities may also include emergency eye wash facilities and emergency showers depending on type of work carried out.
- Other equipment may include stretchers, oxygen administering apparatus, special blankets, etc.
- Adequate first aid facilities must be maintained and fully functional at all times in relation to the work being carried out and the number of workers involved. This covers overtime work as well as weekend and holiday work.

## **WELFARE FACILITIES**

### **INTRODUCTION**



- The local requirements of welfare facilities include adequate provision of same on construction sites.
- Such facilities may include toilets, washing facilities, cold drinking water, rest areas, change rooms, etc.
- All contractors working on our site must provide such facilities and ensure compliance with local rules and regulations.

### **TOILETS**

- Toilets must be properly ventilated, properly drained and continuously cleaned and disinfected.
- Separate facilities must be provided in case of the presence of female workers on site.
- Toilets must be properly situated on site to avoid annoyance to other site users and neighboring plots.

### **WASHING FACILITIES**

- Washing facilities must be provided near toilets and rest areas.
- Washing facilities must be provided with soap, detergents, and any other required cleaning agent which may be required depending on type of work carried out.
- For certain types of works, washing facilities may be required to be fitted with showers and/or eyewash facilities.
- Number of washing facilities must correspond to the number of people working on site.

### **COLD DRINKING WATER**

- Sufficient supply of cold drinking water must be available on site at all times. This should correspond to the number of people working on site taking into consideration ease of access.
- This is particularly important during hot weather.
- Drinking water and related facilities must be periodically inspected and cleaned as required by site conditions.



## **REST FACILITIES**

- Rest facilities must be provided on site for taking breaks and eating meals.
- The rest facilities must be adequately covered to protect the workers from the elements such as direct sun, rain, strong winds, etc.
- The rest facilities must be provided with adequate disposal containers for dumping leftovers and other unwanted materials. Those must be properly designed to prevent growth of rodents and the like.
- Local rules and regulations must be adhered to while ensuring that rest facilities are sufficient for the work force present on site.
- Rest facilities must be kept functional in case of night, holiday, and weekend work.
- Rest facilities must be properly situated on site to be accessible while maintaining a safe distance for the work areas and site offices.



## USE AND CARE OF ROPES, CHAINS AND LIFTING GEAR

### A. PURPOSE

To provide standardized procedures for the use, maintenance, inspection, and testing of ropes, chains, and lifting gear on the project or in fabrication shop areas and the like.

### B. APPLICABILITY

This standard applies to all operations carried out on site.

### C. POLICY

All load lifting equipment shall be inspected, maintained and operated in accordance with international and local codes, and the manufacturer's recommendations/requirements.

#### 1) Legal Requirements

Statutory provisions applicable to Ropes, Chains and Lifting Gear must be strictly adhered to. These make requirement as to:

- Construction
- Testing
- Examination
- Safe Working Load/Means of Identification
- Hooks
- Slings/Chains
- Wires

#### 2) Definitions

Lifting Gear means: a chain sling, rope sling or similar gear and a ring, link, hook, plate, clamp, shackle, swivel or eye bolt.

This will encompass items of equipment now in common use in construction such as: Beam clamps, Column (*Dawson*) clamps and Webb slings.

#### 3) Construction

No chain, rope or item of lifting gear may be used in raising, lowering or as a means of suspension unless it is of:

- Good construction.
- Sound material.
- Adequate strength.



- Suitable quality.
- Free from patent defect.
- It is clearly marked with the SWL and accompanied by a certificate.

#### 4) **Testing**

Prior to first use on site, all Wire Ropes, Chains and Lifting Gear must be tested and thoroughly examined by a competent person and a certificate of the test produced, specifying the safe working load.

New test certificates are required when any item is lengthened, altered or repaired by welding.

#### 5) **Safe Working Load/Means of Identification**

All items of lifting gear must be clearly marked, in figure and letters, with their Safe Working Load and Individual Means of Identification.

When lifting gear is delivered to site, the Safe Working Load and Individual Means of Identification must be checked prior to first use to ensure that the information given corresponds to that on the Certificate of Test and Examination.

Particular attention must be paid to the information given on webbing slings to ensure that the information tag found sewn into the eye of the sling is legible. Hand written pen markings are not acceptable. Safe load lettering must be a minimum of 20 mm high.

Any lifting gear which is not clearly marked, legible, or the information does not correspond to the information on the Certificate of Test and Examination, is NOT TO BE USED. It is to be returned to the supplier immediately.

The Safe Working Load must not be exceeded under any circumstances.

**NB:** Fiber ropes and fiber rope slings must also be marked with their S.W.L.

#### 6) **Examination**

All Ropes, Chains and Lifting Gear must always be thoroughly examined by a competent person. A written report of all such thorough examinations is to be made in the Site Register.

#### 7) **Hooks**

Every Hook to be provided with an efficient safety catch or be of such shape to reduce the risk of load displacement.

#### 8) **Slings/Chains**



All Slings are to be securely attached to the lifting appliance so as not to cause damage to any part of the sling or to any lifting gear supporting it.

All Slings/Chains are to be protected to prevent edges of loads coming into contact with them where this may cause damage to the chain or sling. Knots are not to be tied in any chain or sling and chains may only be shortened by specially designed devices. No webbing slings may be used if there is any sign of wear.

It is imperative that all slings are kept free of contamination by cement, dust or sand, as this reduces significantly the S.W.L.

## 9) Wires/Ropes

No wire rope may be used if any broken wires are visible at all.

## 10) Standard Operating Procedures

### A) **Acquisition**

#### 1) ***Tower Crane Lifting Gear***

All items of lifting gear are to be supplied by the company supplying the Tower Crane, except specialist lifting gear i.e. beam clamps, column (*Dawson*) clamps etc. These are to be supplied by the specialist contractor using them. All lifting gear supplied is to be accompanied with their Certificate of Test and Examination. This applies to all tower cranes.

#### 2) ***Mobile Crane Lifting Gear***

All items of lifting gear shall be supplied with the crane except specialist lifting gear. These are to be supplied by the specialist contractor using them. All lifting gear supplied is to be accompanied with their Certificate of Test and Examination.

#### 3) ***Lifting Equipment***

Where lifting equipment such as scaffold cranes, elephant hoists etc., are supplied the hirer is also to supply any associated lifting gear. All lifting equipment and gear supplied is to be accompanied with their Certificate of Test and Examination.

### B) **Selection of Equipment**

Chains, ropes and lifting gear must be selected with care given the anticipated types and weights of loads to be handled.

Drop chains and multi leg chain sets must have a S.W.L. of 6 tons, or equal to the maximum capacity of the crane at maximum radius, whichever is the greater.

Webbing slings used with tower or mobile cranes are to have a minimum S.W.L. of 6 tons each, 12 tones per pair, or equal to the



maximum capacity of the crane at maximum radius, whichever is the greater. Webbing slings complete with extra protective sleeves are required when loads have sharp edges such as holonic decking.

Lifting forks, of suitable size and S.W.L. complete with safety net are required to lift all palletized loads. Where this is not practicable, a method for lifting is to be agreed with Engineer.

### **C) Thorough Examination**

#### **1) *Lifting Gear for use with Tower and Mobile Cranes***

It is the responsibility of the crane supplier to arrange six-monthly examination of all chains, ropes and lifting gear they have supplied for use with the crane (*whether sale or hire*) provided that the crane supplier has a crane driver on site. In all other cases it will be the responsibility of the purchaser to arrange the six-monthly inspections, i.e. equipment purchased from third parties for use with the crane.

#### **2) *Lifting Equipment***

It is the responsibility of the company purchasing or hiring the equipment to arrange the six-monthly inspection of the lifting gear associated with scaffold cranes, elephant hoists, etc.

#### **3) *Webbing Slings***

Webbing slings are not to be used after six months from the date of the original Certificate of Test and Examination. These are to be destroyed and re-ordered, whoever the supplier.

#### **4) *Color Coding***

The use of color coding for lifting tackle on site should be considered to ensure that all inspections actually take place.

### **D) Documentation**

All test certificates are to be attached to the Site Register where reports of six-monthly examination are recorded. Those must be from an approved source acceptable to the Engineer.

### **E) Inspection**

It is the specific duty of all authorized Banksmen to visually inspect all chains, ropes and lifting gear upon each occasion of use. Any damage or defect is to be immediately reported. If any doubt exists as to the serviceability of any item, it is to be withdrawn from use until examined by a competent person.

### **F) Banksmen/Slings**



Only authorized persons, who have received training in the correct use of chains, ropes and lifting gear, are permitted to sling loads. Training is also required where it is necessary to control lifting/lowering by means of hand signals or radios.

**G) Security/Stability of Loads**

The security and stability of every load must be checked when the load is approximately 300 mm clear of the loading area. Lifting will only continue when the Banksman is satisfied.

**H) S.W.L. of Slings and Chains**

The S.W.L. of any sling or chain is not to be exceeded.

The S.W.L. of 2 or 4 leg chains is calculated when the angle measure between diagonally opposed chains is not more than 90°. On 3 leg chains the angle is 45° between any chain and a line vertically down from the master suspension point. Where a single chain is hooked back onto itself to form a choke hitch loop, the angle formed must not exceed 90°.

WHERE THESE ANGLES ARE EXCEEDED THE S.W.L. IS REDUCED. The use of slings and chains at angles greater than those stated above is not permissible without sanction from Engineer.

A reduction of S.W.L. also applies to web slings at angles in excess of 90°.

**I) Storage**

Where practicable, all ropes, chains and lifting gear are to be hung in a dry place when not in use. Provisions must be made for the drying of items when wet but not by exposure to heat. A suitable area on site must be made available for this purpose. Each item of lifting tackle should have its S.W.L. clearly marked at the hanging point with the Test Certificate readily available nearby.





## **NON-COMPLIANCE WITH SAFETY REQUIREMENTS**

1. The Contractor shall comply with the application of the contents of the Safety Manual.
2. Where the Contractor breaches or violates the safety, provisions described within the Safety Manual, the Construction Manager shall take the appropriate remedial action, including the imposing of penalties for violating the safety regulations, as per the attached table.
3. On the occurrence of the first violation, the Contractor shall be warned in writing by the Construction Manager and shall be instructed to remedy the violation within a specified time. Where the contractor fails to remedy the violation within the time stipulated, the Contractor will be prohibited from carrying out any further work within the affected area until the specific exposure has been corrected.
4. On the occurrence of all further violations, the severity of each violation, shall be considered by the Construction Manager. The Contractor instructed accordingly. Where the Contractor unreasonably ignores the Construction Manager's instructions, then the engineer responsible for operation in the area where the safety violations are occurred shall be dismissed from the site.
5. Should the Contractor persistently breach the safety requirements with undue reason, then the principal of the Contractor shall be summoned to the site and instructed to take the appropriate action to ensure that his employees comply with the safety requirements of the Contract.