SAFETY MANUAL

TEAL CONSTRUCTION COMPANY

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Safety Manual
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SECTION 1
ADMINISTRATIVE POLICIES AND PROCEDURES

1.0 STANDARDS

This manual contains policies and procedures for maintaining a safe and healthful work environment at Teal construction sites.

All Teal Construction employees and Contractors must follow these safety practices and render every possible aid to safe operations and be a part of the program by reporting all unsafe conditions or practices. Teal Construction has a responsibility and obligation to make sure that all employees and Contractors observe and obey all applicable company, state or Federal regulations. It is the policy of Teal Construction to provide a safe and healthful place of employment for its employees and contractors. It is there fore the purpose of this stated policy:

- That all Contractor's will comply with Federal, State and Teal Construction safety regulations and policies as they pertain to their work.
- That all Contractors apply good sense and safe practices to all jobs.
- That all Contractors exercise good judgment in the application of this policy.
- That all Contractors protect the public from any and all hazards which result from our operations.
- That all Contractors are required to have a copy of their Safety Manual and HAZCOM manual on the jobsite at all times.

Although the Teal Construction Health and Safety Manual, and OSHA construction standards cover most common construction hazards, construction employees are also subject to:

- Applicable general industry standards
- Local, state, and municipal safety regulations
- Other standards incorporated by reference, such as
  - Mine Safety and Health Administration (MSHA)
  - American National Standard Institute (ANSI)
- National Fire Protection Association (NFPA)

1.2 ACCIDENT PREVENTION/SAFETY POLICY

1.2.1 OBJECTIVES

Teal Construction is firmly committed to maintaining a safe and healthful working environment. To achieve this goal, they have implemented the policies and procedures contained in this

manual. This safety system is designed to prevent workplace accidents, injuries, and illness. Teal's objective is to conduct operations in a safe, effective, and efficient manner which can be achieved through a combination of concerned management, responsible and knowledgeable supervision, and conscientious, well-trained employees acting in a proactive approach to manage safety.

Proactive safety management is crucial to Teal Construction's total quality management philosophy. Our safety performance directly indicates our dedication to quality. An effective safety system requires total involvement from all levels of personnel to reach our safety performance goal.

What is Our Safety Performance Goal?

While we realize that accidents, operational mishaps, and injuries do occur, these occurrences are never considered acceptable. The only acceptable safety performance goal is zero incidents. Any other goal would imply that we accept injuries and accidents, or less than quality performance.

As previously stated, commitment from all levels of Teal Construction and their Contractor's staff is necessary to attain our goal of performance perfection. All levels of management and supervision accept responsibility for the prevention of operational mishaps.

All Contractors must make every reasonable effort to provide a safe and healthful work environment free from recognized hazards that cause or are likely to cause death or serious physical harm to workers or damage to facilities or equipment. Every Contractor will be held accountable for the safety performance demonstrated by employees under their supervision.

This manual serves as a guide to achieving a uniform safety system for all Teal Construction projects and provides the means to achieve the following objectives:

- Provide each project with guidelines for uniform implementation of a safety system that promotes strict compliance with statutory requirements.
- Eliminate personal injury and property damage, thus eliminating human suffering and reducing monetary loss.
- Establish lines of communication responsibility and accountability for the safety system at each worksite.
- Develop safety policies for areas or activities not covered by federal, state, or local standards.

The effectiveness of the Teal Construction project safety program depends on the combined efforts of Teal Construction Management, Contractor and Subcontractor supervision, and all jobsite employees. Their participation and cooperation are imperative to effect a sound safety system.

1.2.2 ASSIGNMENT OF RESPONSIBILITIES

The objective of this safety system is to manage the health and safety risks at the Teal Construction project jobsites.

The following definitions of responsibilities provide insight into the requirements for the positions within an organization to promote the successful implementation of the SCR Health and Safety System and its safety policies and procedures.

1.2.2.1 PROJECT SUPERINTENDENT

The Project Superintendent for Teal Construction implements these safety policies and procedures at their individual locations. Specifically:

- Require Contractor field supervisors and other designated supervisors to be sufficiently trained to carry out their responsibilities to implement the safety policies and procedures.
- Insures Contractors assign responsibility, authority, and accountability for implementing the safety policies and procedures, and ensure that they are communicated and understood within an organization.
- Provide leadership and direction for the safety policies and procedures.
- Administer all phases of the safety system established on a project.
- Review all accident investigation reports thoroughly and insure corrective actions are initiated.
- Require all Contractors to record all injuries on daily report.
- Hold a formal safety meeting each week with all Contractor supervisors.
- Review a project's safety performance each week and take any necessary corrective actions.
- In the event of a fatal or disabling accident, initiate an investigation according to requirements prescribed in subsection 1.3 of this manual.
- Maintain effective lines of communication to monitor prompt dissemination of information concerning safe work practices, safety policies and procedures, and health and safety issues through Contractor meetings and supervision.
- Review and evaluate the individual safety performance of all Contractors, and provide guidance where needed to improve performance.
- With the assistance of the Contractor Management, determine safety code requirements from federal, state, city, or other agencies, and provide facilities to meet those requirements.
- Insure Contractors require employee participation in toolbox meetings conducted by contractors, or client personnel as appropriate.
- Enforce the use of safe work practices through corrective action and recognition programs.

- Enforce all phases of a project safety system as well as any special controls issued by the Client.
- Participate in safety surveys before project commencement and whenever requested.
- Communicate safety information to all Contractors project supervisors and alert them to potential dangers that may develop from daily operations.
- Insure Contractors provide proper posting, in locations accessible to all employees, current pertinent information regarding safety work practices, workplace hazards, safety policies and procedures, emergency procedures, and emergency situations.
- Implement a workable housekeeping program.
- Insure Contractors assign specific duties to assistants and supervisors, making daily checks of work areas.
- Perform, at a minimum, weekly housekeeping inspections (accompanied by a Contractor's supervisor, if possible).
- Keep records of conditions found and corrective actions taken, and perform regular facilities checks.
- Insure Contractors develop and maintain a workable inspection schedule as applicable for:
  - All rigging equipment, including wire ropes, shackles, blocks, hooks, slings, and manila ropes.
  - Tools and pneumatic equipment, fire extinguishers.
  - Major equipment such as cranes, derricks, trucks, and welding machines.
  - Scaffolds.
  - All safety equipment.
- Require all Contractors to train their employees in the proper use of personal protective equipment and enforce the requirements for the use of personal protective equipment in accordance with OSHA Standards.
- Monitor safe work practices.
- Regularly review safety issues and safety policies and procedures with Contractors.
- Through action, example, and training, instill a sincere attitude toward safety in all project personnel; develop a better understanding of accident prevention and loss control.
- Insure Contractors determine that adequate and suitable safety equipment is furnished, and that it is properly used, cared for, and maintained.
- Develop and communicate safe job procedures and safe work practices for unusual or hazardous operations.

- Enforce compliance with federal, state, city, OSHA, MSHA, and other agency requirements.

All Site Managers of Construction are responsible for making every reasonable effort to maintain a safe and healthful work environment free from recognized hazards that cause or are likely to cause death or serious physical harm to employees or damage to facilities or equipment.

1.2.2.4 CONTRACTOR'S MANAGEMENT/SUPERVISORS RESPONSIBILITIES

Contractors report to Teal Project Superintendents and are responsible for the safety of all their project workers, the safe condition of the assigned work area, and the safe operation of equipment. Specifically, Contractors are to:

- Enforce all phases of a project's safety system and any special controls issued by Teal Construction.
- Monitor the safety of their entire work area, including anybody or anything not connected with personnel entering, working in, or leaving the work area.
- Inspect the work area for hazards and take necessary corrective actions. Report to Teal Construction any conditions that cannot be readily corrected. This inspection includes housekeeping, hazards from electrical and other utility lines, traffic, other Contractors, inadequate guarding, elevated work situations, and operations of others.
- Instruct their employees to inspect tools and scaffolds before use; spot-check workers' tools and scaffolding.
- Inspect major equipment, check for defects with operators of cranes and other major equipment; perform continuing inspections of assigned work areas.
- Inspect hose, rigging, and hooks in the assigned work area and continuously observe their safe use.
- Maintain a thorough knowledge of safe work procedures and safety rules contained in this Health and Safety Manual and/or other safety regulations applicable to the work being performed.
- To the extent possible, monitor workers' work, alertness, and physical condition.
- Enforce the use of safety lines and other personal protective equipment by area workers when required for safe performance of assigned work.
- Participate in safety meetings as required; conduct toolbox meetings at least once a week with assigned workers.
- Regularly review safety issues with each assigned worker at least once each week.
- Prepare investigation reports on all injuries requiring the services of a health care professional.

- Stay with workers as much as possible. When this is not possible, leave safe work practice and hazard instructions with workers. Also take other steps as indicated to foresee and prevent the risk of injury.
- Continually observe workers to ensure adherence to safety rules and safe procedures.
- Indoctrinate assigned new hires to jobsite safe work practices and hazard training for the individual's specific task assignment and jobsite area.
- Help assigned workers develop a proper and cooperative attitude toward safe work practices and hazards training.

1.2.2.3 EMPLOYEE RESPONSIBILITIES

All Contractor employees are required to comply with the Teal Construction safety policies and procedures, as well as with all applicable federal, state, and local requirements. It is every employee's responsibility to ensure the safety of others and himself or herself. Any employee who violates this policy is subject to disciplinary action, including termination. At minimum employees are to receive two written safety warnings and, upon the third warning, are subject to termination. However, employees may be subject to termination on first warning if the offense could have resulted in serious physical harm or death to themselves or others, or if serious property or equipment damage could have occurred. Based on the discrepancy the Contractor may be requested to have the employee removed from the Teal Construction Project.

No employees are required to work in an unsafe area except to make that area safe, but not before proper procedures are taken to control the unsafe condition(s) in that area for the protection of employees engaged in activities in such areas.

1.2.3 BASIC SAFETY EQUIPMENT

The minimum safety equipment as applicable with OSHA Standards for each jobsite may include:

- Hard hats
- Safety harnesses
- Lanyards
- Respirators (type depending on job)
- Safety glasses
- Goggles - overall
- Cutting goggles
- Ear plugs
- Fire extinguishers (type depending on job)
- Welding hoods and lens
- Welding gloves
- Welding sleeves
- Face shields

1.2.4 BULLETIN BOARDS

Where applicable Contractor's Bulletin Boards must be prominently displayed in a location where all of their employees are likely to see them.

Bulletin boards can be purchased, or fabricated on the jobsite and should be of a size to accommodate the following listed material. Each bulletin should contain, at a minimum:

- A copy of Safety and Health Protection on the Job (OSHA poster)
- All emergency numbers of company doctors, local fire department, ambulance, hospitals, and clinics
- State Workers' Compensation Act poster
- Hazard information on toxic substances and harmful physical agents and where Material Safety Data Sheets (MSDS) are accessible
- Crane Hand Signal Chart, if applicable.
- Safety posters
- Job safety rules

1.3 ACCIDENT REPORTING AND INVESTIGATION PROCEDURES

Teal Construction is committed to careful reporting and investigation of all injuries, property damage, and production interruption.

Incidents on jobsites that result in OSHA-recordable injury to an employee of Teal Construction, or an employee of Contractor or Subcontractor, or in damage to equipment or property, require investigation, a detailed report and must be reported immediately to Teal's Safety Director.

When such incidents take place, the Contractor must immediately notify the Teal Project Superintendent and initiate an investigation in accordance with the procedures in this subsection.

1.3.1 INITIAL REPORT

Upon learning of an accident involving an OSHA-recordable injury or substantial property damage on the project, the following persons must be notified immediately:

- Safety Director. After working hours, the Safety Director is to be notified at home. Home and emergency numbers for all Teal project managers should be readily accessible in such emergencies
- Teal Project Superintendent. After working hours, the Project Superintendent is to be notified at home. Home and emergency numbers for all Teal project managers should be readily accessible in such emergencies.
- In case of a fatality, the appropriate public law enforcement agency. These authorities notify the relevant coroner or medical examiner.

- In case of a fatality or catastrophe the OSHA area office and/or state safety agency. A catastrophe is defined as any incident that results in 3 or more employees requiring hospitalization.
- The Teal Project Superintendent notifies Teal Safety Director.

Note: State and federal agencies must be notified only after consultation with Teal Management.

1.3.2 INVESTIGATION MEASURES

After the necessary initial reporting, a comprehensive investigation is conducted by an accident investigation team. The Contractor's Accident Investigation report is forwarded to the Teal Project Superintendent. The goal of the investigation is to find facts, not fault.

If a project accident investigation team is deemed necessary by the Teal Project Superintendent it will consist of the Contractor's Representative and Teal Representative(s).

The purpose of an investigation is to identify all possible contributing causes so that future incidents of a similar type can be prevented. The investigation also determines all the facts that may have a bearing on legal liability.

The investigation team should perform its job diligently and with a high degree of interest and professionalism. Such a team sends a powerful message throughout a workplace about the importance of safe work practices.

An accurate description of the operation being performed at the time of the accident is of extreme importance, in that an apparently minor miscalculation or oversight may have triggered a sequence of events that results in an accident. All personnel associated with the work task and other eyewitnesses to the accident must be interviewed by the team and their statements taken. In general, the investigation should proceed in the following manner. The investigator or team:

1. Identifies those involved and any eyewitnesses
2. Identifies and secures any evidence, tools, etc., that might prove important to the investigation
3. Provides a private place and time for each individual to prepare a written statement
4. Conducts interviews with appropriate individuals
5. Prepares a final report

At a minimum, the following individuals must be interviewed by all members of the accident investigation team.

1. The injured employee or employees
2. The supervisor or supervisors of the injured employee or employees
3. All eyewitnesses to any accident or, if no eyewitnesses are found, the coworker with the most knowledge about the accident

The information obtained by the investigation team must be first-hand facts, not hearsay. Each person interviewed must sign a statement accurately recording his or her understanding of the sequence of events that led to the accident. The statement must also include the facts of the accident itself. If an eyewitness or other person interviewed refuses to sign a statement, the investigation team should conduct the interview and add a notation at the end of the statement that the person interviewed refused to sign the statement.

The following information must be obtained from each witness to and any other persons involved in an accident:

1. Date, place, and time of the accident.
2. Date, place, and time of the interview.
3. Name, employee number, address, and occupation or trade of each affected employee, witness, and/or coworker interviewed.
4. Where the person interviewed was at the time of the accident.
5. What operational activity or other events were taking place before and at the time of the accident.
6. What materials (lumber, concrete, steel, etc.), equipment (tools, cranes, scaffolding, etc.), or conditions (weather, working environment, labor disputes, etc.) were involved. This includes all possible contributing factors, personal and physical, directly or indirectly related to the accident.
7. What happened? The answer should be a complete narrative of the sequence of events leading up to and during an accident.
8. What factors might have caused the accident. Answers must be as objective as possible and include all unsafe conditions or unsafe acts.
9. Any pre-existing known and/or reported unsafe conditions or actions associated with the accident. If applicable, to the best knowledge of the person interviewed, when each unsafe condition or action was reported, to whom, and any action taken at the time of first report.

In addition to personnel interview statements, the investigation team should obtain statements from the Contractor's Site Manager, if applicable. At a minimum, these statements must contain:

1. Date, place, and time of the accident
2. Name, employee number, address, and occupation or trade of each victim
3. How long each accident victim was employed on the jobsite
4. A review of victim's safety training bearing directly on the incident
5. Titles and dates of all safety orientations and safety related training and education furnished to each victim

In support of item 5 above, copies of reports of all safety meetings and other instructional sessions attended by an accident victim covering related safe work practices and accident prevention topics should be available for review and attached to the statements.

1.3.3 ADDITIONAL REPORTING MEASURES

For lost time injuries or significant destruction of property, the investigation team must take the following additional steps.

1. After an accident, secure the area of the accident immediately after the occurrence to prevent any alteration of the scene before the investigation can begin. Any equipment, tools, or materials involved with the accident must be removed from service and placed in safekeeping. If this proves to be impracticable, put a cord around the accident scene and keep all unauthorized personnel out of the area. It is in the best interest of all parties that all physical evidence not be tampered with, regardless of the circumstances involved. Any secured areas may be reopened only upon authorization from the Teal Project Superintendent.

2. Take photographs of the jobsite area where the accident occurred. Enough photographs should be taken to tell a complete and comprehensive story of the facts of the accident.

   The photographs should be taken as quickly as possible after each occurrence to avoid the risk of change in the conditions or circumstances surrounding an accident. If a member of the investigation team is unable to take the photographs, the services of a competent photographer should be arranged for immediately.

   Each photograph is to be labeled with the following information:

   a. Description and location of principal item(s)
   b. Date and time photograph is taken
   c. Name of photographer
   d. From which position the photograph is taken

3. Mark up drawings and prepare sketches indicating the location of the accident. All measurements of time, distance, size, weight, etc., must be accurate.

1.3.4 REPORTS

Contractor's Personal Injury or Property Damage Reports are to be used in completing the accident investigation. Additional information can be attached to the report should it be warranted.

Investigations and interviews must be accomplished promptly so that a final report can be issued within 3 working days after an accident. If lack of access to persons involved prohibits timely issuance of a report, an interim report must be issued within 3 working days after the accident and the final report issued as soon as possible thereafter.

1.4 SUBCONTRACTOR GENERAL CONDITIONS

Subcontractors working for Teal Construction, Company are required to adhere to OSHA Standards at minimum and Teal's policies and procedures.

1.4.1 HOLD HARMLESS AGREEMENT PROVISIONS

In case of an accident on the project, an accident report must be prepared by the subcontractor and one copy given to the Prime Contractor's Superintendent and one copy to Tea'sl Project Superintendent.

Safety equipment and safeguards suitable to the occupational hazards involved and conforming to the safety regulations on the project must be furnished by each subcontractor.

Each subcontractor must comply with all federal, provincial, state, local, and prime contractor's orders, as well as all statutes, rules, and regulations governing safety and the safe performance of work.

Each subcontractor must be directly responsible for its own safety program and, unless otherwise addressed in the particular subcontract, for first-aid and medical services for its employees.

Each subcontractor must agree to indemnify and hold harmless the prime contractor and owner from and against any and all claims, liabilities, obligations, and causes of action of whatsoever kind or nature that result from failure to comply with the safety requirements described in the preceding paragraphs.

A prime contractor may shut down work if, in the opinion of the prime contractor or its safety engineer, a subcontractor's work is being performed in a hazardous and dangerous manner. Work may not thereafter proceed until the subcontractor agrees to conduct the work in a safe manner.

Subcontractors are not entitled to additional compensation or extensions of time for performance of contracts in the event a prime contractor shuts down a subcontractor's work pursuant to this paragraph.

If a prime contractor furnishes a full-time safety engineer or a combination first-aid person and safety engineer, the prime duties of that person are to look after the safety and first-aid interests of the prime contractor and to enforce the project safety rules and regulations. The presence of the first-aid person does not in any way diminish a subcontractor's safety responsibility as outlined in the preceding paragraphs.

Subcontractors must specifically require their subcontractors to comply with the provisions outlined in this subsection.

1.5 SUBSTANCE ABUSE POLICY

This section summarizes Teal Construction's policies and procedures for addressing substance abuse in the workplace. Teal's Substance Abuse/Drug Free workplace Policy are detailed in the contractor's Exhibit 1 package.

Teal is committed to providing a safe and healthy work environment for all employees. Abuse of alcohol or drugs could directly affect an employee's job performance, the safety of others, and relationships with our clients. Teal's goal is to establish a work environment that is free from the effects of alcohol and drug abuse.

For purposes of this procedure, test is defined as a urinalysis, blood test, saliva test, or other similar examination used to determine the presence and concentration of alcohol or illegal drugs in the human system.

1.5.1 POLICY

Teal Construction Company has a zero tolerance for alcohol or drug abuse on the jobsite. Any employee who manufactures, distributes, or dispenses any illegal drug or controlled substance at any place or location, or any employee who uses, conceals, or possesses any illegal drug or controlled substance except for lawfully prescribed substances at any place or location, will be subject to discharge, without advance notice or other warning, in accordance with the principals of employment-at-will.

Teal Construction Company employees are prohibited from being at work under the influence of the aforementioned substances at any time will test under the following conditions:

- **Application for Employment.** Applicants for employment, regardless of employment category, are required to pass an alcohol and drug examination before placement. Failure to submit to or pass an examination results in immediate disqualification from consideration for placement.

- **Random.** All Teal employees are subject an Alcohol and Drug examination on a random basis. Refusal by an employee to take such a test is viewed as an admission of such use by the employee and will be subject to termination.

- **Reasonable Suspicion.** Reasonable Suspicion is defined as unsatisfactory behavior or job performance (including an on-the-job accident or injury) that makes the Area Manager and/or Supervisor suspect that alcohol or drug abuse may be a problem..

- **Post Accident** (Vehicle or jobsite). Individuals involved or causing an accident or Near Miss Incident will be subject to an alcohol and drug examination.

Teal's policy is that all employees report to work in a fit condition ready to perform their duties at the utmost levels of safety and efficiency. To that end, **Employees who fail to pass or refuse to take an Alcohol and Drug examination will be subject to discharge, without advance notice or other warning, in accordance with the principals of employment-at-will.**

1.5.1.1 PROPERT SEARCH

Searches are another means of protecting the safety of individuals and property at those locations where the nature of the work has the potential for serious injury or damage. Reasonable searches may be conducted of individuals, their personal vehicles, belongings, and other areas under the individual's control while at such worksites or while engaged in Teal business at such sites. Employees are not detained or searched without their consent.

An employee's cooperation in a search at such worksites is a condition of employment. Each affected employee is required to sign an acknowledgment for Toxicological Tests form.

1.5.2 RESPONSIBILITIES

1.5.2.1 CONTRACTORS

The contractor's immediate supervisor is responsible for monitoring employee behavior and performance, as well as for being alert to problems arising from an employee's unsatisfactory behavior or performance.

The supervisor is responsible for documenting all pertinent facts and discussing them with their site management. Supervisors are not to diagnose the employee's medical condition, but a supervisor should record any facts that may indicate reasonable suspicion that alcohol or illegal drugs may be a contributing factor.

The Contractor is responsible for notifying the Teal Project Superintendent, in writing, the moment one of their employees is convicted of a drug-related crime occurring in the workplace.

1.5.2.2 HUMAN RESOURCES

Human Resources maintains the Substance abuse/drug free workplace policies and procedures for the Teal Construction Company.

1.6 TRAINING

1.6.1 BASIC TRAINING

- All Contractor employees are required to have an Orientation prior to being assigned work. The Orientation will consist at minimum of the following:
- Teal Site Management
- Contractor's Site Management
- Substance Abuse Policy
- HAZCOM
- Site Specific Policies and Safe Practice Rules
- PPE Required
- Tools, Electrical and Hand
- Material Handling
- Accident Reporting

1.6.2 SPECIFIC TRAINING

Other training as applicable includes:

- A review of lockout/tagout and work permit procedures.
- Aerial Lifts
- A review of Safe Practice Rules
- Training on task-specific items covered in a job task analysis.
- Confined space work.
- Equipment Operations (New Equipment Operating procedures)

1.6.3 TRAINING DOCUMENTATION

Each contractor should have a record of employee training and available for review by the Teal Project Superintendent. This record should include:

- The identity of the employee
- The date of training
- The method of training

1.7 JOB TASK ANALYSIS

1.7.1 PURPOSE

The purposes of this procedure are to eliminate all personal safety risks and to eliminate or reduce jobsite operational or environmental risks to an acceptable level. All contractors are required to perform a JTA or Job Hazard Analysis prior to assigning their employees work at the Teal Construction project.

This job task analysis (JTA) procedure is an acceptable method of undertaking an activity when any one or more of the following conditions exist.

1. High hazard tasks such as:
    a. Use of respirators
    b. Confined space entry
    c. Critical lifts
    d. Pneumatic testing

1.7.2 GENERAL REQUIREMENTS

The JTA is used to identify and reduce each task into definable and manageable components whenever the following potential risk situations exist.

1. Risk of personnel injury as a result of performing high hazard tasks.

2. Risk of adverse effect on construction operations

3. Risk of violating environmental regulations or operations

The only acceptable level of risk to personnel is zero risk.

During a job task analysis, the acceptable level of risk to operations and to the environment must be identified, defined, and agreed to by all parties to the JTA.

An identified risk is a managed risk. Teal Construction Company contractor personnel must perform job task analyses for all field construction activities in accordance with this procedure.

The JTA must also define approaches to managing risk to reduce or eliminate injuries to workers, and to reducing the risk to operations and the possible violation of environmental regulations to acceptable levels.

Once a JTA is approved, any changes or added items to the scope of work covered by the JTA will require an amended JTA.

1.8.4 PREPARATION

Contractor's management is responsible for preparing in writing the preliminary JTA using the defined scope and tasks, the field strategy, and the following criteria:

1. Task Details

    a. Work scope
    b. Testing details
    c. Inspection requirements

2. Hazard and Risk Identification

    a. Personal injury
    b. Environmental
    c. Equipment
    d. Interference or potential hazard to operations
    e. Assigned level of risk (high, marginal, low)
    f. Proper technical support
    g. Field verification of data and conditions

3. Hazard and Risk Corrective Action. All hazards or potential hazards require a recommended action or procedure to prevent incidents. Action by the applicable group, company, or individuals should be defined in writing.

All Contractor's JTA's should be on site and available for review by the Teal Project Superintendent.

SECTION 2
FIRST AID AND MEDICAL SERVICES

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FIRST AID AND MEDICAL SERVICES

2.1 RESPONSIBILITY

Teal Requires each Contractor to evaluate the scope of first-aid and medical services required to meet the safety and health of their employees at the project.

Determination of first-aid and medical service requirements must be completed by the contractor before their employees mobilize on the project.

The following items should be considered in determining the scope of the first-aid and medical services required by a project.

- Peak manpower loading of the project and estimated number of manhours to be expended
- Duration of the project
- Existing community medical resources such as clinics, hospitals, ambulance services, etc., and the location of the project, taking into consideration accessibility, transportation, and communication facilities
- Exposure to health and safety hazards; e.g., toxic hazards and occupational disease exposures and the potential for explosions, fires, or other catastrophes

2.2 FIRST-AID PERSONNEL

The selection of first-aid personnel or of a medical service provider will be made by the Contractor and conveyed in writing to the Teal Project Superintendent.

All contractors will have a company approved, fully stocked first aid kit on the jobsite at all times. First aid kits are to be replenished with supplies on a continuing basis as needed and inspected monthly.

2.3 ROUTINE TRANSPORTATION OF INJURED OR ILL EMPLOYEES

Any time a Contractor employee is sent to an outside medical facility, a member of that contractor must accompany that employee to the facility and stay with the injured employee until the attending physician has determined the condition of the employee.

2.4 EMERGENCY TRANSPORTATION OF INJURED OR ILL EMPLOYEES

The proper handling of seriously injured or ill employees at the jobsite and their prompt dispatch to a hospital will, to a great extent, minimize confusion and offset the negative reaction that often occurs after a serious incident has taken place.

The Contractor will determine the best method of providing emergency transportation from the jobsite. Local Emergency Medical Services (EMS 911) ambulance service will be utilized whenever possible; if none are available outside ambulance firms will be contacted.

2.5 LIGHT OR MODIFIED DUTY

A contractor's employee who has sustained an on-the-job injury or illness may return to work provided the attending physician has approved such return in writing and provided there is a job assignment within the employee's capability and meets his or her physical restrictions or limitations.

Contractor's employees who are restricted in their work tasks by casts, braces, etc., or who require crutches to move about will not be permitted to return to work unless a review of each individual case has been made by the Area Manager, the Safety Director, and the attending physician.

2.6 MEDICAL RECORDKEEPING

Each contractor will maintain the OSHA 300 and all mandatory paperwork in compliance with all Federal, state and local requirements. OSHA 300's will be posted in accordance with OSHA 1904 standards. All contractor project related records are subject to review by Teal Construction at any time during the project.

SECTION 3
HAZARD COMMUNICATION PROGRAM

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HAZARD COMMUNICATION PROGRAM

3.1 HAZARD COMMUNICATION PROGRAM

Teal Construction and its contractors shall comply with the requirements of OSHA's Hazard Communication Standard, *29 CFR 1910.1200* and *29 CFR 1926.59,* by compiling a list of the hazardous chemicals, using MSDSs, ensuring that containers are labeled, and workers are trained. This program applies to all work operations at our main office facility and jobsites where our and our contractor's employees may be exposed to hazardous substances under normal working conditions or during an emergency situation.

The Corporate Safety Director will be the program coordinator, acting as the representative of the company, and has overall responsibility for the program. The program will be reviewed and updated, as necessary. Copies of the written program may be obtained by making a request to any of the Teal Construction Superintendents. Contractors will be required to have a written program and meet all the requirements of the OSHA standards aforementioned.

All employees, or their designated representatives, can obtain further information on this written program, the hazard communication standard, applicable MSDSs, and chemical information lists from the Teal Construction Superintendents. Under this program, Contractors employees are required to be informed of the contents of the Hazard Communication Standard, the hazardous properties of chemicals with which they work, safe handling procedures, and measures to take to protect themselves from these chemicals.

Each Teal contractor shall ensure their hazardous communication program must include the following elements:

1. The person(s) responsible for the program and for communicating the program requirements to employees.
2. The person(s) responsible for insuring the employees are informed and trained, obtaining Material Safety Data Sheets (MSDSs), labeling procedures and like activities, in compliance with the OSHA Standard on Hazard Communications.
3. What media will be used to determine whether a substance is hazardous, i.e., such as the hazard statement in the material safety data sheets supplied by a manufacturer.
4. Each Teal Contractor will be responsible for maintaining an inventory of hazardous substances they are using at that location.

5. Each Teal Contractor shall ensure a copy of the MSDSs for each hazardous chemical they are using at that location is being maintained and/or accessible within the OSHA guidelines

6. Material Safety Data Sheets (MSDS) shall be requested from suppliers or manufacturers when such materials are ordered. The exception will be when a current MSDS is already in place.

7. Materials without MSDS or labels are not to be accepted.

8. Prior to any new hazardous material being introduced into the workplace the MSDS will be reviewed and the affected employees are to receive the appropriate training and precautions necessary to safely use the material.

3.2 HAZARDOUS MATERIAL LABELING

1. All hazardous material containers will be labeled.

2. Manufactured Labels shall be maintained when possible, should the label become unreadable a new readable (HMIS or NFPA) label shall be placed on the material.

3. Should the need for a material to be placed in another container it too shall be labeled with its contents and the information necessary to identify the type of hazard(s) it might pose.

4. Hazardous Materials Identification System (HMIS) or National Fire Protection Association (NFPA) labels are to be used in aiding the employee to identify the hazards.

3.3 INFORM AND TRAIN EMPLOYEES

The Hazard Communication Standard requires that employees be advised of their rights to chemical hazard information and to specific training with respect to hazardous substances in the workplace. This training will comply with the requirements of the Standard and will be conducted for each new employee who may be exposed to hazardous substances. Additional training will be provided to all employees about any new hazards associated with substances in the workplace about which the employer has received information. All training will be documented and maintained.

At a minimum, the information and training required by the Standard are to include:

1. The identity of any hazardous substances in the workplace and their associated physical and health hazards.

2. The measures employees should take to protect themselves from hazards, including the specific procedures implemented by the purchaser or employer to control the hazards.

3. The methods and observations available for detecting the presence or release of a hazardous chemical in the workplace. Methods can include monitoring conducted by a designated employee. Observations may include the appearance of or the detection of odors of substances.

4. The details of the hazard communication program developed for the workplace including an explanation of the labeling system and MSDSs and where employees can obtain appropriate hazard information and instructions for its use.

5. Information on the applicable Hazard Communication Standard and the employees' right to chemical hazard information.

SECTION 4
PERSONAL PROTECTION EQUIPMENT (PPE)

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PERSONAL PROTECTION EQUIPMENT (PPE)

Employees encountering hazardous conditions must be protected against potential hazards. The purpose of Personal Protective Equipment (PPE) and clothing is to shield or isolate individuals from chemical, physical, biological, or other hazards that may be present in the workplace.

4.1 RESPONSIBILITY

4.1.1 Each contractor will evaluate the need for Personal Protective Equipment (PPE) to meet the safety and health needs of their employees while on the project.

4.1.2 Contractors are required to evaluate the PPE being used on their project to insure it is sufficient to safeguard their employees and to make changes as necessary to maintain their employee's safety. All changes must be reported to the Teal Construction Site Manager.

4.1.3 Contractor employees are required to wear the appropriate PPE necessary to safeguard them while conducting work on all Teal Construction projects. Contractor employees are also required to maintain the PPE assigned to them in as reasonable condition as possible, turning in and replacing worn or defective PPE.

Since many of the projects are similar and there is a history to base the PPE safety requirements, of like processes, determination of PPE will be through past experience of similar projects and an evaluation of any new or additional processes, chemicals or other factors.

4.2 TRAFFIC VESTS

When Contractor employees are exposed to vehicular traffic they will be required to adhere to the requirements under the Manual of Uniform Traffic Control Devices Part 6, Section 6E.02 High Visibility Clothing.

- For daytime work, the worker's vest, shirt or jacket shall be orange, yellow, yellow-green, or a fluorescent version of these colors.
- For nighttime work, the similar outside garments shall be retro-reflective. The retro-reflective material shall be orange, yellow, white, silver, yellow-green, or a fluorescent version of these colors, and shall be visible at a distance of 1,000 ft. The retro-reflective clothing shall be designed to clearly identify the wearer as a person.

4.3 HEAD PROTECTION

- HARD HATS ARE MANDATORY FOR ALL EMPLOYEES ON ALL JOBS AT ALL TIMES.

- Hard Hats shall meet ANSI Z89.1-1969 Safety Requirements for Industrial Head Protection in accordance with OSHA 1926.100(b)
- Hard Hats are to be checked by contractors for cracks, penetrations headband breakage or other defect. Faulty equipment is not to be worn.
- Hard Hats are not to be painted or covered with stickers.

4.4 EYE AND FACE PROTECTION

All Contractor employees are required to have safety glasses available to them while on the jobsite. Employees are required to wear their safety glasses for the following type of work:

- Areas where rust, dust, sand or other materials are blowing about.
- Handling or moving brick, cinders, junk or trash.
- Handling material in powder or semi-powder forms.
- Chipping, sawing, sanding, breaking, reaming or drilling any material where a flying chip hazard exists.
- Grinding, filing, or buffing any material.
- Using compressed air tools.
- Working near other persons doing work that requires them to wear eye protection.

It should be noted that in some cases where there is heavy debris a Face Shield, goggles or other protective devices may also be need to protect the worker.

0.0 SHOES/FOOT PROTECTION

All Contractors employees are required to wear work boots on all jobs. Safety toed shoes are not required however they are encouraged where an employee may be exposed to falling materials or debris.

- Work boots should be of sturdy leather construction.
- When working with concrete, chemicals, or solvents Rubber boots may be used.
- NO SOFT SHOES OR TENNIS SHOES ARE ALLOWED.

1.0 HAND PROTECTION

Gloves are pehaps the most common protection to fingers, hands and sometimes wrists and forearms. Ideally, gloves should be designed to protect against specific hazards of a job being performed.

- Contractors should furnish gloves to their employees when required and should have a program to replace worn gloves.

- Contractor employees should wear the appropriate type of glove for the task, leather for handling materials, neoprene/rubber for chemicals, welding gloves for wielding.
- Wear only gloves that fit your hand.
- Gloves should be worn with great caution around or near moving equipment or machinery parts.

4.7 HEARING PROTECTION

Contractor with employees exposed to noises at or beyond 85 decibels shall be subject to OSHA Standards on hearing protection and are to provide protection for their workers appropriate to reduce the noise exposure.

- All contractors are to make a determination if there are work areas where Hearing Protection is required at the project (Use of a Noise Level Meter may be required to make this determination).
- The manufacturers Noise Reduction Rating (NRR) will be used to determine the type of hearing protection necessary.
- In some cases a combination of ear muffs and ear plugs may be needed to reduce the noise to an acceptable level.
- Rule of thumb – Any time you have to shout to be heard by the coworker beside you should be wearing hearing protection.

0.0 RESPIRATOR

All Contractors shall comply with the requirements under 29CFR OSHA standards 1926.103 when tasks or process call for employees to don a respirator. Medicals, fit testing and appropriate training will be required prior to the employee donning a respirator for company use.

- Contractors will evaluate projects and determine the necessary steps to insure the need for a respirator, the appropriate type, and training required.
- Fresh Air Respirators must be used at all times when sandblasting.
- Dust masks may be required when working in dusty environments.

4.9 CLOTHING

Clothing which might obviously contribute to an accident will not be worn. Full length pants and full shirts with short ¾ length sleeves are required, long sleeves are not required and are optional. Tank tops are not allowed.

SECTION 5
FALL PROTECTION

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FALL PROTECTION

This section provides the minimum requirements necessary to prevent or reduce the risk of injury from fall hazards.

5.1 APPLICABILITY

This section is applicable to all Contractors and subcontractors work (including maintenance, operations, construction, and research) where an employee may be exposed to a fall hazard.

5.2 REQUIREMENTS

5.2.1 RESPONSIBILITIES

Responsible contractor/subcontractor managers/supervisors are responsible for ensuring that:

- Walking/working surfaces on which employees are to work have the strength and structural integrity to support employees safely.
- Prompt rescue of employees is provided in the event of a fall.
- Competent persons, qualified persons and safety monitors are designated for their area of responsibility.
- Contractors/subcontractors are required to insure training is provided for each of their employees who might be exposed to fall hazards.
- Fall hazard issues are considered and resolved in the design review of new equipment.
- Enforcing compliance with the requirements of this section.
- Monitoring employee safety performance.
- Retraining their employees when:
  - There is reason to believe an affected employee's knowledge and use of fall protection systems or equipment indicate that the employee does not possess adequate understanding or skill.
  - Changes in the workplace render previous training obsolete.
  - Changes in the types of fall protection systems or equipment to be used render previous training obsolete.

All employees are responsible for:

- Inspecting their personal fall protection equipment for wear, damage, and other deterioration prior to each use.
- Reporting and removing defective components from service.
- Using only the fall protection equipment for which they have been trained.
- Complying with the requirements of this section.

5.2.2 GENERAL

Any employee exposed to a fall hazard greater than 6 feet must be protected by a conventional fall protection system (see definition).

EXCEPTION 1

Employees may be exposed to falls from heights greater than 6 feet with an approved FPP.

EXCEPTION 2

A travel restriction system may be used to prevent exposure to a fall hazard.

Employees working off portable ladders above 10 feet use a personal fall arrest system (PFAS).

Three-point contact must be maintained at all times when an employee works above 6 feet.

All fall protection equipment must meet the requirements of *ANSI A10.14-1991* or *ANSI 359.1-1992.*

Employees are allowed to work on only those surfaces that have adequate strength and structural integrity.

5.2.3 CONDITIONS

Working at heights outdoors is not permitted during bad weather.

Note: If there is any question concerning safe weather conditions, the Teal Construction Superintendent should be consulted.

Employees working less than 6 feet above dangerous equipment must be protected from falling into or onto the dangerous equipment by a guardrail system or by equipment guards.

Employees working more than 6 feet above dangerous equipment must be protected by conventional fall protection.

5.2.4 PROTECTION FROM FALLING OBJECTS

When an employee is exposed to potential falling objects, that employee must wear a hard hat, along with one of the following implemented:

- Toe-boards, screens, or guardrail systems must be erected:
  - With opening sizes in the barrier smaller than the size of the potential falling objects.
  - At a sufficient distances to prevent objects from falling from higher levels.

OR

- A canopy structure of sufficient strength to prevent collapse or penetration must be erected.

OR

- The area to which objects could fall must be barricaded and employees prohibited from entering the barricaded area.

Objects that may fall from a higher to a lower level must be kept far enough away from the edge of the higher level so that those objects would not go over the edge if they were accidentally displaced.

Materials which are piled, grouped, or stacked near a roof edge must be stable, self-supporting, and secured.

5.2.5 INSPECTIONS (PRE-USE)

Employees must conduct pre-use inspections on all fall protection gear prior to each use.

When gear fails its pre-use inspection, it must be removed from service.

5.2.6 FALL HAZARD PREVENTION ANALYSIS (FHPA)

Note: A job hazard analysis (JHA) or other work control documents that meet the requirements of this section may be used as the FHPA.

FHPAs are attached to and retained with (standard work control records retention) other applicable work control documents associated with the task.

For each project the contractor/subcontractor must conduct an FHPA for routine tasks.

The FHPA must identify, as a minimum:

- Each fall hazard associated with a routine task.
- The conventional fall protection system that will be used to mitigate the consequences of a fall.
- Anchor points.
- The fall protection equipment for each individual fall hazard.

The FHPA must be approved by the contractor/subcontractor job competent person and superintendent.

5.2.7 CLIMBING

Employees climbing to work locations must be provided fall arrest protection when climbing above 6 feet without a standard access route (such as portable or fixed ladders and stairs).

5.2.8 AERIAL LIFTS

A body harness with a positioning lanyard must be worn when operating or working from the platform of all aerial lift devices.

Lanyards must be adjusted to restrict travel to the inside of the platform basket.

Employees must use only the floor of the platform as the walking/working surface.

Employees must not anchor off to an adjacent structure or equipment while in the lift.

5.2.9 SCAFFOLDS

Employees erecting scaffolds or working on completed scaffolds above 6 feet must be provided with a PFAS.

EXCEPTION

This requirement is not applicable when working on scaffolds erected in compliance with *29 CFR 1926.451*.

5.2.10 COMPATIBILITY OF EQUIPMENT

Note: Fall protection components from different manufacturers, meeting *ANSI 359.1* and used as designed, may be mixed together to provide a PFAS.

All fall protection equipment used in a PFAS must be compatible.

5.2.11 PERSONAL FALL ARREST SYSTEMS (PFASs)

Only full body harnesses may be used.

Only self-closing, self-locking type snaphooks may be used.

Only ropes and straps (webbing) made from synthetic fibers may be used in fall protection components.

PFASs must be rigged such that an employee can neither free fall more than 6 feet, nor contact any lower level.

PFASs may be used only by an employee having a combined person and tool weight of less than 310 pounds.

PFASs and associated components subjected to impact loading must be immediately removed from service.

PFASs may not be attached to guardrail systems or hoists.

When a PFAS is used at hoist areas, it must be rigged to allow the movement of the employee only as far as the edge of the walking/working surface.

A positioning system must be used in addition to the PFAS when the task demands the use of both hands.

5.2.12 LIFELINES

On suspended scaffolds or similar work platforms with horizontal lifelines which may become vertical lifelines, the devices used to connect to a horizontal lifeline must be capable of locking in both directions on the lifeline.

Horizontal lifelines must be designed, installed, and used, under the supervision of a qualified person, as part of a complete PFAS, which maintains a safety factor of at least two.

When vertical lifelines are used, each employee must be attached to a separate lifeline.

5.2.13 ANCHORS

Anchors used for attachment of personal fall arrest equipment must be independent of any anchorage being used to support or suspend platforms.

Anchors must be designed to at least one of the following criteria

- Anchors must be capable of supporting at least 5,000 pounds per employee attached.

OR

- Anchors must be designed, installed, and used as follows:
  - As part of a complete PFAS which maintains a safety factor of at least two.
  - Under the supervision of a qualified person.

Anchors must have sufficient strength to withstand twice the potential impact energy of an employee free falling a distance of 6 feet or the free fall distance permitted by the system, whichever is less.

Anchors for travel restriction must be capable of supporting at least 500 pounds.

5.2.14 WARNING LINES

Where warning lines are used, they must be designed to the performance criteria in and the following:

- The warning line must be erected around all sides of the roof or work area.
- When mechanical equipment is not being used, the warning line must be erected not less than 6 feet from the roof edge.
- When mechanical equipment is being used, the warning line must be erected:

- Not less than 6 feet from the roof edge which is parallel to the direction of mechanical equipment operation, and
- Not less than 10 feet from the roof edge which is perpendicular to the direction of mechanical equipment operation.

Points of access, materials handling areas, storage areas, and hoisting areas must be connected to the work area by an access path formed by two warning lines.

When the path to a point of access is not in use, one of the following must be performed.

- A rope, wire, chain, or other barricade equivalent (see definition) in strength and height to the warning line must be placed across the path at the point where the path intersects the warning line erected around the work area.

OR

- The path must be offset such that a person cannot walk directly into the work area.

No employee is allowed in the area between a roof edge and a warning line unless that employee is performing roofing work in that area.

5.2.15 CONTROLLED ACCESS ZONES (CAZ)

Where CAZ lines are used, they must be designed to the performance criteria and comply with the following:

- When used to control access to areas where leading edge and other operations are taking place, the CAZ must be defined by a control line or by any other means that restricts access.
- When control lines are used, they must be erected not less than 6 feet nor more than 25 feet from the unprotected edge (see definition) or leading edge, except when erecting precast concrete members.
- When erecting precast concrete members, the control line must be erected not less than 6 feet nor more than 60 feet or half the length of the member being erected, whichever is less, from the leading edge.

The control line must extend along the entire length of, and approximately parallel to, the unprotected or leading edge.

The control line must be connected on each side to a guardrail system or wall.

5.2.16 SAFETY MONITORS

The safety monitor must be competent to recognize fall hazards.

The safety monitor must warn the employee when it appears that an employee is unaware of a fall hazard or is acting in an unsafe manner.

The safety monitor must be on the same walking/working surface and within visual sighting distance of the employee being monitored.

The safety monitor must be close enough to communicate orally with the employee.

The safety monitor must not be assigned other responsibilities which could take the monitor's attention from the monitoring function.

Mechanical equipment may not be used or stored in areas where safety monitoring systems are being used to monitor employees engaged in roofing operations on low-slope roofs (see definition).

Only those authorized employees are allowed in an area where an employee is being protected by a safety monitoring system.

Employees must comply with the safety monitor's instructions.

5.2.17 HOLES, OPENINGS, AND COVERS

Holes and openings must be barricaded or covered whenever work is not being actively performed in the hole or opening.

Note: Skylights are considered to be a type of a hole.

Covers in floors, roofs, and other walking/working surfaces (including roadways and vehicular aisles) must be capable of supporting at least twice the weight of employees, equipment, and materials that may be imposed on the cover at any one time.

All covers must be secured when installed so as to prevent accidental displacement.

All temporary covers must be color coded or marked with the word "HOLE" or "COVER" to warn of the hazard.

EXCEPTION

This requirement does not apply to cast iron manhole covers or steel grates used on streets or roadways, nor to confined space accesses or equipment access hatchways.

5.2.18 FALL PROTECTION PLAN

Note: Other forms of work control may be used as an FPP provided they conform to the criteria in this section.

Only those employees engaged in leading edge work, precast concrete erection work or who can demonstrate that it is unfeasible or it creates a greater hazard to conventional fall protection system are allowed to work under an FPP.

Note: There is a presumption that the use of conventional fall protection system is feasible and will not create a greater hazard to implement. Accordingly, each contractor/subcontractor

has the burden of establishing that it is appropriate to implement an FPP for a particular workplace situation.

An FPP must document the reasons why the use of conventional fall protection systems is infeasible or why their use would create a greater hazard.

The FPP must include a written discussion of other measures that will be taken to reduce or eliminate the identified fall hazard.

The FPP must identify each location where conventional fall protection systems cannot be used.

These locations must be classified CAZs.

Where no other alternative measure has been implemented, the employer must implement safety monitoring.

Each employee working under an FPP must be identified by name.

Only designated employees are allowed to enter CAZs.

The FPP must be developed specifically for the site where the work is being performed.

The FPP must be kept up to date.

Any changes to the FPP must be approved by a qualified person.

A copy of the FPP with all approved changes must be maintained at the jobsite.

The implementation of the FPP must be under the supervision of the contractor/subcontractor's competent person.

In the event an employee falls or some other related, serious incident occurs (such as a near miss), an investigation of the circumstances of the fall or other incident will be required to determine if the FPP needs to be revised.

The contractor/subcontractor must implement identified changes to prevent similar types of falls or incidents.

5.3 DEFINITIONS

Aerial lift devices — Any vehicle mounted device, telescoping, articulated, or both, used to position personnel above a lower level.

Anchorage — A secure point of attachment for lifelines, lanyards, or deceleration devices.

Bad weather — For the purposes of this section, any weather condition that may increase the hazard of falling for personnel working from heights including snow, rain, icing or wind gusts of 35 miles per hour or sustained winds of 25 miles per hour.

Body harness	An arrangement of 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 PFAS.
Compatible	For the purposes of this document, system subcomponents are used and arranged in the system based on their design intent and that subcomponent connectors are arranged so that no combination of twisting and pressure between snap-hooks, carabiners, etc., can cause rollout.
Competent person	An individual capable of identifying hazardous or dangerous conditions in a PFAS or any component thereof, capable of identifying hazardous or dangerous conditions in the application and use of the PFAS or any component thereof with related equipment, and knowledgeable in the requirements of *29 CFR 1926, subpart M.*
Controlled access zone	An area in which certain work (for example, overhand bricklaying) may take place without the use of guardrail systems, PFASs, or safety net systems and access to the zone is controlled.
Conventional fall protection system	The use of a PFAS, guardrail system, or safety nets to protect employees from the consequences of a fall.
Equivalent	Alternative designs, materials, or methods to protect against a hazard which the employer can demonstrate will provide an equal or greater degree of safety for employees than the methods, materials or designs specified in this section or *29 CFR 1926, subpart M.*
Free fall	The act of falling before a PFAS begins to apply force to arrest the fall.
Free fall distance	The vertical displacement of the fall arrest attachment point on an employee's body harness between onset of the fall and just before the system begins to apply force to arrest the fall. This distance excludes deceleration distance, and lifeline or lanyard elongation, but includes any deceleration device slide distance or self-retracting lifeline or lanyard extension before they operate and fall arrest forces occur.
Guardrail system	A physical barrier erected to prevent employees from falling to lower levels.
Holes	Gaps or voids in a floor, roof, or other walking/working surface.

Infeasible	For the purposes of this section, a term used to indicate that it is impossible to perform work using a conventional fall protection system (for example, a guardrail system or PFAS) or that it is technologically impossible to use any one of these systems to provide fall protection.
Impact loading	A component or components of a PFAS or a PFAS that has received the forces generated by someone falling while connected to the system.
Lanyard	A flexible line or strap which generally has a connector at each end for connecting the body harness to a deceleration device, lifeline, or anchorage.
Leading edge	The edge of a floor, roof, or form work for a floor or other walking/working surface (such as a 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 an "unprotected side and edge" during periods when it is not actively and continuously under construction.
Lifelines	Components consisting of a flexible line for connection to an anchorage at one end to hang vertically (vertical lifeline), or for connection to anchorages at both ends to stretch horizontally (horizontal lifeline), and which serves as a means for connecting other components of a PFAS to the anchorage.
Mechanical equipment	For the purposes of this section, all motor or human propelled, wheeled equipment used for roofing work except wheelbarrows and mop carts.
Opening	A gap or void 30 inches or more high and 18 inches or more wide, in a wall or partition, through which employees can fall to a lower level.
Personal fall arrest system (PFAS)	A system used to arrest an employee in a fall from a working level It consists of an anchorage, connectors, a body harness and may include a lanyard, deceleration device, lifeline, or suitable combinations of these.
Positioning system	A body harness system 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. It is a one type of a personal restraint system.

Qualified persons	Individuals with a recognized degree or professional certificate and extensive knowledge and experience in the subject field and who are capable of design, analysis, evaluation and specifications in the subject work, project, or product.
Responsible manager	Any person directing activities of personnel exposed to fall hazards. This includes construction management, facility managers and project managers.
Safety monitors	Competent persons assigned to observe other employees and who are responsible for recognizing and warning employees of fall hazards.
Snap-hooks	Connector comprised of hook-shaped members with a normally closed keeper, or similar arrangement, which may be opened to permit the hook to receive an object and, when released, automatically closes to retain the object. Snap-hooks are generally one of two types: 1. The **locking type** has a self-closing, self-locking keeper which remains closed and locked until unlocked and pressed open for connection or disconnection. 2. The **non-locking type** has a self-closing keeper which remains closed until pressed open for connection or disconnection. This type of snap-hook is not used on SCR projects.
Three-point contact	The process of maintaining at least three points of contact with a ladder; for example, two feet and one hand in contact with the ladder.
Toe-boards	Low protective barriers that will prevent the fall of materials and equipment to lower levels and provide some protection from falls for personnel and stepping into small floor holes
Travel restriction system	A type of personal restraint system which prevents one from reaching a location where a fall hazard exists. Travel restriction is a type of exposure prevention and is preferred over the use of a fall arrest system.
Unprotected side	For the purposes of this section, any side or edge (except at entrances to points of access) of a walking/working surface, (such as a floor, roof, ramp, or runway) where there is no wall or guardrail system at least 39 inches high.

Walking/working surface A term used to describe any surfaces, 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. This type of surface does not include ladders, vehicles, or trailers, on which employees must be located in order to perform their job duties.

Warning line system A barrier erected on a roof to warn employees that they are approaching an unprotected roof side or edge, and which designates an area in which roofing work may take place without the use of conventional fall protection systems to protect employees in the area.

5.4 REFERENCES

- 29 CFR 1926, Subpart M, Fall Protection
- 29 CFR 1910.66 Attachment C, Powered Platforms, Man-lifts, and Vehicle Mounted Work Platforms
- ANSI A10.161991, Requirements for Safety Belts, Harnesses, Lanyards, and Lifelines for Construction and Demolition Use
- ANSI Z359.1-1992, Safety Requirements for Personal Fall Arrest Systems, subsystems and components

SECTION 6
CRANES AND MATERIAL HANDLING

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CRANES AND MATERIAL HANDLING

6.1 MATERIALS HANDLING WITH CRANES

All cranes and hoisting equipment must meet or exceed OSHA regulations.

6.1.1 GENERAL

All required crane certifications and inspections must be current. Copies of such certifications and inspections should be in the possession of the Contractor and available for the Teal Site Manager's review.

Inspections of cranes, fork lifts, and like equipment should be performed by a competent person. Generally, a competent person is defined as one who has both the ability to recognize hazards and the authority to correct them.

6.1.2 RIGGING IN AREAS OF GREATER HAZARD POTENTIAL

The following guidelines apply to rigging weights exceeding 5 tons that, because of lift weight and proximity to traffic, equipment, or working personnel, pose an increased hazard. Each person engaged in weight rigging activities must:

1. Follow all rigging requirements in accordance to OSHA Standards and at minimum the requirements of this section.
2. Develop an approved prelift study and plan for review by the Teal Site Manager before making any lift. The plan must include the following elements.
    a. Weights to be lifted
    b. Crane capacity
    c. Lifting operations
    d. Tailing load
    e. Lifting hardware
    f. Stresses
3. Require that an emergency contingency plan be developed by the person supervising the work that identifies the lines and equipment to be lifted over.
4. Require that all planned lifting activities are being coordinated by one person in conjunction with the contractor representative, the project representative, and/or the Site Manager.
5. Require that all the parties completely understand the activities to be performed and maintain communication during lifting activities.

6.1.3 CRANES AND HOISTS

When using cranes or hoists to lift any object or load over active process lines or equipment, the cranes or hoists must not be loaded to greater than client requirements or 80% of their calculated rated load limits, based on boom angle and radius, or

Max lift weight = Rated capacity -20%

For example, if a manufacturer rates its crane at 100 tons, at our location it becomes an 80-ton crane for calculating lifts over active process equipment.

Crane and hoist maintenance is the responsibility of contractor. Each contractor must establish a policy for regular inspection and immediate reporting of defects for prompt corrective action. All manufacturers' specifications for maintenance and inspection must also be carefully followed.

In addition, contractors are responsible for designating individuals to perform the following activities, unless otherwise stated in this section.

1. Inspecting all cranes, hoists, motor vehicles, elevators, and heavy equipment at the beginning of each shift, or at least before use on each shift. All deficiencies on any piece of equipment must be repaired before it is used.
2. The equipment superintendent maintains all inspection records required by law and has available, upon request, for review by the Teal Construction Site Managers.
3. Posting rated load capacity charts, recommended operating speeds, special hazard warnings, and other essential information in all cranes, hoists, and other equipment.
4. Requiring that routine maintenance, fueling, or repairs not be performed while equipment is in use or the power on.
5. Requiring that no load exceeding the rated capacity of a crane be lifted at the crane's operating boom angle. Plates or signs showing safe loads for various radii or boom angles must be attached to each crane.
6. Requiring that standard operating signals be used to direct all operations. Only one person is permitted to give signals to a crane operator unless a load is being transferred to a point that is out of the signalman's sight. In such cases, a second signalman must be designated. These signals are illustrated in Appendix K.
7. Requiring that outriggers be used at all times on rubber-tired cranes unless a load is secured for travel.
8. Requiring that power be off and all controls locked before an operator leaves the cab of a crane or hoist. Where practicable, booms should be lowered to the ground before machinery is left overnight.
9. Erecting barricades around the accessible areas within the swing radius of each crane to prevent employees from being crushed by the crane counterweight.

10. Requiring that each crane cab contain a fire extinguisher rated at least 5 BC.

11. Requiring that all crane hooks have safety latches and that the safety latches are used properly.

12. Requiring that substantial mats be laid down to support cranes being operated on soft ground.

13. Requiring that extreme caution be used when operating near the edge of an excavation.

14. Requiring that slings be adequate for any load being lifted. However, the lift foreman should determine that the proper sling is being used and that it is correctly applied before any lift takes place. Slings should be kept in good condition and not dragged or left lying on the ground. All slings must be inspected by the user before each use.

15. Requiring that tag lines or guide ropes be used on all loads.

16. Requiring that the crane hook be stationed directly over any load being lifted to minimize strain on a crane as well as load sliding. Only shackle or moused hooks are to be used.

17. Requiring that workmen be prohibited from riding loads, and that no load is ever swung over workmen.

18. Requiring that cranes be moved only when directed by signalmen. Workmen on the ground should be kept away from moving machines. No one is permitted to get on or off a moving crane.

19. Reminding all workmen that any overhead line must be considered energized unless a responsible client or utility company representative states that the line is not energized and the line is so tagged.

20. Monitoring that, at no time is a crane or other equipment operated within 10 ft of energized electrical transmission or distribution lines. Specifically:

Line Rating	Minimum Crane or Load Distance
Over 50 kV	10 ft plus 0.4 in. for each 1 kV over 50 kV or twice the length of the line insulator, but never less than 10 ft
During transit with boom lowered:	
50 kV or less	4 ft
50 kV to 345 kV	10 ft
345 kV to 750 kV	16 ft

6.1.4 RIGGING

The contractor's rigging crews, operators, and signalmen are responsible for the following applicable requirements.

1. Checking the angle between the bridle slings under each load. Any time the angle exceeds 60 degrees, the slings must be redistributed under the load. Improper angles of lift result in excessive tension imposed on each leg of the sling. The results are the same as if overloaded. Refer to Appendix B for specific limits.

2. Determining the weight and balance of all loads before each lift to require that lifting equipment operates within capabilities.

3. Requiring that hooks not be point-loaded.

4. Providing for the use of multileg slings when required rather than combinations of single slings. Loads may not be lifted with one leg of a multileg sling until all unused legs are secured.

5. Before each lift, checking that slings are not twisted or knotted and are properly attached to the load. Faulty hookup, point-loaded hooks, improperly secured or unbalanced loads, and lifting with twisted or knotted slings can impose loads in excess of a sling's rated capacity.

6. When lifting or lowering, ensuring that impact loading from sudden jerking is avoided. Jerking or snatching loads can impose stress on a sling in excess of the actual weight of the object being lifted. A gradual lift to eliminate all slack is recommended.

7. Making sure an object being lifted is not lagged, clamped, or bolted to the floor or to another object.

8. Centering the boompoint directly over a load before hookup. The load-block may not be pulled to one side to attach it to a load.

9. Removing or securing all loose materials around a load before it is moved.

10. Removing the handle from any jack supporting the load.

11. Requiring that no load be left suspended with the hoist or crane unattended. Near-capacity loads must remain as close as possible to the ground, but high enough to clear all items in the path of travel.

12. Requiring that shackles not be attached crossways with a load. The eye of the choker should ride on the pin of the shackle. The diameter of the shackle pin should be in accordance with Table 6-1, which appears in the OSHA standards as Table H-19.

13. Requiring that standard lifting lugs not be pulled sideways, especially when loads are being turned.

14. Frequently checking the hooks and catches of snatchblocks. Snatchblocks must be kept clean and well-lubricated.

15. Requiring that hoist lines or discarded rope not be used to make slings.

16. Requiring that no attempt be made to handle large, heavy loads in strong winds.

17. Requiring that, at no time are two or more separately rigged loads (Christmas tree) hoisted in one lift, even though the combined load is within a crane's rated capacity unless it is in accordance with OSHA standards.

18. Requiring that, when two machines are used to lift a heavy or unwieldy load:

    a. One signalman directs all lifting movements (except as stated in item 6 of paragraph 6.1.3)
    b. Lifting plans have been coordinated with both operators before lifting begins
    c. The load distribution is known and slings are arranged so that machines share the load correctly

19. Requiring that maximum clearance be allowed between hook, lock, and head sheaves.

20. Removing from service any hooks that have been opened more than 15% of the normal throat opening (measured at the narrowest point) or twisted more than 10(X) from the plane of the unbent hook.

21. Inspecting cables and slings regularly, cleaning slings before inspection to eliminate any hidden nicks, gouges, or other damage, tagging defective slings *DANGER-DO NOT USE*, and removing them from service for repair or destruction.

22. Requiring that slings be protected from abuse during lifting. When wrapping slings around sharp corners, use softeners to prevent damage.

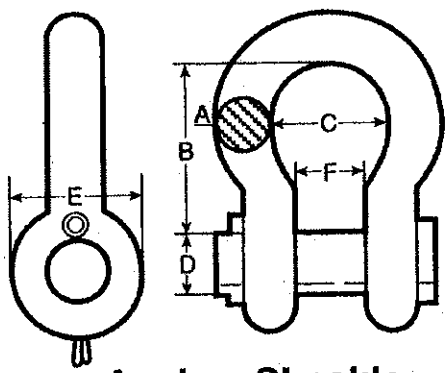
23. Hanging slings up or storing them on racks in assigned areas when not in use.

Table 6-1 – Safe Working Loads for Shackles

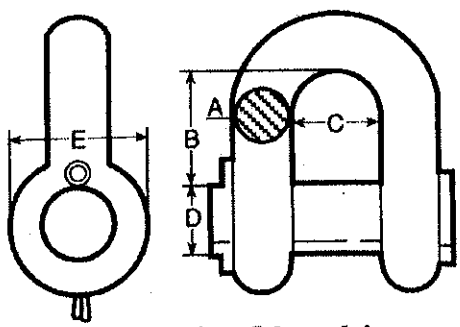
Dimensions in Inches							
Size Inches	Length in Clear	Inside Width at Pin	Inside Width at Bow	Diam. Pin	Outside Diam. of Eye	Rated Capacity in Tons	Approx. Weight Each in Pounds
A	B	F	C	D	E		
*3/16	7/8	3/8	19/32	1/4	9/16	1/3	0.05
1/4	1 1/8	15/32	25/32	5/16	11/16	1/2	0.12
5/16	1 7/32	17/32	27/32	3/8	13/16	3/4	0.18
3/8	1 7/16	21/32	1 1/32	7/16	31/32	1	0.30
7/16	1 11/16	23/32	1 5/32	1/2	1 1/16	1 1/2	0.49
1/2	1 7/8	13/16	1 5/16	5/8	1 3/16	2	0.74
5/8	2 3/8	1 1/16	1 11/16	3/4	1 9/16	3 1/4	1.44
3/4	2 13/16	1 1/4	2	7/8	1 7/8	4 3/4	2.16
7/8	3 5/16	1 7/16	2 9/32	1	2 1/8	6 1/2	3.37
1	3 3/4	1 11/16	2 11/16	1 1/8	2 3/8	8 1/2	5.3
1 1/8	4 1/4	1 13/16	2 29/32	1 1/4	2 5/8	9 1/2	7.0
1 1/4	4 11/16	2 1/32	3 1/4	1 3/8	3	1	9.6

*3/16 in. shackles furnished in screw pin only.

6:1 Safety Factor



Anchor Shackle



Chain Shackle

PCI/H&SM/SWLS

24. Measuring the reach of sling legs to make sure they correspond to the value stamped on the sling identification tag. One or more legs longer than the others might result from the sling being subjected to overloading or excessive wear. Allow a safety factor of no less than 5. Slings in poor condition may not be used.

25. Establishing procedures for proper repair of damaged slings and verifying that those procedures are followed. Under no circumstances may a temporary repair to a sling be considered adequate.

26. Inspecting guy lines and load lines each time they are rigged and taken down, and cutting any defective or damaged rope or cable to prevent further use.

27. Flagging all guy lines at all places where they intersect paths or roadways.

28. Before a load is rigged for lifting for the first time, inspecting all rigging by a designated competent person (see definition of designated competent person in paragraph 6.1.1 of this section).

6.2 SUSPENDED PERSONNEL CRANE PLATFORMS

Teal Construction policy and standards specify: *No hoisting, lowering, swinging or traveling shall be done while anyone is on the load or hook, or the operator shall not hoist, lower, swing or travel while anyone is on the load or hook.*

6.2.1 GENERAL

Friction or hydraulic portals, towers, crawlers, locomotives, trucks or wheel-mounted cranes or derricks may be used to hoist personnel platforms when their use is safer than the erection, use, or dismantling of conventional means of reaching a worksite such as ladders, stairways, aerial lifts, elevated work platforms, or scaffolds, or when those means cannot be used because of structural design or worksite conditions.

6.2.2 CRANE AND DERRICK OPERATION

The following general provisions apply when cranes or derricks are used to hoist personnel.

- Lifting and lowering must be done in a very slow and controlled manner.
- The minimum load hoist wire rope safety factor must be 7. If rotation-resistant rope is used, the safety factor must be at least 10.
- Load and boom hoist drum brakes, swing brakes, and locking devices such as pawls or dogs must be engaged when an occupied personnel platform is in a stationary working position.
- A load line hoist drum must have controlled load lowering. Controlled load lowering implies a system or device on the power train, other than the load hoist brake, that can regulate the rate of the hoist mechanism during lowering. Free fall is prohibited.

- Cranes must be uniformly level within 1% of level grade and set on firm footings. Crane outriggers, if provided, must be used according to manufacturers' specifications when cranes are used to hoist personnel.
- The total weight of the loaded personnel platform and related rigging must not exceed 50% of the rated capacity for the radius and configuration of the crane or derrick.
- Machines having live booms may not be used. Live booms are booms on which lowering is controlled only by a brake without the aid of other devices to retard the rate of descent.

6.2.3 CRANE INSTRUMENTS AND COMPONENTS

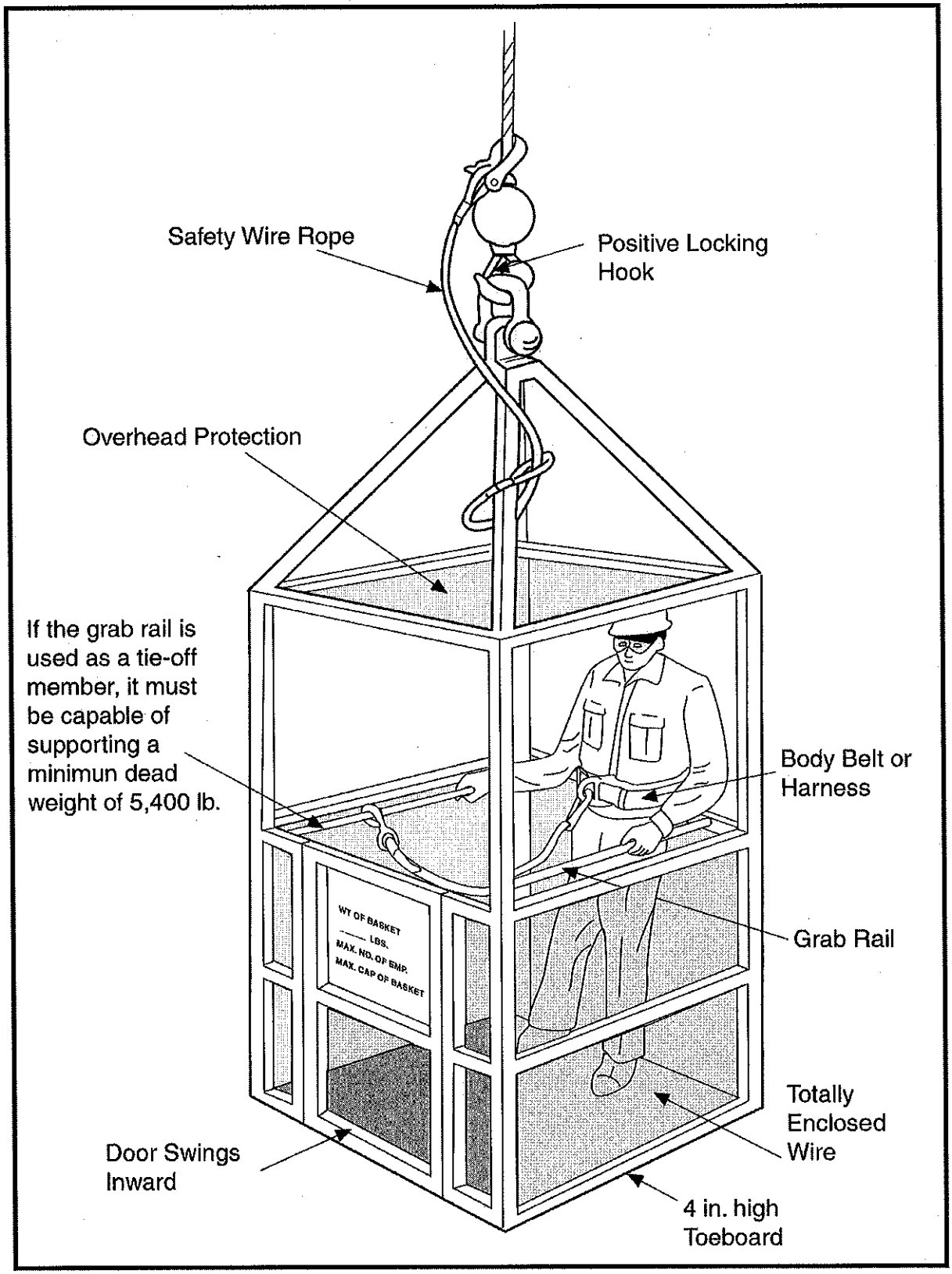
Cranes or derricks used to hoist employees must be equipped as follows.

- A boom angle indicator must be installed on cranes and be readily visible to the operator.
- Telescoping booms must be marked or equipped with a device that clearly indicates at all times the boom's extended length to the operator.
- An antitwo-block device or two-block damage prevention feature must be installed on each crane. Anti-two-blocking devices are positive acting devices that prevent contact between the load block or fall ball and the boom tip. A two-block damage prevention feature is a system that deactivates the hoisting action before damage occurs in the event of a two-block situation.

6.2.4 PERSONNEL PLATFORM DESIGN

Personnel platform design must include the following criteria (refer to Figure 6-1).

- Personnel platforms must be designed by qualified engineers competent in structural design.
- The suspension system must be designed to minimize tipping of the platform by the employees standing on the platform.



PCI/H&SM/EPPSWB

Figure 6-1 – Employee Properly Positioned in Suspended Work Basket

- The entire personnel platform must be designed with a minimum safety factor of 5. If any member of the platform is used for tie-off purposes, it must be able to support a dead weight of at least 5,400 lb.
- Adequate headroom must be provided to allow employees occupying the platform to stand fully upright.

Personnel platforms must conform to the following specifications.

- Each personnel platform must be provided with a guardrail system (extending 42 in. from the floor) with an intermediate rail placed halfway between the floor and the guardrail, and a toeboard 4 in. high. The protective structure must be enclosed at least from the toeboard to the midrail with either solid construction or expanded metal having openings no greater than 1/2 in. in diameter.
- A grabrail must be provided inside each personnel platform.
- Any access gate must swing inward and must be equipped with a restraining device to prevent accidental opening.
- Overhead protection must be provided on the personnel platform if employees could be exposed to falling objects.
- All rough platform edges that could snag employees or employees' clothing must be ground smooth.
- All platform welding must be performed by a welder qualified to perform the weld grades, types, and material specified in the design.
- All personnel platforms must have a conspicuously posted plate or other permanent marking indicating the platform weight and rated load capacity.
- Personnel platforms must be easily identifiable by color or other markings.

Personnel platform design must accommodate the following load limitations.

- The rated load capacity of each personnel platform must never be exceeded.
- The number of employees occupying a personnel platform must not exceed the number required for the work being performed.
- Personnel platforms must be used only for employees, their tools, and sufficient material to do the work being performed.
- Materials on an occupied personnel platform must be secured and their weight evenly distributed while the platform is in motion.

Platform rigging must conform to the following guidelines.

- When a wire rope bridle is used to connect the platform to the load line, the bridle legs must be connected to a master link or shackle.

- Hooks on overhaul ball assemblies, lower load blocks, or other attachment assemblies must be of a type that can be closed and locked, and not of a type having a hook throat opening. An anchor-type shackle with a bolt, nut, and retaining pin may also be used.
- Wire rope, shackles, rings, and other rigging hardware must have a minimum safety factor of 5. Where rotation resistant-rope is used, a safety factor of 10 is required for slings.
- All eyes in wire rope slings must be fabricated with thimbles.

6.2.5 INSPECTION AND TESTING

Cranes and derricks used to hoist personnel platforms must be inspected at the beginning of each shift and before hoisting employees on the platform after the crane or derrick has been used for any material handling operation during which greater than 50% of the rated capacity was lifted.

A trial lift with the personnel platform unoccupied must be made for each new work location and at the beginning of each shift to ensure that all systems, controls, and safety devices are functioning properly.

A change in work location means the personnel platform position has changed, or the path of lift has significantly changed.

A full-cycle operational test lift of at least the intended load must be made before hoisting personnel for the first time at each new setup location. The test lift load must remain under the 50% limit of the hoist's rated capacity.

The setup location is the location to which the crane or derrick is brought and set up, including assembling and leveling.

A visual inspection of the crane or derrick, personnel platform, and base support must be conducted immediately after lift testing to determine whether the testing has adversely affected any crane component or structure.

During such inspections, any defects found that may create a safety hazard must be corrected before the crane or derrick may be further used.

6.2.6 SAFE WORK PRACTICES

Employees must keep all body parts inside the personnel platform during raising, lowering, and positioning.

If the personnel platform is not landed, it must be secured to a structure before employees exit or enter the platform.

Tag lines must be used where practical.

Hoisting of employees while the crane is traveling is prohibited, except for portal and tower cranes operating on a fixed track.

The crane or derrick operator must remain at the controls at all times when employees are being hoisted.

Hoisting of employees must be discontinued upon indication of any dangerous weather conditions or other impending danger.

The platform must be hoisted a few inches and inspected to ensure that it is secure and properly balanced before employees are allowed to occupy it. Employees must not be hoisted unless the following conditions are met.

- Hoist ropes are free of kinks
- Multiple part lines are not twisted around each other
- The primary attachment is centered over the platform
- If the wire rope is slack, the hoisting system must be inspected to ensure that all ropes are properly seated on drums and in sheaves

Employees being hoisted must remain in continuous sight of and communication with the crane operator or the signal person.

Employees occupying the personnel platform must wear a body belt or harness (with lanyard properly attached to the lower load block or overhaul ball, or to a structural member within the personnel platform) capable of supporting a fall of at least 5,400 lb dead weight.

Bridles and associated hardware used for attaching the personnel platform to the hoist line must not be used for any other purpose.

6.2.7 PRELIFT MEETING

Contractors are responsible for holding a meeting to review the appropriate requirements of this subsection before any personnel lift is attempted. The meeting must be attended by each crane or derrick operator, signal person(s), personnel to be lifted, and the person responsible for the task.

The meeting must be held before the beginning of personnel hoisting operations at each new work location and thereafter for any employees newly assigned to the operation.

Exhibit 6-1 contains detailed operating guidelines and prelift checklists for crane and personnel platforms.

6.3 CRANE INSPECTIONS

Inspections of cranes must occur before initial use and at regularly scheduled intervals.

6.3.1 INITIAL INSPECTION

All cranes must be inspected before initial use and after properly administered alterations, in accordance with OSHA regulations and crane manufacturer standards.

A certification record that includes the date of inspection, the serial number or other identifier of the equipment and the signature of the individual who performed the inspection must be maintained and readily available.

6.3.2 REGULAR INSPECTIONS

Regular inspections are divided into two general classifications: frequent and periodic.

1. **Frequent inspections** are conducted daily. The sample inspection form in Exhibit 6-2 is a guideline only. Refer to the manufacturers' guidelines for more specific inspection criteria.

2. **Periodic inspections** are conducted at intervals of 6 months or less, or as specifically recommended by the manufacturer. The sample inspection form in Exhibit 6-2 is only a guideline. Refer to the manufacturers' guidelines for more specific inspection criteria.

6.3.2.1 DAILY INSPECTION

The items listed in Figure 6-2 must be inspected daily or at the intervals indicated. Such inspection includes observation during operation for defects that might appear between regular inspections. Any deficiencies listed should be carefully examined and a determination made as to whether they constitute a safety hazard.

Items to Be Inspected	Inspection Interval
All control mechanisms for maladjustment interfering with proper operation	Daily
All control mechanisms for excessive wear of components and contamination by lubricants or other foreign matter	Daily
All safety devices for malfunction	Daily
Deterioration or leakage in air or hydraulic systems	Daily
Crane hooks for deformations or cracks. Hooks with cracks, or more than 15% in excess of normal throat opening, or more than a 10 degree twist from the plane of the unbent hook must be discarded. Repairs by welding or reshaping are not generally recommended	Daily
Rope reeving for noncompliance with crane manufacturer's recommendations	Daily
Electrical apparatus for malfunctioning, signs of excessive deterioration, and dirt and moisture accumulation	Daily
Use the SCR daily checklist form in Exhibit 6-2 as a guide to recordkeeping for the daily inspections. Inspection records must be maintained and readily available.	

Figure 6-2 - Crane Inspection Frequency

6.3.2.2 PERIODIC INSPECTION

Complete inspections of cranes must be performed every 12 months, or as specifically recommended by the manufacturer. These inspections include the requirements defined in paragraph 6.3.2.1 as well as those in the following list. Any deficiencies must be carefully examined and a determination made as to whether they constitute a safety hazard.

- Deformed, cracked, or corroded members in the crane structure and boom
- Loose bolts or rivets

- Cracked or worn sheaves and drums
- Worn, cracked, or distorted parts such as pins, bearings, shafts, gears, rollers, and locking devices
- Excessive wear on brake and clutch system parts, linings, pawls, and ratchets
- Load, boom angle, and other indicators (across their full range) for any significant inaccuracies
- Gasoline, diesel, electric, or other power plants for improper performance or noncompliance with safety requirements
- Excessive wear of chain-drive sprockets and excessive chain stretch
- Crane hooks; magnetic particle or other suitable crack-detecting inspection should be performed at least once each year
- Travel steering, braking, and locking devices, for malfunction
- Excessively worn or damaged tires

6.4 HOISTS, CONVEYORS, AND ELEVATORS

This procedure identifies the safety requirements for material hoists, personnel hoists, and elevators.

6.4.1 MATERIAL HOISTS OPERATION

The manufacturer's specifications and the limitations applicable to the operation of hoists and elevators must be complied with. If manufacturer specifications are not available, the limitations assigned to the equipment must be based on the determinations of a professional engineer competent in the field.

Rated load capacities, recommended operating speeds, and special hazard warnings or instructions must be posted on cars and platforms.

Wire rope must be removed from service when any of the following conditions exist:

- In hoisting ropes, six randomly distributed broken wires in one rope lay or three broken wires in one strand in one rope lay.
- Abrasion, scrubbing, flattening, or peening, causing loss of more than one-third of the original diameter of the outside wires.
- Evidence of heat damage resulting from a torch or damage caused by contact with electrical wires.
- Reduction from nominal diameter of more than 3/64 in. for diameters up to and including 3/4 in., 1/16 in. for diameters 7/8 in. to 1-1/8 in., and 3/32 in. for diameters 1-1/4 in. to 1-1/2 in.

Hoisting ropes must be installed in accordance with the wire rope manufacturer's recommendations.

The installation of live booms on hoists is prohibited.

The use of endless belt-type manlifts on construction sites is prohibited.

Operating rules must be established by the Site Manager and Contractor and posted at each hoist operator's station. Such rules must include the signal system and allowable line speed for various loads. Rules and notices must be conspicuously posted on the car frame or crosshead, and include the statement *NO RIDERS ALLOWED.*

No one is allowed to ride on material hoists except to perform inspection and maintenance.

The entrances of hoistways must be protected by substantial gates or bars that guard the full width of the landing entrance. Hoist entrance bars and gates must be painted in diagonal contrasting colors, such as black and yellow stripes.

The bars must be no less than 2-in. by 4-in. (2 x 4) wooden bars, or equivalent, placed 2 ft from the hoist line. Bars must be no less than 36 in. and no more than 42 in. above the floor.

Gates or bars protecting the entrances to hoistways must be equipped with a latching device.

An overhead protective covering of 2-in. planking, 3/4-in. plywood or other solid material of equivalent strength must be provided on top of every material hoist cage or platform.

The hoist operator's station must be provided with overhead protection equivalent to tight planking no less than 2 in. thick. The support for the overhead protection must be of equal strength.

Hoist towers may be used with or without enclosed sides. However, both configurations are subject to the following applicable conditions:

- Enclosed hoist towers must be enclosed on all sides for their entire height, with a screen of 1/2-in. mesh, No. 18 U.S. gauge wire, or equivalent, except for landing access.
- For unenclosed hoist towers, the hoist platform or car must be totally enclosed (caged) on all sides for the full height from the floor to the overhead protective covering with 1/2-in. mesh of No. 14 U.S. gauge wire or equivalent. The hoist platform enclosure must include the required gates for loading and unloading. A 6-ft high enclosure must be provided on the unused sides of the hoist tower at ground level.

Arresting devices must be installed on the cars in case of rope failure.

All material hoist towers must be designed by licensed professional engineers.

Material hoists must conform to the requirements of *ANSI A10.5-1969, Safety Requirements for Material Hoists.*

6.4.2 PERSONNEL HOISTS

Hoist towers outside a structure must be enclosed for the full height on the side or sides used for entrance and exit to the structure. At the lowest landing, the side enclosures not used for exit or entrance must be enclosed to a height of at least 10 ft. Other sides of the tower adjacent to floors or scaffold platforms must be enclosed to a height of 10 ft above the level of such floors or scaffolds.

Towers inside structures must be enclosed on all four sides along their full height.

Towers must be anchored to structures at intervals not exceeding 25 ft. In addition to tie-ins, a series of guys must be installed between a tower and its supporting structure. Where tie-ins are not practical the tower must be anchored by means of guys made of wire rope at least 1/2 in. in diameter, securely fastened to anchorage to ensure stability.

Hoists doors or gates must be no less than 6 ft-6 in. high, must be provided with mechanical locks that cannot be operated from the landing side and that are accessible only to persons in the car.

Cars must be permanently enclosed on all sides and on top (except sides, used for entrance and exit, that have car gates or doors).

A door or gate must be provided at each entrance to the car to protect the full width and height of the car entrance opening.

An overhead protective covering of 2-in. planking, 3/4-in. plywood or other solid material of equivalent strength must be provided on the top of every personnel hoist.

Doors or gates must be provided with electric contacts that do not allow movement of the hoist when door or gate is open.

Safeties must be capable of stopping and holding the car and rated load when traveling at governor-tripping speeds.

All cars must have a capacity and data plate secured in a conspicuous place on the car or crosshead.

Internal combustion engines are not permitted for direct drive.

Normal and final terminal stopping devices must be provided.

An emergency stop switch must be provided in the car and marked *STOP*.

The minimum number of hoisting ropes used is three for traction hoists and two for drum hoists.

The minimum diameter of hoisting and counterweight wire ropes is 1/2 in.

The minimum safety factors for suspension wire ropes are shown in Table 6-2.

Table 6-2 – Safety Factors for Suspension Wire Ropes

Rope speed (ft per minute)	Minimum Safety	Rope speed (ft per minute)	Minimum Safety
50	7.60	250	8.90
75	7.75	300	9.20
100	7.95	350	9.50
125	8.10	400	9.75
150	8.25	450	10.00
175	8.40	500	10.25
200	8.60	550	10.45
225	8.75	600	10.70

Following assembly and erection, and before a hoist is put in service, hoist functions and safety devices must be inspected and tested under the supervision of a competent person. A similar inspection and test is required following major alteration of an existing installation. Hoists must be inspected and tested at intervals of no more than 3 months. Contractors are to use a certification record that includes the date inspection and test of all functions and safety devices are performed, the signature of the person who performed the inspection and test, and a serial number (or other identifier) of the hoist inspected and tested. The most recent certification record must be maintained on file at the jobsite.

Personnel hoists must be constructed of materials and components that meet the specifications for materials, construction, safety devices, assembly, and structural integrity stated in *ANSI A10.4-1963, Safety Requirements for Workmen's Hoists*. The requirements of that paragraph do not apply to cantilever-type personnel hoists.

Personnel hoists used in bridge tower construction must be approved by a registered professional engineer and erected under the supervision of a qualified engineer competent in this field.

- If a hoist tower is not enclosed, the hoist platform or car must be totally enclosed (caged) on all sides, for the full height between the floor and the overhead protective covering, with 3/4-in. mesh, No. 14 U.S. gauge wire or equivalent. The hoist platform enclosure must include the required gates for loading and unloading.
- Hoists must be inspected and maintained on a weekly basis. When hoisting equipment is exposed to winds exceeding 35 miles per hour, it must be inspected and put in operable condition before reuse. Such inspections should be recorded.
- Wire rope must be taken out of service when any of the following conditions exist:
  - In running ropes, six randomly distributed broken wires in one lay or three broken wires in one strand in one lay.
  - Wear of one-third of the original diameter of outside individual wires, or kinking, crushing, bird caging, or any other damage resulting in distortion of the rope structure.

- Evidence of any heat damage from any cause.
- Reductions from nominal diameter of more than 3/64 in. for diameters to and including 3/4 in., 1/16 in. for diameters 7/8 in. to 1-1/8 in., and 3/32 in. for diameters 1-1/4 to 1-1/2 in.
- In standing ropes, more than two broken wires in one lay in sections beyond end connections or more than one broken wire at end connection.

Permanent elevators used by employees for work covered by OSHA regulations must comply with the requirements of *ANSI A.17.1-1965 with addenda A17.1a-1967, A17.1b-1968, A17.1c-1969, A17.1d-1970*, and be inspected in accordance with *ANSI A17.2-1960 with addenda A17.2a-1965, A17.2b-1967.*

6.4.3 BASE-MOUNTED DRUM HOISTS

This procedure identifies the safety requirements for base-mounted drum hoists.

Exposed moving parts (such as gears, projecting screws, setscrews, chain, cables, chain sprockets, and reciprocating or rotating parts), that constitute a hazard must be guarded.

Controls used during the normal operation cycle must be within easy reach of the operator's station.

Electric motor-operated hoists must be provided with:

- A device that disconnects the motors from the line upon power failure and will not permit motor to be restarted until the controller handle is brought to the *OFF* position
- An overspeed preventive device, if applicable
- A means to stops remotely operated hoists when control is ineffective

Base-mounted drum hoists must meet all applicable requirements for design, construction, installation, testing, inspection, maintenance, and operations, prescribed by the hoist manufacturer.

6.4.4 OVERHEAD HOISTS

This procedure identifies the safety requirements for overhead hoists.

The safe working load of an overhead hoist, as determined by the manufacturer, must be indicated on the hoist. This safe working load must not be exceeded.

The supporting structure to which a hoist is attached must have a safe working load equal to that of the hoist.

Supports must be arranged to provide for free movement of hoists and must not restrict hoists from aligning with loads.

Hoists must be installed only in locations that permit the operator to stand clear of the load at all times.

Air hoists must be connected to an air supply of sufficient capacity and pressure to safely operate the hoists. Air hoses supplying air must be positively connected to prevent disconnection during use.

Overhead hoists must meet all applicable requirements for construction, design, installation, testing, inspection, maintenance, and operation, prescribed by the hoist manufacturer.

6.4.5 CONVEYORS

This procedure identifies the safety requirements for conveyors.

A means for stopping a conveyor motor or engine must be provided at the operator's station. Conveyor systems must be equipped with an audible warning signal. Such warnings should be sounded immediately before starting a conveyor.

If the conveyor operator's station is remotely sited, provision for stopping the motor or engine must be provided at the motor or engine location.

Emergency stop switches must be arranged so that a conveyor cannot be started again until the actuating stop switch has been reset to the running or *ON* position.

Screw conveyors must be guarded to prevent employee contact with turning flights.

Where a conveyor passes over work areas, aisles, or thoroughfares, guards must be provided to protect employees required to work below conveyors.

Crossovers, aisles, and passsageways must be conspicuously marked by suitable signs, as required in *29 CFR 1926.200, 201, 202, and 203.*

Conveyors must be locked out or otherwise rendered inoperable, and tagged out with a *DO NOT OPERATE* tag during repairs and when operation is hazardous to employees performing maintenance work.

Conveyors must meet all applicable requirements for design, construction, inspection, testing, maintenance, and operation, prescribed in *ANSI B20.1-1957, Safety Code for Conveyors, Cableways, and Related Equipment.*

6.4.6 ELEVATORS AND AERIAL LIFTS

This procedure identifies the safety requirements for aerial lifts for personnel.

Unless otherwise provided in this procedure, aerial lifts must be designed and constructed in conformance with the applicable requirements of *ANSI A92.2-1969, Vehicle Mounted Elevating and Rotating Work Platforms.* Aerial lifts that do not meet the requirements of *ANSI A92.2-1969* include the following types of vehicle-mounted aerial devices used to elevate personnel to aboveground jobsites:

- Extensible boom platforms
- Aerial ladders
- Articulating boom platforms
- A combination of any of the above

Aerial equipment may be made of metal, wood, fiberglass reinforced plastic (FRP), or other material; may be powered or manually operated; and is deemed to be an aerial lift whether it is capable of rotating around a substantially vertical axis.

Aerial lifts may be field modified for uses other than those intended by the manufacturer, provided the modifications have been certified in writing by the manufacturer or by an equivalent entity such as a nationally recognized testing laboratory, to be in conformity with all applicable provisions of *ANSI A92.2-1969* and this subsection, and to be at least as safe as they were before modification.

6.4.6.1 LADDER TRUCKS AND TOWER TRUCKS

Aerial ladders must be secured in the lower traveling position by the locking device on top of the truck cab and the manually operated device at the base of the ladder before the truck is moved for highway travel.

6.4.6.2 EXTENSIVE AND ARTICULATING BOOM PLATFORMS

These platforms and their operation must conform to the following requirements:

- Lift controls must be tested each day before use to determine that they are in safe working condition.
- Only authorized persons may operate an aerial lift.
- Belting off to an adjacent pole, structure, or equipment while working from an aerial lift is prohibited.
- Employees must always stand firmly on the floor of the basket, and must not sit or climb on the edge of the basket or use planks, ladders, or other devices for a work position.
- Employees must wear a body belt and a lanyard attached to the boom or basket when working from an aerial lift.
- Boom and basket load limits specified by the manufacturer may not be exceeded.
- The brakes must be set and, when outriggers are used, they must be positioned on pads or on a solid surface. Wheel chocks must be installed before using an aerial lift on an incline, provided they can be safely installed.
- An aerial lift truck must not be moved when the boom is elevated in working position with men in the basket, except for equipment specifically designed for this type of operation in accordance with the provisions of this section.

- Articulating boom and extensible boom platforms, primarily designed as personnel carriers, must have both platform (upper) and lower controls. Upper controls must be in or beside the platform within easy reach of the operator. Lower controls must be able to override upper controls. Control functions must be plainly marked. Lower level controls must not be operated unless permission has been obtained from the employee in the lift, except in an emergency.
- Climbers must not be worn while performing work from an aerial lift.
- The insulated portion of an aerial lift must not be altered in any way that might reduce its insulating value.
- Before moving an aerial lift for travel, the boom must be inspected to see that it is properly cradled and that outriggers are in stowed position, except for equipment specifically designed for this type of operation in accordance with the requirements of this subsection.

All electrical tests must conform to the requirements of *ANSI A92.2-1969, Section 5*. However, equivalent dc voltage tests may be used in lieu of the ac voltage specified in *ANSI 92.2-1969*; dc voltage tests approved by an equipment manufacturer or equivalent entity must be considered equivalent tests for the purposes of this paragraph.

The provisions of *ANSI A92.2-1969, Section 4.9, Bursting Safety Factor*, apply to critical hydraulic pneumatic components. Critical components are those in which a failure would result in a free fall or free rotation of the boom. Non-critical components have a bursting safety factor of at least 2 to 1.

Welding must conform to the following standards as applicable.

- *Standard Qualification Procedure, AWS B3.0-41*
- *Recommended Practices for Automotive Welding Design, AWS D8.4-61*
- *Standard Qualification of Welding Procedures and Welders for Piping and Tubing, AWS D10.9-69.*
- *Specifications for Welding Highway and Railway Bridges, AWS D2.0-69.*

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LADDERS AND SCAFFOLDING

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LADDERS AND SCAFFOLDING

This procedure identifies the safety definitions applicable to ladders and scaffolding. It is applicable to all jobsites. Contractors must comply with OSHA Standards.

7.1 DEFINITIONS

Cleats	Ladder crosspieces of rectangular cross-section placed on edge on which a person may step when ascending or descending.
Single Cleat Ladders	A ladder that consists of a pair of side rails, usually parallel, but with flared side rails permissible, connected together with cleats that are joined to the side rails at regular intervals.
Double Cleat Ladder	A ladder that is similar to a single cleat ladder, but is wider, with an additional center rail allowing two-way traffic for workmen in ascending and descending.
Bearer	A horizontal member of a scaffold upon which the platform rests and which may be supported by ledgers.
Boatswain's Chair	A seat supported by slings attached to a suspended rope, designed to accommodate one workman in a sitting position.
Brace	A tie that holds one scaffold member in a fixed position with respect to another member.
Bricklayers' Square Scaffold	A scaffold composed of framed wood squares that support a platform, limited to light and medium duty.
Carpenters' Bracket Scaffold	A scaffold consisting of wood or metal brackets supporting a platform.
Coupler	A device for locking together the component parts of a tubular metal scaffold. (The material used for couplers shall be of a structural type, such as a drop-forged steel, malleable iron, or structural grade aluminum).
Crawling Board or Chicken Ladder	A plank with cleats spaced and secured at equal intervals, for use by a worker on roofs, but not designed to carry any material.
Double Pole or Independent Pole Scaffold	A scaffold supported from the base by a double row of uprights, independent of support from the walls and constructed of uprights, ledgers, horizontal platform bearers, and diagonal bracing.

Float or Ship Scaffold	A scaffold hung from overhead supports by means of ropes and consisting of a substantial platform having diagonal bracing underneath, resting upon and securely fastened to two parallel plank bearers at right angles to the span.
Guardrail	A rail secured to uprights and erected along the exposed sides and ends of platforms.
Heavy Duty Scaffold	A scaffold designed and constructed to carry a working load not to exceed 75 pounds per square foot.
Horse Scaffold	A scaffold for light or medium duty, composed of horses supporting a work platform.
Interior Hung Scaffold	A scaffold suspended from the ceiling or roof structure.
Ladder Jack Scaffold	A light duty scaffold supported by brackets attached to ladders.
Ledgers (Stringers)	A horizontal scaffold member, which extends from post to post, and which supports the putlogs or bearers forming a tie between the posts.
Light Duty Scaffold	A scaffold designed and constructed to carry a working load not to exceed 25 pounds per square foot.
Manually Propelled	
Mobile Scaffold	A portable rolling scaffold supported by casters.
Masons' Adjustable 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 raising or lowering of the platform to desired working positions.
Maximum Rated Load	The total of all loads, including the working load, the weight of the scaffold, and other loads as may be reasonably anticipated.
Medium Duty Scaffold	A scaffold designed and constructed to carry a working load not to exceed 50 pounds per square foot.
Midrail	A rail approximately midway between the guardrail and platform, secured to the uprights erected along the exposed sides and ends of platforms.
Needle Beam Scaffold	A light duty scaffold consisting of needle beams supporting a platform.
Outrigger Scaffold	A scaffold supported by outriggers or thrustouts projecting beyond the wall or face of the building or structure, the inboard ends of which are secured inside of such building or structure.

Putlog	A scaffold member upon which the platform rests.
Roofing or Bearer Bracket	A bracket used in slope roof construction, having provisions for being fastened to the roof or supported by ropes fastened over the ridge and secured to some suitable object.
Runner	The lengthwise horizontal bracing or bearing members or both.
Scaffold	Any temporary, elevated platform and its supporting structure used for supporting workmen or materials or both.
Single-Point Adjustable Suspension Scaffold	A manually or power operated unit designed for light duty use, supported by single wire rope from an overhead support, arranged and operated to permit the raising or lowering of the platform to desired working positions.
Single-Pole Scaffold	Platforms resting on putlogs or crossbeams, the outside ends of which are supported on ledgers secured to a single row of posts or uprights, and the inner ends of which are supported on or in a wall.
Stone Setters' Adjustable Multipoint Suspension Scaffold	A swinging type scaffold having a platform supported by hangers suspended at four points, permitting the raising or lowering of the platform to the desired working position by the use of hoisting machines.
Toeboard	A barrier secured along the sides and ends of a platform to guard against the falling of material.
Tube and Coupler Scaffold	An assembly consisting of tubing that serves as posts, bearers, braces, ties, and runners, a base supporting the posts, and special couplers that serve to connect the uprights and to join the various members.
Tubular Welded Frame Scaffold	A sectional panel or frame metal scaffold substantially built up using prefabricated welded sections, which consist of posts and a horizontal bearer with intermediate members.
Two-Point Suspension Scaffold (Swing Scaffold)	A scaffold, the platform of which is supported by hangers (stirrups) at two points, suspended from overhead supports to permit the raising or lowering of the platform to the desired working position by tackle or hoisting machines.
Window Jack Scaffold	A scaffold, the platform of which is supported by a bracket or jack, that projects through a window opening.
Working Load	Load imposed by men, materials, and equipment.

7.2 LADDERS

Contractors are required to comply with OSHA standards. This procedure identifies the safety requirements for ladders. It is applicable to all jobsites.

Except where either permanent or temporary stairways or suitable ramps or runways are provided, ladders described in this subsection must be used to give safe access to all elevations.

The use of ladders with broken or missing rungs or steps, broken or split side rails, or other faulty or defective construction is prohibited. Ladders with such defects must be withdrawn immediately from service. Inspection of metal ladders must include checking for corrosion of the interiors of open-end hollow rungs.

Manufactured portable wood ladders must be in accordance with the provisions of *ANSI A14.1-1982, Safety Code for Portable Wood Ladders.*

Portable metal ladders must be of a strength equivalent to that of wood ladders. Manufactured portable metal ladders must be in accordance with the provisions of *ANSI A14.2-1982, Safety Code for Portable Metal Ladders.*

Fixed ladders must meet the provisions of *ANSI A14.3-1984, Safety Code for Fixed Ladders.*

Portable ladder feet must be placed on a substantial base and the area around the top and bottom of the ladder must kept clear.

Portable ladders must be used at such a pitch that the horizontal distance from the top support to the foot of the ladder is about one-quarter of the working length of the ladder. Ladders may not be used in horizontal position platforms, runways, or scaffolds.

Ladders may not be placed in passageways, doorways, driveways, or any location where they could be displaced by any other work, unless they are protected by barricades or guards.

Ladder siderails must extend no less than 36 in. above a landing. When this is not practical, grabrails must be installed to provide a secure grip for anyone moving to or from the point of access.

Portable ladders must be tied at the top, blocked, and otherwise secured to prevent displacement.

Portable metal ladders may not be used for electrical work or where they might come in contact with electrical conductors.

7.2.1 JOB-MADE LADDERS

Job-made ladders must be constructed for a particular use. If a ladder provides the only means of access or exit from a working area for 25 or more employees, or simultaneous two-way traffic is expected, a double cleat ladder must be installed. However, double cleat ladders may not be more than 24 ft long.

In addition, single-cleat ladders may not be more than 24 ft long between base and top landing supports. If ladders connect different landings, or if the length required exceeds the 24-ft

maximum, two or more separate ladders must be used, offset with a platform from one ladder to the next. The exposed sides of the platform must have guardrails and toeboards.

Single-cleat ladders must be at least 16 in., but not more than 20 in., between rails at the top.

7.2.2 SIDERAILS

Lumber for siderails must be as specified in Table 7-1 and stamped with an American Lumber Standards Committee-approved grademark. The minimum fiber stress in bending for siderails must be 1,200 pounds per square inch.

Table 7-1 – Acceptable Stress-Grade Lumber for Job-Made Ladders[1]

Species Group	Minimum Grade[2]
Coastal Sitka spruce	Select structural[3f]
Douglas fir-larch	No. 2[3a,d,f]
Douglas fir-south	No. 2[3d]
Eastern hemlock-tamarack	No. 1[3a,b,f]
Eastern spruce	Select structural[3a,d]
Hem-fir	No. 1[3c,d,f]
Lodgepole pine	Select structural[3a,d]
Mountain hemlock	No. 1[3c,d,f]
Northern pine	No. 1[3a,b]
Ponderosa pine-sugar pine	Select structural[3d,f]
Red pine	Select structural[3f]
Sitka spruce	Select structural[3c]
Southern pine	No. 2[3e]
Spruce-pine-fir	Select structural[3f]
Western hemlock	No. 1[3c,d]

[1]Used at 19% maximum moisture content.
[2]Minimum fiber stress in bending f_b = 1200 lbf/in^2 [pound-force per square inch (psi)].
[3]All lumber shall be identified with the grademark of an ALSC- approved inspection agency under the rules set forth by the following rules-writing agencies:
[a]Northeastern Lumber Manufacturers Association
[b]Northern Hardwood and Pine Manufacturers Association
[c]Western Coast Inspection Bureau
[d]Western Wood Products Association
[e]Southern Pine Inspection Bureau
[f]National Lumber Grades Authority - Canada

For all finger-jointed lumber, if full-length rail members cannot be procured, structural finger-jointed lumber may be used. Finger-jointed lumber must be considered a solid piece and must be graded under the rules for lumber without finger joints. It must be ordered and invoiced as finger-jointed material. The joints must meet the requirements of *U.S. Department of Commerce Voluntary Product Standard PS 56-73 for Structural Glued Lamination Timber.* Adhesives must be classified for wet-use as specified in *PS 56-73.*

Because the load-carrying capacity of siderails is a function of the working length and pitch, these factors must be considered together. The minimum rail sizes for combinations of length and pitch for single-cleat ladders must comply with the specifications in Table 7-2. The rail sizes for double-cleat ladders must comply with the specifications in Table 7-3. Ladders may not be used at pitches flatter than 1 in 4, as shown in Figure 7-1.

Siderails should be continuous. Splices must develop the full strength of a continuous siderail of the same length.

Table 7-2 – Minimum Rail Size for Single-Cleat Ladders (Nominal-Dimension Lumber)

Working Length (feet)	Vertical	Pitch (H/L)[1]			
		1/10	1/8	1/6	1/4
12	2 x 4	2 x 4	2 x 4	2 x 4	2 x 4
14	2 x 4	2 x 4	2 x 4	2 x 4	2 x 4
16	2 x 4	2 x 4	2 x 4	2 x 4	2 x 6
18	2 x 4	2 x 4	2 x 4	2 x 6	2 x 6
20	2 x 4	2 x 4	2 x 6	2 x 6	2 x 6
22	2 x 4	2 x 6	2 x 6	2 x 6	2 x 6
24	2 x 4	2 x 6	2 x 6	2 x 6	2 x 6

[1]Pitch is defined as H, the horizontal distance from base of ladder to supporting surface, divided by working length L, length of rail from base to point of bearing at the top.

Table 7-3 – Minimum Rail Size for Double-Cleat Ladders (Nominal-Dimension Lumber)

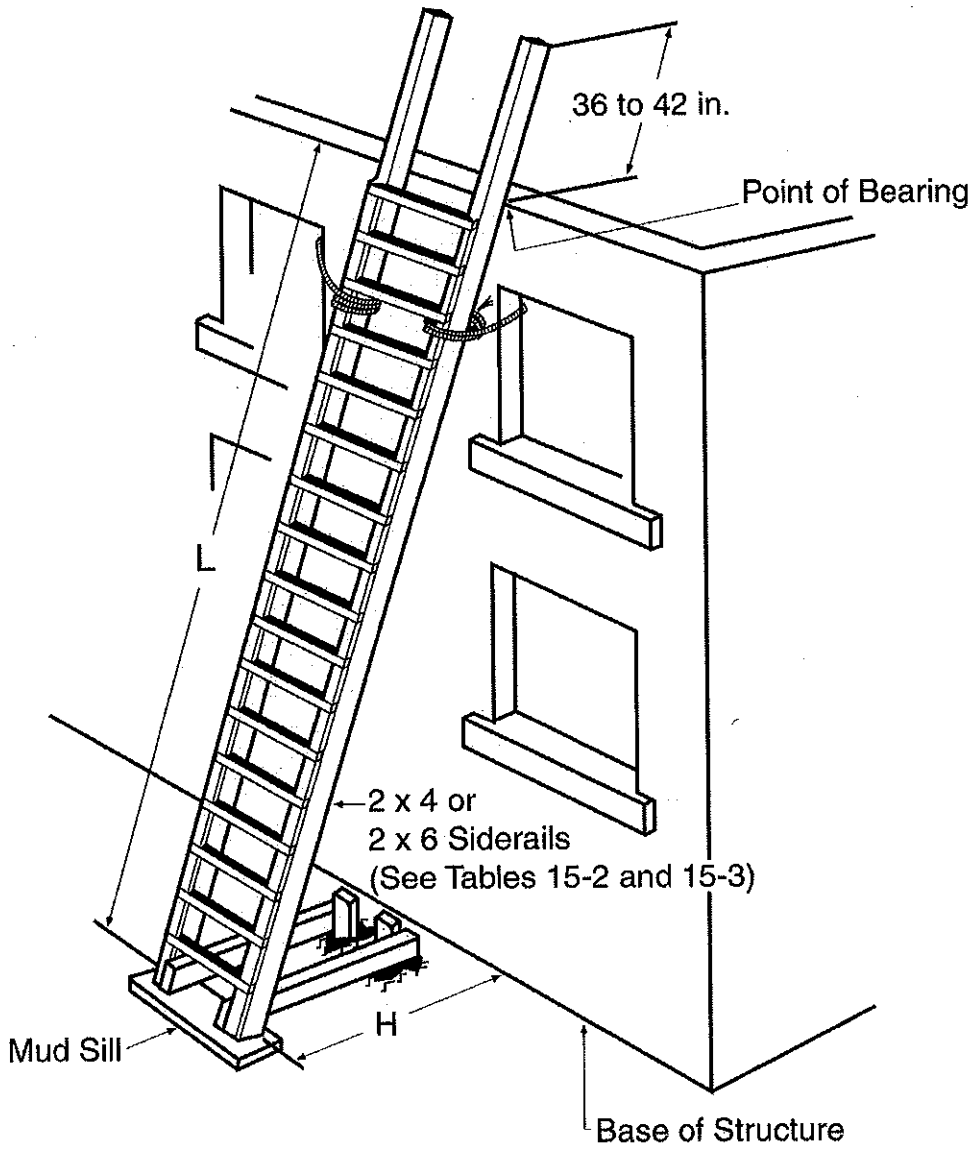
Working Length (feet)	Vertical	Pitch (H/L)[1]			
		1/10	1/8	1/6	1/4
12	2 x 4	2 x 4	2 x 4	2 x 4	2 x 4
14	2 x 4	2 x 4	2 x 4	2 x 4	2 x 6
16	2 x 4	2 x 4	2 x 6	2 x 6	2 x 6
18	2 x 4	2 x 6	2 x 6	2 x 6	2 x 6
20	2 x 4	2 x 6	2 x 6	2 x 6	--[2]
22	2 x 4	2 x 6	2 x 6	2 x 6	--[2]
24	2 x 4	2 x 6	2 x 6	2 x 6	--[2]

[1]Pitch is defined as H, the horizontal distance from base of ladder to supporting surface, divided by working length L, length of rail from base to point of bearing at the top.

[2]Stresses exceed capacity of 2 x 6 rails for this combination of height and pitch.

7.2.3 CLEATS

Because nominal 1 by 4 in. (0.75 in. by 3.5-in. actual) board material is not normally subject to stress-grade rules, it must be inspected at the site and must meet the following requirements.



Notes:

1. Rails shall extend at least 36 inches above point of bearing.
2. The top of the ladder shall be tied off as near the point of bearing as possible.
3. The base shall be secured against displacement.
4. The pitch, H divided by L, shall not exceed 1 in 4.
5. Security attachments shall be affixed directly to the rails and *not* to the cleats.

PCI/H&SM/LP

Figure 7-1 – Ladder Pitch

- Material relatively clear of knots must be used. Tight and sound knots 3/4 in. or less in diameter are permissible for the wide face, but not more than two per cleat span and no closer than 6 in. on center. Knots may not appear closer than 1 in. from the edges of the wide face.
- Edge knots are not permitted.
- The narrow face of ladder cleats must be free of spike knots.
- The slope of grain (deviation of the fiber direction from a line parallel to the sides of the piece) may not be steeper than 1 in 12.
- The wood species groups cited in Table 7-1 apply.

As an alternative, the nominal 2 by 4 in. (1.5 in. by 3.5 in. actual) stress-grade dimension lumber listed in Table 15-1 is acceptable cleat material. It need not be inspected at the site.

Wood cleats must be nominal 1 by 4 in. (1 x 4) site-inspected board material or nominal 2 by 4 in. (2 x 4) stress-grade dimension lumber. Each cleat must be continuous and extend the full width of double-cleat ladders. Cleats must be parallel and level when the ladder is in position.

Cleats must be attached to the narrow face of each rail using three 10d common nails for nominal 1 x 4 in. cleats or three 12d common nails for nominal 2 x 4 cleats. The nails must be staggered to reduce splitting.

Filler blocks the same thickness as the cleats must be inserted between cleats and butted tightly against the underside of each cleat. Filler blocks must be nominal 1 by 2 in. strips for 1 x 4 cleats and 2 by 2 in. strips for 2 x 4 cleats. Filler blocks must be attached using three 10d common nails for 1 by 2 in. strips or three 12d common nails for 2 by 2 in. strips while maintaining a 1-1/2 in. end distance for the top and bottom nails on filler blocks.

For those wood species with a high splitting tendency, lead holes must be predrilled in the cleats and filler blocks. A 1/8-in. diameter bit for 10d and 12d common nails should be used.

Dapping or cutting into the rails to house cleats is not permitted.

Cleats must be evenly spaced throughout the length of ladder from the base to the top point of bearing. Spacing, from top to top of cleats, must be 12 ±1/2 in.

7.3 SCAFFOLDING GENERAL REQUIREMENTS

This procedure identifies the safety requirements for scaffolding. It is applicable to all jobsites. The following general guidelines have been established. These guidelines do not include OSHA standards. Contractors are required to adhere to Subpart L should be familiar with the complete regulation.

The footing or anchorage for scaffolds must be sound, rigid, and capable of carrying the maximum intended load without settling or displacement. Unstable objects such as barrels, boxes, loose brick, or concrete blocks, may not be used to support scaffolds or planks. Scaffolds must be designed by a qualified person.

Scaffolds must be designed by a qualified person and constructed and loaded in accordance with that design. Scaffolds are erected, moved, dismantled, or altered only under the supervision and direction of a competent person qualified in scaffold erection, moving, dismantling, or alteration. Such activities are performed only by experienced and trained employees selected for such work by the competent persons.

Guardrails and toeboards must be installed on all open sides and ends of platforms more than 10 ft above the ground or floor level, except needle beam scaffolds and floats (see paragraphs 7.3.14 and 7.3.21). Each scaffold platform and walkway must be at least 18 in. wide.

Guardrails must be 2 x 4 in., or equivalent, approximately 42 in. high, with a midrail when required. Supports should be at intervals of not more than 8 ft. Toeboards must be a minimum of 3-1/2 in. high.

Where persons are required to work or pass under scaffolds, scaffolds must have a screen between the toeboard and the guardrail extending along the entire opening, consisting of No. 18 gauge U.S. Standard wire, 1/2-in. mesh or equivalent.

Scaffolds and scaffold components must be capable of supporting without failure their own weight and at least 4 times the maximum intended load.

Scaffolds and accessories, such as braces, brackets, trusses, screw legs, and ladders that have been damaged or weakened from any cause must be immediately repaired or replaced.

Load-carrying timber members of scaffold framing must be a minimum of 1,500 fiber (stress grade) construction grade lumber. Dimensions are nominal sizes as provided in the American Lumber Standards, except that where rough sizes are noted, only rough or undressed lumber of the size specified will satisfy minimum requirements.

Planking must be scaffold grade or equivalent, as recognized by approved grading rules for the species of wood used. The maximum spans for 2 x 10 or wider planking are shown in Table 7-4.

Table 7-4 – Maximum Permissible Spans of Planking

	Full Thickness Undressed Lumber			Nominal Thickness Lumber[1]	
Working load (psf)	25	50	75	25	50
Permissible span (ft)	10	8	6	8	6
[1]Nominal thickness lumber not recommended for heavy duty use.					

The maximum permissible span for 1-1/4 by 9 in. or wider plank of full thickness is 4 ft with medium duty loading of 50 pounds per square foot.

Platform planking must be overlapped a minimum of 12 in. or secured from movement.

Access ladders or equivalent safe access must be provided. (Cross-bracing is not permitted as a mean of access.)

Scaffold planks must extend over end supports no less than 6 in. and no more than 12 in.

Scaffold poles, legs, or uprights must be plumb and securely and rigidly braced to prevent swaying and displacement.

Overhead protection must be provided for workers on any scaffold exposed to overhead hazards.

Slippery conditions on scaffolds must be eliminated as soon as possible after they occur.

Welding, burning, riveting, or open flame work may not be performed on any staging suspended by fiber or synthetic ropes. Only treated or protected fiber or synthetic ropes may be used for or near work that uses corrosive substances or chemicals.

Specific requirements for boatswains' chairs and float or ship scaffolds are contained in paragraphs 7.3.10 and 7.3.21.

Wire, synthetic, or fiber rope used for scaffold suspension must support at least 6 times the rated load.

Scaffolds must be inspected by a competent person before each shift and after events which could affect scaffold capacity.

The use of shore or lean-to scaffolds is prohibited.

The lumber sizes stated in this procedure refer to nominal sizes, except where otherwise stated.

A competent person determines the feasibility and safety of providing fall protection for employees erecting or dismantling scaffolds.

7.3.1 POLE SCAFFOLDS

Scaffold poles must bear on a foundation of sufficient size and strength to spread the load from the pole over an area sufficiently large to prevent settlement. Poles must be set plumb.

If poles are spliced, the ends must be squared and the upper section set squarely on the lower section. Splice plates must be provided on at least two adjacent sides, not less than 4 ft long, must overlap the abutted ends equally, and must have the same width and not less than the cross-sectional area of the pole. Splice plates or other materials of equivalent strength may be used.

Independent pole scaffolds must be set as near to the wall of the building being worked on as practicable.

Pole scaffolds must be securely guyed or tied to the relevant building or structure. Where the height or length exceeds 25 ft, the scaffold must be secured at intervals not greater than 25 ft vertically and horizontally.

Putlogs or bearers must be set with the longer dimension vertical, long enough to project at least 3 in. over the ledgers of the inner and outer rows of poles for proper support.

Wooden putlogs on single-pole scaffolds must be reinforced with a steel strip 3/16 by 2 in., or equivalent, secured to the lower edge throughout the entire length.

Ledgers must extend over two pole spaces. They may be spliced between the poles. Ledgers must be reinforced by bearing blocks nailed securely to the sides of the poles to form the ledger support.

Diagonal bracing must be provided to prevent pole movement parallel with the wall of the building or pole buckling.

Cross bracing must be provided between the inner and outer sets of poles in independent pole scaffolds. The free ends of pole scaffolds must also be cross braced.

Full diagonal face bracing must be erected across the entire face of pole scaffolds in both directions. The braces must be spliced at the poles. The inner row of poles on medium- and heavy-duty scaffolds must also be braced.

The edges of platform planks must be close together to eliminate spaces through which tools or fragments of material could fall.

If planking is lapped, each plank must lap its end supports by at least 12 in. Where the ends of planks abut each other to form a flush floor, the butt joint must be at the centerline of a pole, and abutted ends must rest on separate bearers. Intermediate beams must be provided where necessary to prevent plank dislodgment from deflection, and their ends must also be secured to prevent dislodgment.

When a scaffold materially changes direction, the platform planks must be laid to prevent tipping. Planks that meet the corner putlog at an angle should be laid first and extend over the diagonally placed putlog far enough to provide a good safe bearing, but not far enough to incur danger from tipping. Planking running in the opposite direction at an angle should be laid to extend over and rest on the first layer of planking.

When moving platforms to the next level, the old platform must be left undisturbed until the new putlogs or bearers have been set in place and are ready to receive the platform planks.

Guardrails of no less than 2 x 4 in. lumber (or material providing equivalent protection), approximately 42 in. high, with a midrail of 1 by 6 in. lumber (or material providing equivalent protection), and toeboards must be installed at open sides and ends of scaffolds more than 10 ft above the ground or floor level. Toeboards must be a minimum of 4 in. high. Wire mesh must be installed in accordance with paragraph 15.3 when required.

Pole scaffolds 60 ft or less high must be constructed and erected in accordance with Tables 7-5 through 7-8. Pole scaffolds must be designed by a qualified engineer competent in the field and must be constructed and erected in accordance with such design.

Table 7-5 – Minimum Nominal Size and Maximum Spacing of Members of Single Pole Scaffolds – Light Duty

	Maximum Height of Scaffold	
	20 Ft	**60 Ft**
Uniformly distributed load	Not to exceed 25 psf	Not to exceed 25 psf
Poles or uprights	2 x 4 in.	4 x 4 in.
Pole spacing (longitudinal)	6 ft 0 in.	10 ft 0 in.
Maximum width of scaffold	5 ft 0 in.	5 ft 0 in.
Bearers or putlogs to 3 ft 0 in. width	2 x 4 in.	2 x 4 in.
Bearers or putlogs to 5 ft 0 in. width	2 x 6 in. or 3 x 4 in.	2 x 6 in. or 3 x 4 in. (rough)
Ledgers	1 x 4 in.	1-1/4 x 9 in.
Planking	1-1/4 x 9 in. (rough)	2 x 10 in.
Vertical spacing of horizontal members	7 ft 0 in.	9 ft 0 in.
Bracing, horizontal and diagonal	1 x 4 in.	1 x 4 in.
Tie-ins	1 x 4 in.	1 x 4 in.
Toeboards	4 in. high (minimum)	4 in. high (minimum)
Guardrail	2 x 4 in.	2 x 4 in.
All members except planking are used on edge.		

Table 7-6 – Minimum Nominal Size and Maximum Spacing of Members of Single Pole Scaffolds – Medium and Heavy Duty

	Type of Duty	
	Medium	**Heavy**
Uniformly distributed load	Not to exceed 50 psf	Not to exceed 75 psf
Maximum height of scaffold	60 ft	60 ft
Poles or uprights	4 x 4 in.	4 x 6 in.
Pole spacing (longitudinal)	8 ft 0 in.	6 ft 0 in.
Maximum width of scaffold	5 ft 0 in.	5 ft 0 in.
Bearers or putlogs	2 x 10 in. or 3 x 4 in.	2 x 10 in. or 3 x 5 in.
Spacing of bearers or putlogs	8 ft 0 in.	6 ft 0 in.
Ledgers	2 x 10 in.	2 x 10 in.
Vertical spacing of horizontal members	7 ft 0 in.	6 ft 6 in.
Bracing		
Horizontal	1 x 6 in. or 1-1/4 x 4 in.	2 x 4 in.
Diagonal	1 x 4 in.	2 x 4 in.
Tie-ins	1 x 4 in.	1 x 4 in.
Planking	2 x 10 in.	2 x 10 in.
Toeboards	4-in. high (minimum)	4-in. high (minimum)
Guardrail	2 x 4 in.	2 x 4 in.
All members except planking are used on edge.		

Table 7-7 – Minimum Nominal Size and Maximum Spacing of Members of Independent Pole Scaffolds – Light Duty

	Maximum Height of Scaffold	
	20 Ft	60 Ft
Uniformly distributed load	Not to exceed 25 psf	Not to exceed 25 psf
Poles or uprights	2 x 4 in.	4 x 4 in.
Pole spacing (longitudinal)	6 ft 0 in.	10 ft 0 in.
Pole spacing (transverse)	6 ft 0 in.	10 ft 0 in.
Ledgers	1-1/4 x 4 in.	1-1/4 x 9 in.
Bearers to 3 ft 0 in. span	2 x 4 in.	2 x 4 in.
Bearers to 10 ft 0 in. span	2 x 6 in. or 3 x 4 in.	2 x 10 (rough) or 3 x 8 in.
Planking	1-1/4 x 9 in. (rough)	2 x 10 in.
Vertical spacing of horizontal members	7 ft 0 in.	7 ft 0 in.
Bracing, horizontal and diagonal	1 x 4 in.	1 x 4 in.
Tie-ins	1 x 4 in.	1 x 4 in.
Toeboards	4 in. high	4 in. high (minimum)
Guardrail	2 x 4 in.	2 x 4 in.
All members except planking are used on edge.		

Table 7-8 – Minimum Nominal Size and Maximum Spacing of Members of Single Independent Scaffolds – Medium and Heavy Duty

	Type of Duty	
	Medium	Heavy
Uniformly distributed load	Not to exceed 50 psf	Not to exceed 75 psf
Maximum height of scaffold	60 ft	60 ft
Poles or uprights	4 x 4 in.	4 x 4 in.
Pole spacing		
Longitudinal	8 ft 0 in.	6 ft 0 in.
Transverse	8 ft 0 in.	8 ft 0 in.
Ledgers	2 x 10 in.	2 x 10 in.
Vertical spacing of horizontal members	6 ft 0 in.	6 ft 0 in.
Spacing of bearers	8 ft 0 in.	–
Bearers	2 x 10 in.	2 x 10 in. (rough)
Bracing		
Horizontal	1 x 6 in. or 1-1/4 x 4 in.	2 x 4 in.
Diagonal	1 x 4 in.	2 x 4 in.
Tie-ins	1 x 4 in.	1 x 4 in.
Planking	2 x 10 in.	2 x 10 in.
Toeboards	4-in. high (minimum)	4-in. high (minimum)
Guardrail	2 x 4 in.	2 x 4 in.
All members except planking are used on edge.		

7.3.2 TUBE AND COUPLER SCAFFOLDS

Light duty tube and coupler scaffolds must have posts, bearers, runners, and bracing of nominal 2-in. outside diameter steel tubing. The posts must be spaced no more than 6 ft apart by 10 ft along the length of the scaffold. Any other structural metals used must be designed to carry an equivalent load. Dissimilar metals may not be used together.

Medium duty and coupler scaffolds must have posts, runners, and bracing of nominal 2-in. outside diameter steel tubing. Posts spaced no more than 6 ft apart by 8 ft along the length of the scaffold must have bearers of nominal 2-1/2 in. outside diameter steel tubing. Posts spaced no more than 5 ft apart by 8 ft along the length of the scaffold must have bearers of nominal 2-in. outside diameter steel tubing. Other structural metals must be designed to carry an equivalent load. Dissimilar metals may not be used together.

Heavy duty tube and coupler scaffolds must have posts, runners, and bracing of nominal 2-in. outside diameter steel tubing, with the posts spaced no more than 6 ft by 6 ft-6 in. Other structural metals must be designed to carry an equivalent load. Dissimilar metals may not be used together.

Tube and coupler scaffolds must be limited in heights and working levels to those permitted in Table 7-9. Drawings and specifications of tube and coupler scaffolds above the limitations in those tables must be designed by a qualified engineer competent in this field.

Table 7-9 – Tube and Coupler Scaffolds – Light, Medium, and Heavy Duty

Type of Duty	Uniformly Distributed Load	Post Spacing (Longitudinal)	Post Spacing (Transverse)	Working Levels	Additional Planked Levels	Maximum Height
Light	Not to exceed 25 psf	10 ft 0 in.	6 ft 0 in.	1 2 3 4	16 11 6 1	125 ft 125 ft 125 ft 125 ft
Medium	Not to exceed 50 psf	8 ft 0 in.	6 ft 0 in.	1 2	11 1	125 ft 125 ft
Heavy	Not to exceed 75 psf	6 ft 6 in.	6 ft 0 in.	1	6	125 ft

Tube and coupler scaffolds must be constructed and erected to support 4 times the maximum intended loads, as set forth in Table 15-9, or as specified by a licensed professional engineer competent in this field.

Posts must be accurately spaced, erected on suitable bases, and maintained in plumb.

Runners must be erected along the scaffold length on both inside and the outside posts at even heights. Runners must be interlocked to inside and outside posts at even heights to form continuous lengths and must be coupled to each post. The bottom runners must be located as close to the base as possible. Runners must be placed not more than 6 ft-6 in. on centers.

Bearers must be installed transversely between posts and coupled securely to the posts bearing on the runner coupler. When coupled directly to the runners, the coupler must be placed as close to the posts as possible.

Bearers must be at least 4 in., but not more than 12 in., longer than the post spacing or runner spacing.

Cross bracing must be installed across the width of the scaffold at least every third set of posts horizontally and every fourth runner vertically. Such bracing must extend diagonally from the inner and outer runners upward to the next set of outer and inner runners.

Longitudinal diagonal bracing on the inner and outer rows of poles must be installed at an approximate 45-degree angle from near the base of the first outer post upward to the extreme top of the scaffold.

Where the longitudinal length of the scaffold permits, bracing must be duplicated starting at every fifth post. Similarly, longitudinal diagonal bracing must also be installed from the last post extending back and upward toward the first post. Where conditions preclude the attachment of such bracing to the posts, it may be attached to the runners.

The entire scaffold must be tied to and securely braced against the supporting building at intervals not to exceed 30 ft horizontally and 26 ft vertically.

Guardrails of no less than 2 x 4 in. lumber (or material providing equivalent protection), approximately 42 in. high, with a midrail of 1 by 6 in. lumber (or material providing equivalent protection), and toeboards must be installed at open sides and ends of scaffolds more than 10 ft above the ground or floor level. Toeboards must be a minimum of 4 in. high. Wire mesh must be installed in accordance with paragraph 7.3.

7.3.3 TUBULAR WELDED FRAME SCAFFOLDS

Metal tubular frame scaffolds, including accessories such as braces, brackets, trusses, screw legs, and ladders, must be designed, constructed, and erected to safely support 4 times the maximum rated load.

The spacing of panels or frames must be consistent with the loads imposed.

Scaffolds must be properly braced by cross-bracing or diagonal braces or both for securing vertical members together laterally, and the cross braces must be long enough to automatically square and align vertically.

Scaffold legs must be set on adjustable or plain bases placed on mud sills or other foundations adequate to support the maximum rated load.

The scaffold frames must be stacked one on top of another with coupling or stacking pins to provide proper vertical alignment of the legs.

Where uplift might occur, panels must be locked together vertically by pins or equivalent means.

Scaffolds must be secured to supporting buildings or structures at intervals not to exceed 30 ft horizontally and 26 ft vertically.

Maximum permissible spans or planking must conform to the requirements of Table 7-4.

Drawings and specifications for frame scaffolds more than 125 ft in height above baseplates must be designed by a registered professional engineer.

Guardrails of no less than 2 x 4 in. lumber (or material providing equivalent protection), approximately 42 in. high, with a midrail of 1 by 6 in. lumber (or material providing equivalent protection), and toeboards must be installed at open sides and ends of scaffolds more than 10 ft above the ground or floor level. Toeboards must be a minimum of 4 in. high. Wire mesh must be installed in accordance with paragraph 7.3.

7.3.4 MANUALLY PROPELLED MOBILE SCAFFOLDS

The height of free-standing mobile scaffold towers may not exceed 4 times the minimum base dimension.

Casters must be properly designed for strength and dimensions to support 4 times the maximum intended load. Casters must have a positive locking device to hold scaffolds in position.

Scaffolds must be properly braced using cross-bracing and horizontal bracing conforming with the requirements of paragraph 7.3.3.

Platforms must be tightly planked for the full width of the scaffold except for necessary entrance openings. Platforms must be secured in place.

A ladder or stairway must be provided for proper access and exit, affixed or built into the scaffold, and located so that it will not tend to tip a scaffold. Landing platforms must be provided at intervals not to exceed 35 ft.

The force necessary to move the mobile scaffold must be as close to the base as practicable. Provision must be made to stabilize the tower during movement from one location to another. Scaffolds must be moved only on level floors free of obstructions and openings.

Employees may not ride on manually propelled scaffolds.

Scaffolds in use must rest on a suitable footing and must stand plumb. The casters or wheels must be locked to prevent movement.

Mobile scaffolds constructed of metal members must also conform to applicable provisions of paragraphs 7.3.1, 7.3.2, and 7.3.3, depending on the materials of construction.

Guardrails of no less than 2 x 4 in. lumber (or material providing equivalent protection), approximately 42 in. high, with a midrail of 1 by 6 in. lumber (or material providing equivalent protection), and toeboards must be installed at open sides and ends of scaffolds more than 10 ft above the ground or floor level. Toeboards must be a minimum of 4 in. high. Wire mesh must be installed in accordance with paragraph 7.3.

7.3.5 ELEVATING AND ROTATING SCAFFOLDS

The applicable requirement of *ANSI A92.2-1969, Vehicle Mounted Elevating and Rotating Work Platforms, Section 15,* governs the design, construction, and use of elevating and rotating work platforms.

7.3.6 OUTRIGGER SCAFFOLDS

Outrigger beams must extend not more than 6 ft beyond the face of the supporting building. The inboard ends of outrigger beams, measured from the fulcrum point to anchorage point, may be not less than 1-1/2 times longer than the outboard ends. The beams must rest on edge, the sides must be plumb, and the edges must be horizontal. The fulcrum point of the beam must rest on a secure bearing at least 6 in. in length and width. Each beam must be secured in place against movement and be securely braced against tipping at the fulcrum point.

The inboard ends of outrigger beams must be securely anchored by struts bearing against sills touching the overhead ceiling beams or by tension members secured to the floor joists underfoot or by both, if necessary. The inboard ends of outrigger beams must be secured against tipping and the entire supporting structure securely braced in both directions to prevent horizontal movement.

Unless outrigger scaffolds are designed by a registered professional engineer competent in this field, they must be constructed and erected in accordance with Table 7-10. Outrigger scaffolds designed by a registered professional engineer must be constructed and erected in accordance with such design.

Table 7-10 – Minimum Nominal Size and Maximum Spacing of Members of Outrigger Scaffolds

Maximum Scaffold Load	Light Duty (25 psf)	Medium Duty (50 psf)
Outrigger size	2 x 10 in.	3 x 10 in.
Maximum outrigger spacing	10 ft 0 in.	6 ft 0 in.
Planking	2 x 10 in.	2 x 10 in.
Guardrail	2 x 4 in.	2 x 4 in.
Guardrail uprights	2 x 4 in.	2 x 4 in.
Toeboards	4 in. (minimum)	4 in. (minimum)

Planking must be laid tight, extend to within 3 in. of building walls, and be secured to beams.

Guardrails of no less than 2 x 4 in. lumber (or material providing equivalent protection), approximately 42 in., with a midrail of 1 by 6 in. lumber (or material providing equivalent protection), and toeboards must be installed at open sides and ends of scaffolds more than 10 ft above the ground or floor level. Toeboards must be a minimum of 4 in. high. Wire mesh must be installed in accordance with paragraph 15.3.

A Masons' adjustable multiple-point suspension scaffold must be capable of sustaining a working load of 50 pounds per square foot and may not be loaded in excess of that figure. The scaffold must be provided with hosting machines that meet the requirements of Underwriters' Laboratories or Factory Mutual Engineering Corporation.

The platform must be supported by wire ropes capable of supporting at least 6 times the intended load, suspended from overhead outrigger beams. The scaffold outrigger beams must consist of structural metal securely fastened or anchored to the frame or floor system of the building or structure.

Each outrigger beam must be equivalent in strength to at least a standard 7-in., 15.3 pounds steel I-beam, at least 15 ft long, and may not project more than 6 ft-6 in. beyond the bearing point.

When an overhang exceeds 6 ft by 6 in., outrigger beams must be composed of stronger beams or multiple beams and must be installed under the supervision of a competent person. Outrigger beams must be set and maintained with webs vertically positioned.

A stop bolt must be placed at each end of every outrigger beam, and the outrigger beam must rest on suitable wood bearing blocks.

The free end of suspension wire ropes must be equipped with properly sized thimbles, secured through splicing or equivalent means. The running ends must be securely attached to the hoisting drum. At least four turns of wire rope must remain on the drum at all times. The use of fiber rope is prohibited.

If a single outrigger beam is used, the steel shackles or clevises with which the wire ropes are attached to the outrigger beams must be placed directly over the hoisting drums.

The scaffold platform must be equal in strength to at least 2-in. planking. For maximum planking spans, see paragraph 7.3.

When employees are working on a scaffold and an overhead hazard exists, the scaffold must have overhead protection not more than 9 ft above the platform, consisting of 2-in. planking (or material of equal strength), laid tight and extending not less than the width of the scaffold.

Each scaffold must be installed or relocated under the supervision of a competent person.

Guardrails of no less than 2 x 4 in. lumber (or material providing equivalent protection), approximately 42 in. high, with a midrail and toeboards must be installed at open sides and ends of scaffolds more than 10 ft above the ground or floor level. Toeboards must be a minimum of 4 in. high. Wire mesh must be installed in accordance with paragraph 7.3.

7.3.7 SWINGING SCAFFOLDS TWO-POINT SUSPENSION

Two-point suspension scaffold platforms may be not less than 20 in. or more than 36 in. wide overall. Each platform must be securely fastened to its hangers by U-bolts or by other equivalent means.

The hangers for two-point suspension scaffolds must be made of mild steel or equivalent material, having a cross-sectional area capable of sustaining 4 times the maximum rated load and designed with a support for the guardrail, intermediate rail, and toeboard.

When hoisting machines are used on two-point suspension scaffolds, such machines must be of a design tested and approved by Underwriters' Laboratories or Factory Mutual Engineering Corporation.

Roof irons or hooks must be of mild steel or equivalent material of proper size and design, securely installed and anchored. Tiebacks of 3/4-in. manila rope, or equivalent, must serve as a secondary anchorage, installed at right angles to the building face, whenever possible, and secured to a structurally sound part of the building.

Two-point suspension scaffolds must be suspended by wire, synthetic, or fiber ropes capable of supporting at least 6 times the rated load. Other components must be capable of supporting at least 4 times the rated load.

The sheaves of blocks, consisting of at least one double and one single block, must fit the size and type of rope used.

Wire ropes, fiber and synthetic ropes, slings, hangers, platforms, and other supporting parts must be inspected before each installation. Scaffolds must be periodically inspected while in use.

No more than 2 men are permitted to work at one time on suspension scaffolds designed for a working load of 500 lb. No more than 3 men are permitted to work at one time on suspension scaffolds with a working load of 750 lb. Each employee must be protected by a personal fall arrest system securely attached to substantial members of the structure (not the scaffold) or attached to securely rigged lines that will safely suspend the employee in case of a fall. The attachment point of the lifeline should be changed, as appropriate, as work progresses.

Two-point suspension scaffolds must be securely lashed to the building or structure to prevent swaying. Window cleaners' anchors may not be used for this purpose.

The platform of a two-point suspension scaffold must be one of the following types:

- **Ladder-Type Platforms**. The side stringer must be of clear straight-grained spruce or material of equal strength and durability. The rungs must be of straight-grained oak, ash, or hickory, at least 1-1/8 in. in diameter, with 7/8-in. tenons mortised into the side stringers to a depth of at least 7/8-in. The stringers must be tied together with tie rods not less than 1/4-in. in diameter, passing through the stringers and riveted tight against washers on both ends. The flooring strips must be spaced not more than 5/8-in. apart, except at the side rails where the spacing may be 1 in. Ladder platforms must be constructed in accordance with Table 7-11.

- **Plank-Type Platforms**. These platforms must be composed of nominal 2 x 10 in. or larger unspliced planks, properly cleated together on the underside, starting 6 in. from each end at intervals not to exceed 4 ft.

- Plank platforms may not extend more than 12 in. beyond hangers. A bar or other effective means must be securely fastened to a platform at each end. The span between hangers for plank platforms may not exceed 8 ft.

Table 7-11 – Schedule for Ladder-Type Platforms

	Length of Platform (ft)				
	12	14 and 16	18 and 20	22 and 24	28 and 30
Side stringers, minimum cross section (finished sizes)					
At ends (in.)	1-3/4 x 2-3/4	1-3/4 x 2-3/4	1-3/4 x 3	1-3/4 x 3	1-3/4 x 3-1/2
At middle (in.)	1-3/4 x 3-3/4	1-3/4 x 3-3/4	1-3/4 x 4	1-3/4 x 4-1/4	1-3/4 x 5
Reinforcing strip (minimum)[1]					
Rungs[2]					
Tie rods					
Number (minimum)	3	4	4	5	6
Diameter (minimum)	1/4 in.	1/4 in.	1/4 in.	1/4 in.	1/4 in.
Flooring, minimum finished size (in.)	1/2 x 2-3/4	1/2 x 2-3/4	1/2 x 2-3/4	1/2 x 2-3/4	1/2 x 2-3/4

[1]A 1/8 x 7/8 in. steel reinforcing strip or its equivalent shall be attached to the side or underside, full length.

[2]Rungs shall be 1-1/8-in. minimum diameter with at least 7/8-in. diameter tenons, and the maximum spacing shall be 12 inches center to center.

- **Beam-Type Platforms.** These platforms must have side stringers of lumber not less than 2 x 6 in. set on edge. The span between hangers may not exceed 2 ft when beam platforms are used. The flooring must be supported on 2 x 6 in. crossbeams laid flat and set into the upper edge of the stringers with a snug fit. The following must be supported by cross beams at intervals of not more than 4 ft and securely nailed in place. The flooring must be of 1 x 6 in. material properly nailed. Floorboards may not be spaced more than 1/2 in. apart.

- **Light Metal-Type Platforms**. These platforms must be tested and listed according to Underwriters' Laboratories or Factory Mutual Engineering Corporation.

Guardrails of lumber no less than 2 x 4 in. (or material providing equivalent protection), approximately 42 in. high, with a midrail and toeboards, must be installed at open sides and ends of scaffolds more than 10 ft above the ground or floor level. Toeboards must be a minimum of 4 in. high. Wire mesh must be installed in accordance with paragraph 7.3.

7.3.8 STONE SETTERS' ADJUSTABLE MULTIPLE-POINT SUSPENSION SCAFFOLDS

These scaffolds must be capable of sustaining a working load of 25 pounds per square foot and must not be overloaded. Scaffolds may not be used for storage of stone or other heavy materials.

The hoisting machine and its supports must be of a type tested and listed by Underwriters' Laboratories or Factory Mutual Engineering Corporation.

The scaffold platform must be securely fastened to its hangers by U-bolts or equivalent means. For materials and spans, see Table 7-4. The scaffold unit must be suspended from metal outriggers, iron brackets, wire rope slings, or iron hooks.

Outriggers must be set with webs vertically positioned, securely anchored to the building or structure, and provided with stop bolts at each end.

The scaffold must be supported by wire rope capable of supporting at least 6 times the rated load. Other components must be capable of supporting at least 4 times the rated load.

The free ends of the suspension wire ropes must be equipped with properly sized thimbles, secured by splicing or equivalent means. The running ends must be securely attached.

When two or more scaffolds are used on a building or structure, they may not be bridged one to the other, but must be maintained at even height with their platforms abutting closely.

Guardrails of no less than 2 x 4 in. lumber (or material providing equivalent protection), approximately 42 in. high, with a midrail and toeboards, must be installed at the open sides and ends of scaffolds more than 10 ft above the ground or floor level. Toeboards must be a minimum of 4 in. high. Wire mesh must be installed in accordance with paragraph 7.3.

A personal fall arrest system must also be used.

7.3.9 SINGLE-POINT ADJUSTABLE SUSPENSION SCAFFOLDS

These scaffolds, including power units or manually operated winches, must be of a type tested and listed by Underwriters' Laboratories or Factory Mutual Engineering Corporation.

The power units may be electrically or air motor driven. Gasoline-powered equipment hoists may not be used. All power operated gears and brakes must be enclosed.

In addition to the normal operating brake, power driven units must have an emergency brake that engages automatically when the normal speed of descent is exceeded.

All hoisting machines, cables, and equipment must be regularly serviced and inspected.

These units may be combined to form a two-point suspension scaffold. Such scaffold must comply with the requirements of paragraph 7.3.7.

The supporting cable must be vertical for its entire length, and the basket may not be swayed or the cable fixed to any intermediate points to change the original path of travel.

Suspension methods must conform to applicable provisions of paragraphs 7.3.6 and 7.3.7.

Guards, midrails, and toeboards must completely enclose the cage or basket. Guardrails must be no less than 2 x 4 in. or equivalent and approximately 42 in. above the platform. Midrails shall be 1 x 6 in. or equivalent and installed equidistant between the guardrail and the platform. Toeboards must be a minimum of 4 in. high.

For additional details not covered in this paragraph, applicable technical portions of *ANSI A120.1-1970, Power-Operated Devices for Exterior Building Maintenance Powered Platforms,* should be used.

7.3.10 BOATSWAINS' CHAIRS

Chair seats must not be less than 12 by 34 in. and 1-in. thick. Seat must be reinforced on the underside by cleats securely fastened to prevent splitting.

Two-fiber rope seat slings must have a 5/8-in. diameter, reeved through the 4 seat holes so as to cross each other on the underside of the seat.

When the person using the chair is performing a heat-producing process, such as gas or arc welding, seat slings must be of at least 3/8-in. wire rope.

Each employee using a boatswain's chair must be protected by a personal fall arrest system, in accordance with the Fall Protection Policy (section 4) of this manual. The attachment point of the lifeline to the structure must be appropriately changed as work progresses.

The tackle must consist of correctly sized ball bearing or bushed blocks and must be properly spliced, 5/8-in. diameter, first grade manila rope or equivalent.

The roof irons, hooks, or objects to which the tackle is anchored must be securely installed. Tiebacks, when used, must be installed at right angles to the face of the building and must be securely fastened.

7.3.11 CARPENTERS' BRACKET SCAFFOLDS

The brackets for these scaffolds must consist of a triangular wood frame not less than 2 x 3 in. in cross-section or of metal of equivalent strength. Each member must be properly fitted and securely joined.

Each bracket must be attached to the structure using one of the following methods.

- A bolt with a diameter no less than 5/8 in. extending through to the inside of the building wall
- A metal stud attachment
- Welding to steel tanks
- Hooking over a well-secured supporting member of adequate strength

The brackets must be spaced no more than 8 ft apart.

No more than 2 employees may occupy any given 8 ft of a bracket scaffold at any one time. Tools and materials may not exceed 75 lb in addition to the weight of the scaffold occupants.

The platform must consist of no less than two 2 x 10 in. nominal size planks extending not more than 12 in. or less than 6 in. beyond each end support.

Guardrails of no less than 2 x 4 in. lumber or material providing equivalent protection, approximately 42 in. high, with a midrail of 1 x 6 in. lumber or material providing equivalent protection, and toeboards must be installed at open sides and ends on scaffolds more than 10 ft

above the ground or floor level. Toeboards must be a minimum of 4 in. high. Wire mesh must be installed in accordance with paragraph 7.3.

7.3.12 BRICKLAYERS' SQUARE SCAFFOLDS

The squares of these scaffolds must not exceed 5 ft in width and 5 ft in height.

The scaffold members may not be less than those specified in Table 7-12.

Table 7-12 – Dimensions for Bricklayers' Square and Horse Scaffold Members

Members	Scaffold Types and Dimensions (in.)	
	Bricklayers' Square	Horse
Bearers or horizontal	2 x 6	3 x 4
Legs	2 x 6	1-1/4 x 4-1/2
Braces at corners	1 x 6	-
Braces diagonally from center frame	1 x 8	-
Longitudinal brace between legs	-	1 x 6
Gusset brace at top of legs	-	1 x 8
Half diagonal braces	-	1-1/4 x 4-1/2

The squares must be reinforced on both sides of each corner with 1 x 6 in. gusset pieces. The square must also have diagonal braces 1 x 8 in. on both sides, running from center to center of each member, or other means to secure equivalent strength and rigidity.

The squares must be set no more than 5 ft apart for medium duty scaffolds and no more than 8 ft apart for light duty scaffolds. Bracing, 1 x 8 in. extending from the bottom of each square to the top of the next square, must be provided on both front and rear of the scaffold.

Platform planks must be at least 2 x 10 in. nominal size. The ends of the planks must overlap the bearers of the squares and each plank must be supported by not less than three squares.

Bricklayers' square scaffolds may not exceed 3 tiers in height and must be so constructed and arranged so that one square rests directly above another. The upper tiers must stand on a continuous row of planks laid across the next lower tier and be nailed down or otherwise secured to prevent displacement.

Scaffolds must be level and rest on a firm foundation.

7.3.13 HORSE SCAFFOLDS

Horse scaffolds may not be arranged using more than 2 tiers or constructed more than 10 ft high.

The members of the horses may be not less than those specified in Table 7-12.

Horses must be spaced no more than 5 ft apart for medium duty and no more than 8 ft apart for light duty.

If arranged in tiers, each horse must be placed directly over the horse in the tier below.

On all tiered scaffolds, the legs must be nailed down or otherwise secured to the planks to prevent displacement or thrust, and each tier must be substantially cross braced.

Weak or defective horses or parts of horses may not be used.

Guardrails of no less than 2 x 4 in. natural lumber (or material providing equivalent protection), approximately 42 in. high, with a midrail of 1 x 6 in. lumber (or material providing equivalent protection), and toeboards must be installed at open sides and ends on scaffolds more than 10 ft above the ground or floor level. Toeboards must be a minimum of 4 in. high. Wire mesh must be installed in accordance with paragraph 7.3.

7.3.14 NEEDLE BEAM SCAFFOLD

Wood needle beams may be not less than 4 x 6 in. in size, with the greater dimension being the vertical. Metal beams or equivalent, conforming to paragraph 7.3.7 and Table 7-4, may be used but may not be altered or moved horizontally while in use.

Ropes or hangers must be provided for all scaffold supports. The span between supports on the needle beam must not exceed 10 ft for timbers 4 x 6 in. Rope supports must be equal in strength to 1-in. diameter, first grade manila rope.

The ropes must be attached to needle beams using a scaffold hitch or eye splice. The loose end of the rope must be tied in a bowline knot or in a round turn and a half hitch.

The scaffold hitch must be arranged to prevent the needle beam from rolling or otherwise being displaced.

The platform span between the needle beams may not exceed 8 ft when using 2-in. scaffold planking. For spans greater than 8 ft, platforms must be designed based on design requirements for each span. The overhang of each end of platform planks may not be less than 6 in. and not more than 12 in.

If needle beam scaffolds are used, the planks must be secured against slipping.

Unattached tools, bolts, and nuts used on needle beam scaffolds must be kept in suitable, properly secured containers.

One end of a needle beam scaffold may be supported by a permanent structural member conforming to the provision of paragraph 7.3.8 and Table 7-4.

Each employee working on a needle beam scaffold must be protected by a personal fall arrest system in accordance with section 4, Fall Protection, of this manual.

7.3.15 PLASTERERS', DECORATORS', AND LARGE AREA SCAFFOLDS

Plasterer, lathers, and ceiling workers' platforms inside scaffolds must be constructed in accordance with the general requirements set forth for independent wood pole scaffolds (see paragraph 7.3.1 and Tables 7-7 and 7-8).

Platform planks must be laid with the edges close together.

When independent pole scaffold platforms are erected in sections, each section must have connecting runways equipped with substantial guardrails.

Guardrails of no less than 2 x 4 in. lumber (or material providing equivalent protection), approximately 42 in. high, with a midrail of 1 x 6 in. lumber or material providing equivalent protection, and toeboards must be installed on open sides and ends of scaffolds more than 10 ft above the ground or floor level. Toeboards must be a minimum of 4 in. high. Wire mesh must be installed in accordance with paragraph 7.3.

7.3.16 INTERIOR HUNG SCAFFOLDS

Interior hung scaffolds must be hung or suspended from roof structures or ceiling beams.

The suspending wire or fiber rope must be capable of supporting at least 6 times the rated load. The rope must be wrapped at least twice around the supporting member and twice around the scaffold bearers, with each end of the wire rope secured by at least 3 standard wire-rope clips.

For hanging wood scaffolds, the following minimum nominal size material must be used.

- Supporting bearers 2 x 10 in. on edge
- Planking 2 x 10 in., with maximum spans of 7 ft for heavy duty and 10 ft for light or medium duty

Steel tube and coupler members may be used for hanging scaffolds with both types of scaffolds designed to sustain a uniform distributed working load up to heavy duty scaffold loads with a safety factor of 4.

Guardrails of no less than 2 x 4 in. lumber (or material providing equivalent protection), approximately 42 in. high, with a midrail of 1 x 6 in. lumber (or other material providing equivalent protection), and toeboards must be installed at open sides and ends on scaffold more than 10 ft above the ground or floor level. Toeboards must be a minimum of 4 in. high. Wire mesh must be installed in accordance with paragraph 7.3.

7.3.17 LADDER JACK SCAFFOLDS

Ladder jack scaffolds are limited to light duty and may not exceed a height of 20 ft above the floor or ground level.

Ladders used with ladder jack scaffolds must be heavy-duty and designed and constructed in accordance with *ANSI A14.1-1968, Safety Code for Portable Wood Ladders, and A14.2-1968, Safety Code for Portable Metal Ladders*. Cleated ladders may not be used for this purpose.

Ladder jacks must be designed and constructed to bear on siderails and ladder rungs. If bearing on rungs only, the bearing area must be at least 10 in. on each rung.

Ladders used with ladder jacks must be placed, fastened, held, or equipped with devices to prevent slipping.

The wood platform planks may be not less than 2 in. (nominal) in thickness. Both metal and wood platform planks must overlap the bearing surface by not less than 12 in. The span between supports for wood may not exceed 8 ft. Platforms may not be less than 18 in. wide.

No more than two employees may occupy any given 8 ft of any ladder jack scaffold at any time.

7.3.18 WINDOW JACK SCAFFOLDS

Window jack scaffolds may be used only for work at window openings through which the jack is placed.

Window jacks may not be used to support planks placed between one window jack and another or for other elements of scaffolding.

Window jack scaffolds must be provided with guardrails, unless a personal fall arrest system is attached and provided for the employee on the scaffold run on.

No more than one employee may occupy a window jack scaffold at any time.

7.3.19 ROOFING BRACKETS

Roofing brackets must be constructed to fit the pitch of the roof being worked on. Brackets must be secured by nails and pointed metal projections. If it is impractical to nail brackets, rope supports may be used. If rope supports are used, they must consist of first grade manila rope of at least 3/4-in. diameter or equivalent.

A catch platform must be installed below the working area of roofs more than 16 ft from the ground to the lowest point of the eaves with a slope greater than 4 in. in 12 in. without a parapet. The platform must extend 2 ft in width beyond the protection of the eaves and be provided with a guardrail, midrail, and toeboard. This provision does not apply if employees engaged in work on such roofs are protected by safety belts attached to lifelines.

7.3.20 CRAWLING BOARDS OR CHICKEN LADDERS

Crawling boards may not be less than 10 in. wide and 1 in. thick, with cleats 1 x 1-1/2 in. The cleats must be equal in length to the width of the board, spaced at equal intervals not to exceed 24 in. Nails must be driven through the board and clinched on the underside. A crawling board must extend from the ridgepole to the eaves when used in connection with roof construction, repair, or maintenance.

A firmly fastened lifeline of at least 3/4-in. diameter rope, or equivalent, must be strung beside each crawling board for use as a handhold.

Crawling boards must be secured to roofs by using ridge hooks or other effective means.

7.3.21 FLOAT OR SHIP SCAFFOLDS

Float or ship scaffolds must not be used to support more than 3 men and a few light tools. They must be constructed in accordance with the provisions of this paragraph, unless substitute designs and materials provide equivalent strength, stability, and safety.

Platforms may not be less than 3 ft wide and 6 ft long, made of 3/4-in. plywood equivalent to American Plywood Association Grade B-B, Group 1, exterior, or other similar material.

There must be two supporting bearers under the platform made from 2 x 4 in. or 1 x 10 in. rough, selected lumber or better. The bearers must be free of knots or other flaws and project 6 in. beyond the platform on both sides. The ends of the platform must extend 6 in. beyond the outer edges of the bearers. Each bearer must be securely fastened to the platform.

An edging of wood not less than 3/4 x 1-1/2 in. or equivalent must be placed around the sides of the platform to prevent tools from rolling off.

Supporting ropes must be 1-in. diameter manila rope or equivalent and must be free from deterioration, chemical damage, flaws, or other imperfections. Rope connections must ensure that a platform cannot shift or slip. If two ropes are used with each float, they must be arranged to provide four ends that can be securely fastened to an overhead support. Each supporting rope must be hitched around one end of bearer and pass under the platform to the other end of the bearer to be hitched again, leaving sufficient rope at each end for the supporting ties.

Each employee must be protected by a personal fall arrest system, in accordance with section 4, Fall Protection, of this manual.

7.3.22 FORM SCAFFOLDS

Form scaffolds must be constructed of wood or other suitable materials, such as steel or aluminum members of known strength characteristics. Scaffolds must be designed and erected with a minimum safety factor of 4, computed on the basis of the maximum rated load.

Scaffold planking must be a minimum of 2 x 10-in. (nominal) scaffold grade, as recognized by approved grading rules for the species of lumber or equivalent material used.

Maximum permissible spans may not exceed 8 ft on centers for 2 x 10 in. nominal planking. Scaffold planks must be nailed or bolted to the ledgers or of such length that they overlap the ledgers by at least 6 in. Unsupported projecting ends of scaffolding planks are limited to a maximum overhang of 12 in.

Scaffolds may not be loaded in excess of the working load for which they are designed.

Figure-four form scaffolds are intended for light duty and may not be used to support loads exceeding 25 pounds per square foot, unless specifically designed for heavier loading. For minimum design criteria, see Table 7-13.

Table 7-13 – Minimum Design Criteria for Figure-Four, Metal Bracket, and Wooden Bracket Form Scaffolds

Members	Scaffold Types and Dimensions		
	Figure-Four	Metal Bracket	Wooden Bracket
Uprights	2 x 4 in. or 2 x 6 in.	2 x 4 in.	2 x 4 in. or 2 x 6 in.
Outriggers ledgers (two)	1 x 6 in.	–	–
Braces	1 x 6 in.	–	1 x 6 in.
Guardrails	2 x 4 in.	2 x 4 in.	2 x 4 in.
Height	Approximately 42 in.	Approximately 42 in.	Approximately 42 in.
Intermediate	1 x 6 in.	1 x 6 in.	1 x 6 in.
Toeboards (minimum)	4 in.	4 in.	4 in.
Length of ledgers (maximum)	3 ft 6 in. (unsupported)	–	–
Planking	2 x 10 in.	2 x 9 in.	–
Upright spacing (on centers)	8 ft 0 in.	–	8 ft 0 in.
Support ledgers	–	–	2 x 6 in.
Maximum scaffold width	–	–	3 ft 6 in.

Figure-four form scaffold frames must be spaced no more than 8 ft on centers and constructed from sound lumber, as follows:

- The outrigger ledger must consist of 2 pieces of 1 x 6 in. or heavier material nailed on opposite sides of the vertical form support.
- Ledgers may not project more than 3 ft 6 in. from the outside of the form support and must be substantially braced and secured to prevent tipping or turning.
- The knee or angle of approximately 45 degrees and the lower ends must be of such length that they extend at least 6 in. beyond ledgers at each end, unless secured to the ledgers.
- When planks are nailed or bolted to the ledgers, a wood filler strip must be used between the ledgers.
- Unsupported projecting ends of planks are limited to a maximum overhang of 12 in.

7.3.22.1 METAL BRACKET FORM SCAFFOLDS

Metal brackets or scaffold jacks that are integral to a form must be securely bolted or welded to the form. Folding brackets must be bolted or secured with a locking pin when extended for use.

Clip-on or hook-over brackets may be used, provided form walers are bolted to the form or secured by snap ties or shear-bolts extending through the form and securely anchored.

Metal brackets must be spaced no more than 8 ft on centers.

Scaffold planks must be bolted to the metal brackets or of such length that they overlap the brackets at each end by at least 6 in. Unsupported projecting ends of scaffold planks are limited to a maximum overhang of 12 in.

Metal bracket form scaffolds must be equipped with wood guardrails, intermediate rails, toeboards, and scaffold planks meeting the minimum dimensions shown in Table 7-13. Metal may be substituted for wood, if it affords equal or greater design strength.

7.3.22.2 WOOD BRACKET FORM SCAFFOLDS

Wood bracket form scaffolds must be integral to the form panel. The minimum design criteria set forth herein and in Table 7-13 cover scaffolding intended for light duty and may not be used to support loads exceeding 25 pounds per square foot, unless specifically designed for heavier loading.

Scaffold planks must be nailed or bolted to the ledgers or of such length that they overlap the ledgers at each end by at least 6 in. Unsupported projecting ends of scaffold planks are limited to a maximum overhang of 12 in.

Guardrails and toeboards must be installed on all open sides and ends of platforms and scaffolding over 10 ft above floor or ground level. Guardrails must be of lumber 2 x 4 in. (nominal dimension) or material providing equivalent protection, approximately 42 in. high, supported at intervals not to exceed 8 ft. Guardrails must be equipped with midrails of 1 x 6-in. nominal lumber or material providing equivalent protection. Toeboards must be no less than 4 in. high.

7.3.23 PUMP JACK SCAFFOLDS

Pump jack scaffolds must:

- Not carry a working load exceeding 500 lb
- Be capable of supporting without failure at least 4 times the maximum intended load
- Not be loaded in excess of the manufacturer's recommended limits for manufactured components

Pump jack brackets, braces, and accessories must be fabricated from metal plates and angles. Each pump jack bracket must have two positive gripping mechanisms to prevent failure or slippage.

The platform bracket must be fully decked and the planking secured. Planking, or equivalent, must conform to the provisions of subsection 7.3, Scaffolding General Requirements.

If wood scaffold planks are used as platforms, poles used for pump jacks must not be spaced more than 10 ft center-to-center. Fabricated platforms must fully comply with the other provisions of this paragraph. Pole spacing exceeding 20 ft center-to-center may be used.

- Poles may not exceed 30 ft in height.
- Poles must be secured to the work wall using rigid triangular bracing, or equivalent, at the bottom, top, and other points as necessary to provide a maximum vertical spacing of no more than 10 ft between braces. Each brace must be capable of supporting a minimum tension or compression of 225 lb.

- For the pump jack bracket to pass bracing already installed, an extra brace must be used approximately 4 ft above the one to be passed until the original brace is reinstalled.

Poles must bear on mud sills or other adequate firm foundations.

Pole lumber must be two 2 x 4, of Douglas fir or equivalent, straight-grained, clear and free of cross-grain, shakes, large, loose, or dead knots, and other defects that might impair strength.

When poles are constructed of two continuous lengths, they must be 2 x 4 spiked together with the seam parallel to the bracket and with 10d common nails no more than 12 in. center-to-center, staggered uniformly from opposite outside edges.

If 2 x 4 are spliced to make up the pole, the splices must be constructed to develop the full strength of the member.

A ladder, in accordance with subsection 7.2 of this manual, must be provided for access to the platform during use.

No more than 2 persons are permitted at one time on a pump jack scaffold between any two supports.

Pump jacks scaffolds must have standard guardrails, but no guardrail is required when safety belts with lifelines are provided for employees using scaffolds.

If a work bench is used at an approximate height of 42 in., the top guardrail may be eliminated if the work bench is fully decked and the planking secured and capable of withstanding 200-lb pressure in any direction.

Employees are not permitted to use a work bench as a scaffold platform.

SECTION 8
EXCAVATION AND TRENCHING

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EXCAVATION AND TRENCHING

8.1 EXCAVATIONS

All excavations and trenching performed on Teal Construction sites must conform to applicable OSHA standards and to the safety policies and procedures in this manual.

8.1.1 INSPECTIONS

Contractor's competent person must be on site and be designated in writing with review by the Teal Site Manager upon request. Contractors are required to conduct daily inspections of excavations and trenches, made by a designated competent person. If evidence of potential cave-ins, slides, or water accumulation is found, all work in the excavation or trench must cease until the necessary precautions have been taken to safeguard employees.

All excavations and trenches must be inspected by a designated competent person after every rainstorm or other hazard-increasing occurrence, and safeguards against slides and cave-ins must be increased, if warranted.

Refer to the tables in the relevant OSHA regulations as a reference guide to angle of repose and shoring techniques used in excavations and trenches. These tables show the minimum requirements. Added measures must be taken if conditions warrant. Refer to Appendixes A through E of *OSHA Excavation Standard 1926.652* and L of this manual for those tables and for other pertinent information such as soil classifications.

8.1.2 GENERAL REQUIREMENTS

Excavations 4 ft or more deep must be shored or sloped in an approved manner unless they are made entirely in stable rock.

Sides of trenches above the 4-ft level may be sloped in lieu of shoring, but the slope may not be steeper than 1-1/2 H:1 V.

Each trench where employees are working 3 ft deep or more must have ladders to provide safe exits. There must be no more than 25 ft of lateral travel distance to the nearest ladder.

Excavated or other material must not be stored nearer than 4 ft, if possible, and no closer than 2 ft from the edge of any excavation. Surface encumbrances that create a hazard must be moved or supported, as necessary.

The locations of any underground installations such as sewer lines, electric lines, etc. are determined before excavation. Utility companies must be notified of the proposed work to establish the locations of utility installations before the start of an excavation. All such installations must be appropriately identified for the safety of persons working nearby.

Employees exposed to vehicular traffic must be provided with, and be instructed to wear, warning vests marked with or made of reflecting or high-visibility material.

No employee is permitted under loads handled by lifting or digging equipment.

When mobile equipment operates adjacent to or approaches the edge of an excavation, a warning system such as barricades, hand or mechanical signals, or stop logs must be used.

The use of water control and removal equipment must be monitored by a competent person.

Sloping or benching excavations greater than 20 ft deep must be designed by a registered professional engineer.

If the excavation is considered a high hazard task as defined in subsection 1.11 of this manual, the job task analysis procedure must be followed.

8.1.3 HAZARDOUS ATMOSPHERES

If the possibility exists in an excavation of an oxygen deficient atmosphere (less than 19.5% oxygen) or an atmosphere in excess of 20% of the lower flammable limit (or lower explosive limit) of a gas, atmospheric testing must be conducted before employees enter the excavation. Refer to Confined Space Work (section 12) and Respiratory Protection (subsection 5 PPE) for additional guidance.

Proper respiratory equipment and ventilation must be established for each excavation before employees enter the excavation.

Atmospheric monitoring must be conducted to ensure that atmospheres remain safe when controls are being used to reduce the level of contaminants. Refer to the confined space work and respiratory protection sections for additional guidance.

8.1.4 RESCUE EQUIPMENT

When hazardous atmospheres exist, or are likely to develop, breathing apparatus and a safety harness and line or basket stretcher must be readily available. This equipment must be attended when in use.

Employees entering bell-bottom pier holes or similar confined footing excavations must be equipped with safety harnesses and individual lifelines. An individual must be in attendance at all times while an employee is in an excavation of this type.

8.1.5 STABILITY OF ADJACENT STRUCTURES

Support systems such as shoring or underpinning must be provided for adjacent structures that may be endangered by excavation operations.

Excavations below the level of the base or footing are normally not permitted unless.

- A support system is used
- The excavation is stable

- A registered engineer has determined that the structure is sufficiently removed from the excavation to avoid cave-ins
- A registered engineer has determined that no other hazard exists

8.1.6 PERSONAL PROTECTIVE EQUIPMENT

All employees must have personal protective equipment for the head, eyes, ears, respiratory organs, feet, hands, and other parts of the body as outlined below.

- Head protection must be worn at all times.
- Appropriate eye protection must be worn when the danger exists of eye or face injury from physical, chemical, or radiant agents.
- If it is not feasible to reduce noise levels or noise exposure duration, hearing protective devices must be provided and used. Plain cotton is not an acceptable protective device.
- If engineering controls are inadequate or fail to control exposure to dust, fumes, vapors, and gases, respiratory protection must be provided and used.
- Mechanical guards or protective devices must be provided and used when hands and feet are exposed to potential injury from mechanical devices or other harmful agents.

8.1.7 FALL PROTECTION

Walkways and bridges over excavations must be provided with standard guardrails. Adequate barriers must be provided at all excavations. All wells, pits, shafts, etc., must be barricaded or covered.

Upon completion of exploration and similar operations, all wells, pits, shafts, etc., must be backfilled.

8.1.8 PROTECTIVE SYSTEMS

Employees working in excavations must be protected by shoring, sloping, or benching. Exceptions to this requirement are:

- Excavations made entirely in stable rock
- Excavations less than 4 ft deep and where examination of the ground by a competent person provides no indication of potential cave-in

All protective systems for excavation sites must be designed by a registered professional engineer when it is not feasible to attain required slope configurations in accordance with *1926.652(b)(1), (2) and (3).*

Sloping or benches greater than 20 ft deep must be approved by a registered engineer. Appendix L contains the requirements for soil classifications and sloping and benching to be used by registered engineers in determining sloping and benching for a particular excavation site.

The registered professional engineer's recommended protective systems must be documented in sufficient detail to establish compliance with OSHA excavation requirements. The recommendations must be signed by the registered professional engineer, and the report must be maintained at the jobsite.

When manufactured support systems are used, the manufacturer's written specifications, recommendations, and limitations must be maintained at the jobsite.

A designated competent person must monitor the construction and maintenance of the recommended protective systems and their use in excavations.

8.2 PROBING AND EXPLORATORY TRENCHING

This procedure supplements the procedures in subsection 8.1, Excavations, and should be read in conjunction with those procedures.

On many Teal Construction projects it is necessary to perform excavations. In virgin soil, a probing and exploratory trenching procedure normally is not necessary. However, Teal Construction projects may deal with chemical and refining construction in existing facilities. Extreme caution must be taken to ensure the safety of employees and the client's property. Underground utilities and other obstructions present a very real danger and every effort must be taken to determine that excavation operations are performed safely. Therefore, where excavations are required to be performed on Teal Construction sites, the following probing and exploratory trenching procedures must be followed.

8.2.1 RESPONSIBILITIES

The Contractor designates a representative to conduct a search for drawings of all areas requiring excavation. This search must be completed during the design phase, so all pertinent drawings are issued with the construction package.

The designated person holds a constructability meeting with the client representative and The Teal Construction Site Manager as early in the design stage as possible. If required, a registered professional engineer must approve the excavation plan.

The Contractor and the Teal Construction Site Manager review in detail any pertinent drawings and as-built drawings that are available to determine the location of the piping or other underground obstacles.

The Contractor designated person schedules a task force meeting with the responsible personnel, as required.

It is the duty of the Contractor's designated person to see that all workers involved in the task receive all known information. This includes subcontractors, if applicable.

8.2.2 REQUIREMENTS

All excavations are performed with extreme caution to prevent injury or damage to underground piping, electrical wiring, etc.

If there are known underground obstacles, the task force meeting defines appropriate protective measures.

When excavations occur within 2 ft, vertically or horizontally, of a direct buried electrical or communication cable, exploratory hand trenching must be done to authenticate the actual location of the cable.

Before and during excavations, these additional requirements must also be met.

The area to be excavated must be swept with a metal detector.

When excavating with mechanical equipment or other means, probing is required every 4 in. on center over the total area to be excavated.

Exploratory trenching can be used at the perimeter of an area to be excavated by probing and trenching on 4-in. centers. The depth of the trench is determined by the depth needed to accommodate the footings, supports, pipe, etc., that will be placed inside the perimeter area.

Probing may be performed by jetting or dry probing; however, the depth of probing must always exceed the depth of excavating by at least 1 ft. The selected depth of probing must be consistent; that is, if one hole is probed at 3 ft, another hole cannot be probed at 4 ft.

8.2.3 OPERATIONS

The Contractor's designated person may elect to use either dry probing or a water probing system. Water probing systems must adhere to the following procedures.

When using water jetting, the Contractor's person in charge of work must require all employees to wear safety glasses and face shields. The person actually probing must wear both a face shield and goggles.

During excavations with a backhoe, there must be an observer at all times to watch the backhoe bucket. This observer should be stationed adjacent to the excavation to avoid the operations of the hoe. The observer is responsible for visually identifying any obstruction while the bucket is excavating, and alerting the operator immediately if any obstructions are observed.

If the observer leaves the excavation area, excavation efforts must be stopped immediately until an observer returns.

If pipe or other obstacles are encountered, shoring and hand excavation are required until the obstacles are identified and cleared.

Air-operated clay spades may be used during hand excavations, provided extreme care is taken.

During hand excavations, if a person's head is below the top of the excavation or if the trench is greater than 4 ft deep, shoring is required.

Should any underground obstructions be encountered, the Contractor's designated person must immediately notify the designated client representative, who in turn notifies the proper personnel to assist in identification of the obstruction and its possible removal or re-routing.

SECTION 9
HAND AND POWER OPERATED TOOLS

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SECTION 9
HAND AND POWER OPERATED TOOLS

9.0 HAND AND POWER OPERATED

Contractors are to comply with OSHA 29 CFR 1926 Subpart I - Tools – Hand and Power. The following practices are considered minimum requirements for the project:

- All tools must be maintained in a safe condition.
- When power operated tools are designed to accommodate guards, the guard must be in place on the tool.
- The point of operation (the area on the machine where the work is being performed) must be guarded to prevent the operator from having any part of his or her body in the danger zone when there is exposure that could cause injury to the operator.
- Belts, sprockets, gears, chains, spindles, drums, flywheels, or any moving or rotating part of equipment must be guarded if the parts could injure employees or otherwise create a hazard.
- The periphery of blades must be guarded. The guards may not have openings larger than 1/2 in.
- Contractor employees must use the specific personal protective equipment necessary to protect against hazards such as dusts, fumes, mists, vapors, gases, falling objects, or flying, abrasive, and splashing objects.
- Circular saws, chain saws, and percussion tools without positive accessory holding means, must be equipped with a switch that will shut the power off when it is released.
- Machines designed for fixed locations must be anchored to prevent moving or walking.

9.1 HAND TOOLS

The use of unsafe hand tools is prohibited.

Wrenches such as adjustable, pipe, end, and socket wrenches may not be used when the jaws are sprung and slippage could occur.

Impact tools such as drift pins, wedges, and chisels must be kept free of mushroomed heads.

Wooden-handled tools must be replaced if the handles become splintered or cracked. Wooden handles must be tight.

9.2 ELECTRIC POWER TOOLS

Electric power hand tools must be of the approved double insulated type or must be in conformance with the assured grounding program requirements defined in section 8 of this manual.

Electric cords must not be used for hoisting, lowering, or any purpose other than their intended use.

Electric power tools that are damaged in any way must be taken out of service immediately.

9.3 PNEUMATIC POWER TOOLS

Pneumatic power tools must be secured to their hoses or whips by a positive means to prevent the tools from being disconnected accidentally.

Pneumatic impact tools must have safety clips or retainers securely installed to prevent attachments from accidentally disconnecting.

All pneumatic nailers (or other similar equipment with automatic fastener feeds that operate at 100 psi) must have a device that will allow only fasteners to eject when the muzzle is in contact with the work surface and when a triggering device that is separate from the muzzle is activated simultaneously.

Compressed air used for cleaning purposes must be less than 30 psi. Effective chip guarding and personal protective equipment such as safety glasses or face shields must be used during cleaning.

Compressed air may not be used to clean the pneumatic tool operator or other persons.

The manufacturer's guidelines for hose types, pipe valves, filters and other fittings must be followed at all times.

Hoses must not be used for hoisting and lowering objects.

All hoses having an inside diameter of more than 1/2 in. must have a safety device at the source of supply or branch line to reduce pressure in case of hose failure (refer to Appendix J).

Airless spray guns that atomize paint or other fluids at high pressures (1,000 psi or more) must have a manual or automatic device that prevents the trigger from being pulled until the safety device is manually released.

In lieu of the above requirement, a diffuser nut may be used that prevents high-pressure, high-velocity release and a nozzle tip guard that prevents the tip from coming into contact with the operator.

Abrasive blast cleaning nozzles must have a valve that must be manually held open.

9.4 FUEL POWERED TOOLS

Fuel powered tools may be refueled, serviced, or maintained only while the tools are stopped and not operating.

Fuels must be transported, handled, and stored in accordance with *29 CFR 1926, subpart F.*

When fuel powered tools are used indoors, extreme caution must be taken to prevent the buildup of carbon monoxide or other hazardous gases to concentrations that exceed established safe levels. Air movers, ventilation, and exhaust ducts are some controls required to reduce unsafe levels of hazardous gases. Personal protective equipment such as respirators must be used only after it has been determined that engineering controls will not reduce hazardous gas concentrations to safe levels.

9.5 ABRASIVE WHEELS AND TOOLS

Floor-stand and bench-mounted abrasive wheels must be provided with substantial guards. The maximum angular exposure must not be more than 90 degrees. When the work requires contact with the wheel below the horizontal plane of the spindle, the angular exposure must not exceed 125 degrees. Exposure must not begin at more than 65 degrees above the horizontal plane of the spindle.

Floor- and bench-mounted grinders must be provided with work rests adjusted to no more than 1/8 in. from the surface of the wheel.

Portable grinders must be guarded. The maximum angular exposure of the grinding wheel must not exceed 180 degrees. Exceptions are:

- When the work location makes the use of such guards impossible. In such circumstances, a wheel equipped with safety flanges must be used for wheels designed to fit the flanges.
- When wheels of 2 in. or less in diameter securely mounted on the steel mandrel are used. In such circumstances, a wheel equipped with safety flanges must be used for wheels designed to fit the flanges.
- When the wheel is entirely within the work being ground. In such circumstances, a wheel equipped with safety flanges must be used for wheels designed to fit the flanges.

Abrasive wheels must be inspected and ring-tested before mounting to ensure that the wheels are free of cracks or defects.

Do not force abrasive wheels onto spindles or overtighten the wheels onto the spindles.

The operating speeds indicated on the abrasive wheel must not be exceeded.

Safety glasses and face shields must be worn when grinding with abrasive wheels.

9.6 WOODWORKING TOOLS

All fixed woodworking tools must be equipped with a disconnect that can be locked in the *OPEN* position only.

The operating speeds indicated on the saw blades must not be exceeded.

All portable power saws must be equipped with guards above and below the baseplate shoe. When the tool is withdrawn from the work, the lower guard must automatically and instantly return to the covering position.

9.7 POWDER ACTUATED TOOLS

A number of tools using explosive charges to drive fastenings and perform similar functions are in wide use throughout the industry. The manufacturers of these devices provide detailed instructions regarding their use. Those instructions should be followed at all times.

The two types of powder actuated tools are direct acting and indirect acting.

- **Direct Acting Tool.** A tool in which the expanding gas of the power load acts directly on the fastener to be driven.
- **Indirect Acting Tool.** A tool in which the expanding gas of the power load acts on a captive piston, which in turn drives the fastener.

The three classes of tools are low velocity, medium velocity, and high velocity.

- **Low Velocity Tool.** A tool whose test velocity has been measured 10 times while using the highest velocity combination of:
  - The lightest commercially available fastener designed for that specific tool
  - The strongest commercially available power load that will properly chamber in the tool
  - The piston designed for that tool and appropriate for that fastener that will produce an average test velocity from the 10 tests not in excess of 10 meters per second (m/s) or 328 feet per second (ft/s) with no single test showing a velocity of more than 108 m/s (354 ft/s).
- **Medium Velocity Tool.** A tool whose test velocity has been measured 10 times while using the highest velocity combination of:
  - The lightest commercially available fastener designed for the tool
  - The strongest commercially available power load that will properly chamber in the tool

- The piston designed for that tool and appropriate for that fastener that will produce an average test velocity from 10 tests in excess of 100 m/s (328 ft/s) but not in excess of 150 m/s (492 ft/s), with no single test having a velocity of 160 m/s (525 ft/s).

- **High Velocity Tool.** A tool whose test velocity has been measured 10 times while using a combination of:

  - The lightest commercially available fastener designed for the tool
  - The strongest commercially available power load that will properly chamber in the tool that will produce an average velocity from the 10 tests in excess of 150 m/s (492 ft/s)

9.7.1 TOOL SELECTION

Many applications requiring powder actuated tools can be successfully accomplished using the low velocity piston tool (trigger or hammer actuated). The low velocity piston tools should be used whenever possible because they impose the least potential risk to operator safety.

Only tools approved by a state or other governing agency should be used.

9.7.2 OPERATING RECOMMENDATIONS

The assistance and services of the tool manufacturer or authorized distributor should be called on whenever doubt exists concerning proper use or service, or if operator training is required.

1. Powder actuated tools must only be used by properly trained and qualified operators. Users must possess qualified operator's cards which are issued by a particular manufacturer's authorized dealer or distributor or other competent source only after thorough training. Instructors must be authorized by the manufacturer.

2. Safety goggles must be worn by operators and assistants at all times while operating powder actuated tools. If a potential hazard could cause injury to an operator's face, transparent face shields must be used in addition to safety goggles.

3. Hearing protection must be used when operating the tools.

4. A loaded tool must never be carried away from a worksite. Tools must always be left unloaded until ready for use. Loaded tools must never be left unattended. Tools not in use must be kept in a locked case labeled *POWDER ACTUATED TOOL.*

5. Tools must never be pointed at anyone, whether loaded or unloaded, and hands must be kept clear of the open muzzle end at all times.

6. Powder actuated tools must never be stored or used in explosive atmospheres, in the vicinity of highly flammable materials, or where nonsparking tools are required.

7. Tools must be held firmly against and perpendicular to the surface being driven into, except for specific applications recommended by the tool manufacturer.

8. In the event of jamming or obstruction in the bore, the manufacturer's instructions must be carefully followed.

9. Tools must be inspected in accordance with manufacturers' recommendations before each use to ensure that:

   a. Safety devices are in proper working condition
   b. Tools are clean
   c. All moving parts operate freely
   d. Barrels are free from obstruction

   Any tool not in working order or that develops a defect during use must be removed immediately from service and not used until proper repairs have been made by competent personnel. Before testing, check to make sure the tool is not loaded. Any tools found to be defective must be removed from service and from power loads and tagged *DEFECTIVE, DO NOT USE.*

10. Tools must be inspected and maintained on a regular basis and inspection documentation must be maintained at the site.

11. As required, use the appropriate safety guards supplied by manufacturers. Also follow the safety guard requirements in *ANSI A10.3-1985.*

12. Always use the proper type and powder level load. The preferred power loads are recommended by the manufacturer of each tool being used. To decrease power, use a lower number; to increase power, use a higher number.

13. In areas where powder actuated tools are being used extensively, warning signs (available from manufacturers) and barriers, if necessary, identifying the hazard area are recommended.

14. An operator's instruction manual must be kept in the carrying case for the specific tool being used for reference, when necessary, concerning proper operation, service, etc.

15. Only fasteners that are specially designed and manufactured for use in powder actuated tools may be used.

9.7.3 OPERATING LIMITATIONS

Manufacturer's recommendations must be referred to if doubt exists about a fastening application. Do not drive into hard or brittle materials such as cast iron, glazed tile, surface-hardened steel, glass brick, live rock-face brick, and hollow tile.

To prevent flying hazards, no stud or attachment should be driven without first making sure that it will not pass completely through the material into which it is being driven.

Only fasteners specially designed and manufactured for use in powder actuated tools may be used.

Fasteners driven by standard velocity tools must not be driven directly into masonry materials closer than 3 in. from an unsupported edge or corner, or into steel closer than 1/2 in. from an edge or corner. Specific applications recommended by tool manufacturers are the only exceptions.

Fasteners may not be driven through existing holes unless the holes are used solely as guides, as recommended by tool manufacturers, and to ensure positive alignment.

Fasteners must not be driven into concrete unless material thickens and is at least three times the penetration depth of the fastener shank.

In the event of a misfire, tools must not be removed from the working surface for a minimum of 30 seconds. Then, the explicit instructions in the manufacturer's manual for the specific tool must be carefully followed.

9.8 CAPTIVE STUD TOOLS

These tools are designed to stop a stud or pin in its tracks should it be fired mistakenly into soft or insubstantial materials. The stud is prevented from free flight by a piston and buffer in the guard assembly. A partial turn of the tool frees it from a stud properly set in the work surface. Captive stud tools have been replaced by low velocity powder actuated tools and are no longer available. However, some may still be in use in the field.

9.9 IDENTIFICATION OF CASED LOADS

The standard means of identifying power levels of loads used in tools uses the uniform colors and printed descriptions shown in Table 9-1. The color codes are strikingly printed on the load containers to provide a visual indication of the power level of the load.

9.10 TOOL DESIGN REQUIREMENTS

Among other requirements, the following design criteria must be complied with.

1. The tool must be designed to prevent inadvertent actuation.
2. The tool must be designed to prevent actuation that could propel a fastener or any part thereof into the air when dropped from a height of 3 meters (10 ft) onto a smooth, hard surface such as concrete or steel.
3. Actuation of any tool must depend on at least two separate and distinct operations by the operator, with at least one operation being other than the operation of holding the tool against the work surface.
4. The tool must be designed not to be operable other than against a work surface with a force on the work surface equal to 22 newtons (N) 5 lb greater than the weight of the tool, or a minimum impact energy of 4 joules (3 ft-lb).
5. All tools must be designed so that compatible protective shields or fixtures designed, built, and supplied by the tool manufacturer can be used.

6. Tools must be designed so that a determinable means of varying the power levels is available for selecting a power level adequate to perform the desired work.

7. Tools must be designed so that all principal functional parts can be checked for any foreign matter that may affect operation.

8. Tools must be designed so that all parts are of adequate strength to resist maximum stresses on actuation when the tool is used in accordance with the manufacturer's instruction and is powered by any commercially available power load that will properly chamber in the tool.

Table 9-1 – Recommended Power Loads

Power Level	Color Identification		Nominal Velocity (ft/sec)
	Case Color	Load Color	
1	Brass	Gray	300
2	Brass	Brown	390
3	Brass	Green	480
4	Brass	Yellow	570
5	Brass	Red	660
6	Brass	Purple	750
7	Nickel	Gray	840
8	Nickel	Brown	930
9	Nickel	Green	1,020
10	Nickel	Yellow	1,110
11	Nickel	Red	1,200
12	Nickel	Purple	1,290

The nominal velocity applies to 3/8-in. diameter, 350 grain ballistic slug fired in a test device. It has no reference to the actual fastener velocity developed in any specific size or type of tool.

SECTION 10
LOCK OUT TAG OUT

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LOCK OUT TAG OUT (LOTO)

10.1 GENERAL POLICIES

Teal Construction requires all of its contractors/subcontractors to comply with the OSHA Standards when working on or near energized equipment. All Contractor employees who may be exposed to energized or potentially energized equipment must be properly protected from the unexpected energization or start-up of that equipment.

Any noncompliance or attempt to defeat the OSHA energy isolation standards will make the offender(s) subject to immediate removal from the project. This program applies to all Teal Construction work projects where employees may be exposed to live parts and/or those parts that have been energized.

The Teal Construction Superintendent has overall responsibility for coordinating safety at their assigned project. Teal Construction's contractor/subcontractor's are required to have written Lock-Out Tag Out procedures and shall ensure their employees receive instructions in the purpose and use of energy control procedures, as well as the other required elements of the Control of Hazardous Energy standard.

10.2 DEFINITIONS:

Affected Employee - An employee whose job requires him/her to operate or use a machine or equipment on which servicing or maintenance is being performed under lockout or tag-out, or whose job requires him/her to work in an area in which such servicing or maintenance is being performed.

Authorized Employee - A person who locks out or tags out machines or equipment in order to perform servicing or maintenance on that machine or equipment. An affected employee becomes an authorized employee when that employee's duties include performing servicing or maintenance covered under this section.

Capable of being locked out - An energy isolating device is capable of being locked out if it has a hasp or other means of attachment to which, or through which, a lock can be affixed, or it has a locking mechanism built into it. Other energy isolating devices are capable of being locked out, if lockout can be achieved without the need to dismantle, rebuild, or replace the energy isolating device or permanently alter its energy control capability.

Energized - Connected to an energy source or containing residual or stored energy.

Energy isolating device - A mechanical device that physically prevents the transmission or release of energy, including but not limited to the following: A manually operated electrical circuit breaker; a disconnect switch; a manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors, and, in addition, no pole can be operated independently; a line valve; a block; and any similar device used to block or isolate energy. Push buttons, selector switches and other control circuit type devices are not energy isolating devices.

Energy source - Any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy.

Hot tap - A procedure used in the repair, maintenance and services activities which involves welding on a piece of equipment (pipelines, vessels or tanks) under pressure, in order to install connections or appurtenances. it is commonly used to replace or add sections of pipeline without the interruption of service for air, gas, water, steam, and petrochemical distribution systems.

Lockout - The placement of a lockout device on an energy isolating device, in accordance with an established procedure, ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

Lockout device - A device that utilizes a positive means such as a lock, either key or combination type, to hold an energy isolating device in the safe position and prevent the energizing of a machine or equipment. Included are blank flanges and bolted slip blinds.

Normal production operations - The utilization of a machine or equipment to perform its intended production function.

Servicing and/or maintenance - Workplace activities such as constructing, installing, setting up, adjusting, inspecting, modifying, and maintaining and/or servicing machines or equipment. These activities include lubrication, cleaning or unjamming of machines or equipment and making adjustments or tool changes, where the employee may be exposed to the **unexpected** energization or startup of the equipment or release of hazardous energy.

Setting up - Any work performed to prepare a machine or equipment to perform its normal production operation.

Tag-Out - The placement of a tag-out device on an energy isolating device, in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tag-out device is removed.

Tag-Out device - A prominent warning device, such as a tag and a means of attachment, which can be securely fastened to an energy isolating device in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tag-out device is removed.

10.3. ENERGY TYPES

Contractors/subcontractors procedures must consider the types of energy their employees may be exposed to while on the Teal Construction project, which may be one or more of the following:

- Electrical energy – Present in Power transmission lines, circuit breakers, motors, and even in devices such as batteries or capacitors (devices that store energy).
- Hydraulic energy – Fluid under pressure.
- Pneumatic energy – Air under pressure (nail guns, compressors, etc.).
- Pressurized liquids & gasses – Energy sources present in pipes, supply lines, and storage tanks (compressed gas bottles, water, etc.).
- Gravity – Equipment or processes where shifting of weight may be detrimental.
- Combination – all sources of energy that could cause bodily harm should be contained or neutralized.

10.4 TRAINING PROGRAM

Every contractor/subcontractor employee is required to have training on their Lock-Out Tag-Out program, initially in their Orientation with. Specific training is required for those individuals who have to conduct LOTO in their job assignment insuring they are capable of performing the necessary steps to protect themselves and their co workers.

The Contractor/Subcontractor's training program should cover at minimum these basic elements:

- Who, in their company, is responsible for the implementation and governing of their program.
- Where the written Lock-Out tag-Out procedure can be located.
- The types of energy that may be applicable to their employees.
- The process for them to obtain and use the locks and tags.
- Method they are to inform all affected personnel
- Safe procedures for de-energizing circuits and equipment.
- Application of locks and tags. Tag-outs, simply tagging the switch, valve, etc. is prohibited
- Verification that the equipment has been de-energized.
- Procedures for reenergizing the circuits or equipment.
- Other electrically related information which is necessary for employee safety.

- All electrical workers will at all times have with them a voltage tester to detect voltage and will not ever work anything while the circuit is energized.
- No employee will be permitted to remove another employee's lockout.
- It is the responsibility of the supervisor to ensure that no work is performed on electrical related systems beyond the protection of the installed lockout.
- Multi-lock devices must be used if other crafts are involved in the lockout.
- Every Company job-site and/or service vehicle will have available at least one Lockout & Tag kit.
- No isolation device will be operated with a lockout device and tag attached, regardless of the circumstances.
- If the lockout of a system must be in place for a long period of time, daily inspections must be performed to ensure lockout devices and tags are still in place.

A Hazard Analysis must be completed before starting the lockout/tag out process

Contractor/subcontractor personnel working on or near energized or de-energized electric sources should be "qualified" to work safely with electrical energy and have received the appropriate training and certification to do so. In addition to the basic training elements, our "qualified" employees should be trained in the skills and techniques necessary to identify exposed live parts, determine nominal voltages, and clearance distances and corresponding voltages.

All Contractor/subcontractor employees who are required to work on any powered equipment, pressurized system or enclosed fluid system containing flammable and/or toxic materials shall receive instruction concerning this program as follows:

1. Prior to conducting any equipment or system repair and/or maintenance,
2. Refresher training annually,

Contractor/Subcontractor employees who are designated to work on powered equipment, pressurized system or enclosed fluid system containing flammable and/or toxic materials shall be trained in accordance with OSHA standards and good practices. Such instruction shall be documented.

10.5 SHIFT OR PERSONNEL CHANGES

If applicable each contractor/subcontractor, in their written program, will have a procedure in case of shift or personnel changes.

10.6 LOCKS AND TAGS

Each applicable contractor/subcontractor shall furnish their qualified employees with the necessary tags and locks to complete their lock-out tag-out program in a safe manner.

10.7 SUMMARY OF RESPONSIBILITIES

A. **Contractor/Subcontractor Management** - It is the responsibility of the Contractor/Subcontractor Management to ensure that appropriate padlocks, keys and lock-out tags are assigned to authorized company personnel. Management shall also be responsible for seeing that their lock-out/tag-out procedure is consistently applied without exception and that all of their program requirements are met.

B. **Authorized Personnel** -These employees are approved and trained to perform lockout / tag-out in compliance with the procedures of this program.

C. **Affected Personnel** - These employees work with or near the equipment being serviced. The authorized personnel shall notify them whenever such equipment has been locked-out and tagged-out and again when it is returned to service.

SECTION 11
ELECTRICAL SAFETY

11.1 GENERAL COMPANY POLICIES

The purpose of this program is to inform interested persons, including employees, that Teal Construction and its contractors is complying with the OSHA Electrical Safety Standard, Title 29 Code of Federal Regulations 1926.400-449, by determining that this workplace needs written procedures for preventing electric shock or other injuries resulting from direct/indirect electrical contacts to employees working on or near energized or de-energized parts. This program applies to all work operations at Teal Construction Projects where employees may be exposed to live parts and/or those parts that have been de-energized.

The Teal Corporate Safety Director has overall responsibility for coordinating safety and health programs at all Teal Construction locations. Teal Project Superintendents have overall responsibility for the Electrical Safety Program at their locations. Teal management will review and update the program, as necessary. Copies of the written program may be obtained from the Teal Corporate Office. Under this program, our employees receive instructions in the purpose and use of energy control procedures, as well as the other required elements of the Control of Hazardous Energy standard.

We encourage all suggestions because we are committed to creating a safe workplace for all our employees, contractor employees and a successful electrical safety program is an important component of our overall safety plan. We strive for clear understanding, safe work practices, and involvement in the program from every level of the company.

11.2 HAZARD ANALYSIS REPORT

Each contractor is required to determine areas of Teal Construction Projects that need to be included in their Electrical Safety program and the contractor is required to conduct a hazard analysis of their workplace. This analysis shall provide information identifying electrical hazards in the project which effect their employees and work.

Electrically operated equipment that must be de-energized before work can be done per Section 10 of the Teal safety Manual.

Each contractor working on or near energized electrical circuits shall comply with NFPA 70E and OSHA standards.

Contractors with employees working on, near, or with energized electric circuits and equipment who have limited knowledge of electrical circuitry must identify them prior to any energized work.

11.3 TEMPORARY LIGHTING AND WIRING

Contractors with employees who face the risk of electric shock from working on or near energized or de-energized electrical sources receive training in electrical related safety work practices pertaining to the individual's job assignment. Each contractor's safety training program shall ensure that all of their employees understand the hazards associated with electric energy and that they are capable of performing the necessary steps to protect themselves and their co workers.

Contractor's electrical training program should cover these basic elements:

- Lockout and tagging of conductors and parts of electrical equipment.
- Safe procedures for de-energizing circuits and equipment.
- Application of locks and tags.
- Verification that the equipment has been de-energized.
- Procedures for reenergizing the circuits or equipment.
- Other electrically related information which is necessary for employee safety.

Contractors with employees who have received the appropriate training and certification for working on or near energized or de-energized electric sources are considered "qualified" to work safely with electrical energy. In addition to the basic training elements, "qualified" employees should be trained in the skills and techniques necessary to identify exposed live parts, determine nominal voltages, clearance distances, and corresponding voltages.

11.4 LOCKOUT AND TAGGING PROGRAM

It is Teal Construction's policy that circuits and equipment must be disconnected from all electric energy sources before work on them begins. Use of lockout and tagging devices to prevent the accidental re-energization of this equipment is mandatory for all contractors. Each contractor must have lockout and tag out procedures in accordance with OSHA standards. The safety procedures that make up a lockout and tagging program should include these elements:

De-energizing circuits and equipment. Circuits and equipment must be disconnected from all electric energy sources and any stored energy that could accidentally reenergize equipment must be released prior to any work taking place on the equipment.

A. **Application of locks and tags.** Only authorized employees are allowed to place a lock and tag on each disconnecting means used to de-energize circuits or equipment before work begins. Locks must prevent unauthorized persons from reenergizing the equipment or circuits and the tags prohibit unauthorized operation of the disconnecting device.

B. **Verification of de-energized condition of circuits and equipment.** Prior to work on the equipment, we require the contractor's "qualified" employee verify that the equipment is de-energized and cannot be restarted.

C. **Reenergizing circuits and equipment.** Before circuits or equipment are reenergized, contractors are to follow these steps in this order:

- A "qualified" employee conducts tests and verifies that all tools and devices have been removed.
- All exposed employees are warned to stay clear of circuits and equipment.
- Authorized employees remove their own locks and tags.
- A visual inspection of the area must be done to ensure all employees are clear of the circuits and equipment.

11.5 TEMPORARY WIRING AND LIGHTING

Contractors furnishing Temporary Lighting and Wiring as contractual obligations are required to meet OSHA Standards 1926.400 – 449 and the National Electric Code. GFCI's are required for all temporary power panels, with periodic inspection of all temporary wiring. All lighting will be serviced on a as needed basis, with minimum checks and servicing on a monthly basis.

Enforcement

Constant awareness of and respect for electrical hazards, and compliance with all safety rules are considered conditions of employment. Contractors not complying with, at minimum, OSHA standards, the National Electric Code and NFP 70 E are subject to termination of contract.

SECTION 12
CONFINED SPACE WORK

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CONFINED SPACE WORK

This section establishes the procedures that must be followed before personnel may enter a confined space.

12.1 SCOPE

Before any person enters a confined space, a job task analysis (JTA) and an entry permit must be issued in accordance with this procedure. All other applicable permits, such as hot work permits, must also be obtained. Entry permits authorize specific work in specific locations.

All these permits and other authorities must certify that existing and potential hazards have been evaluated, and that all necessary protective measures have been taken to ensure the safety of each worker.

The JTA, entry permit, and all other applicable permits must be approved by the Construction Manager or authorized designate and issued by the relevant craft supervisor.

In addition, before any confined space entry can be permitted, a permit space rescue plan must be written for that space. Refer to subsection 12.6 for instructions on completing a confined space rescue plan. The confined space rescue plan should be generated as a self-contained document so it can be readily accessible to affected employees and be posted near the confined space it is designed for.

12.2 DEFINITIONS

A **permit-required confined space** is any enclosed space that:

1. Is large enough and configured so that an employee can enter bodily and perform assigned work
2. Provides limited or restricted means for entry or exit (tanks, vessels, silos, storage bins, hoppers, vaults, pits, and diked areas)
3. Is not designed for continuous occupancy
4. Has one or more of the following characteristics:
    a. Contains or has a known potential to contain a hazardous atmosphere
    b. Contains a material that could engulf an employee
    c. Is internally configured in a way that could trap or asphyxiate an entrant because of its inwardly converging walls, or because its floor slopes downward and tapers to a smaller cross-section

d. Contains any other recognized serious safety or health hazard

A **hazardous atmosphere** is any atmosphere that exposes employees to the risk of death, injury, or acute illness from one or more causes such as:

1. Flammable gases, vapor, or mist in excess of 10% (1/10) of the lower explosive limit (LEL)
2. A concentration of airborne combustible dust that meets or exceeds the LEL or that obscures vision at a distance of 5 ft or less
3. An oxygen concentration less than 19.5% or greater than 23.5%
4. A concentration of any substance above the threshold limit value (TLV)
5. Any other atmospheric condition considered immediately dangerous to life and health (IDLH)

12.3 PREPARATION AND PRECAUTIONS

All preparatory work must be completed before an entry permit can be issued. Preparatory work includes but is not limited to the following steps.

12.3.1 BLINDING

Blind confined spaces properly to prevent the release of hazardous materials into the space or eliminate the potential for employees becoming engulfed by any liquid or solid material.

12.3.2 LOCKOUT AND TAGOUT

Lockout and tagout any electrical connection, pipe, line, or duct into the confined space in accordance with the lockout/tagout procedure contained in section 10.

12.3.3 MECHANICAL HAZARDS

In accordance with the lockout/tagout procedure, secure all mechanical hazards such as agitators, fans, and other power-driven moving parts in vessels and confined spaces. Entry is not permitted until such parts have been rendered motionless.

12.3.4 PURGING AND CLEANING

Purge, steam, and wash a vessel or confined space as needed to free the area of all possible contaminants. Give special attention to removing liquid product, sludge, and residue; to controlling escaping gases and vapors in the surrounding area; to preventing access to the area by unauthorized personnel; and to controlling all ignition sources in the area.

12.3.5 FRESH AIR

Establish a flow of positive fresh air ventilation (eductor or blower) in the vessel or confined space. Natural ventilation is not sufficient.

12.3.6 HAZARD NOTICE

Ensure that all personnel are familiar with all job hazards, that all equipment is in good condition and compatible with the work involved, and that notice is given in the form of signage, during task training, and on permits to indicate specific hazards of the confined space.

12.3.7 BARRICADES

Provide pedestrian, vehicle, or other necessary barriers to protect workers entering a confined space work area from external hazards.

12.3.8 ATTENDANTS

Provide a trained attendant outside each vessel or confined space equipped with a suitable respirator as required. The attendant must be able immediately to perform all planned rescue duties. At no time may an attendant enter a confined space. Attendant duties include:

- Maintaining surveillance of personnel working in the confined space
- Maintaining the conditions and requirements stated on the confined space permit
- Evacuating personnel from a confined space if hazardous conditions are observed
- Maintaining communications with personnel working in a confined space through visual, voice, telephone, or two-way radio
- Obtaining additional assistance if necessary

12.3.9 SAFETY HARNESSES

Safety harnesses with lifelines are required if toxic or flammable atmospheres could exist, if an oxygen deficiency exists or could develop, if there is potential for engulfment, or if the work is to be performed at heights. Refer to the tie-off policy of this manual for specific tie-off requirements.

12.3.10 RESCUE EQUIPMENT

The person responsible for the work must implement procedures and provide the equipment necessary to rescue personnel working in confined spaces. Such equipment should include tripods, lifelines, hoists, and harnesses.

12.3.11 TEMPORARY LIGHTING/GROUND FAULT CIRCUIT INTERRUPTER (GFCI)

Ensure that all temporary lighting in confined spaces is no more than 12 volts, that lights are protected against damage, that cords are heavy duty, and that lights and light cords are kept clear of workspaces and walkways. However, 120-volt lights may be used if protected by a ground fault circuit interrupter. All electrical circuits, lighting, portable tools, and other equipment must be approved for the area classification in which they are used. Ground fault circuit interrupters must be placed outside a confined space.

12.4 CONFINED SPACE TRAINING

The following paragraphs cover training requirements for confined space work for authorized entrants, attendants, persons authorizing or supervising confined space work, and rescue team members. Contractors must submit in writing to the Teal Construction Site Manager that all employees expected to engage in any aspect of confined space activities meets the training requirements of these paragraphs before they may participate in the work

12.4.1 AUTHORIZED ENTRANTS

Personnel qualifying as authorized entrants must be trained in the following areas.

1. **Hazard Recognition.** During training, entrants will:
   a. Be informed of all hazards that might be encountered during entry or occupancy of a confined space
   b. Be trained to recognize the symptoms of exposure to chemical hazards and oxygen deficiency. Oxygen deficient atmospheres contain less than 19.5% oxygen
   c. Understand the results of exposure to confined space hazards
2. **Communication.** Entrants will:
   a. Understand need for maintaining contact with the attendant (hole watch) and the methods used for communication with an attendant
   b. Understand the requirement to notify the attendant when the entrants initiate evacuation
3. Protective Equipment. Entrants will:
   a. Be aware of all personal protective equipment requirements and the use of such equipment
   b. Be aware of the barriers needed to protect workers from external hazards
4. **Self-Rescue.** Entrants will be aware that they must evacuate a confined space when directed by the attendant, when an alarm is sounded, or when an entrant perceives danger.
5. **Rescue Plan.** Entrants will be aware of the provisions of the rescue plan for the task.

12.4.2 ATTENDANTS

Personnel qualifying as attendants must be trained in the following areas.

1. **Hole Watch.** Attendants will understand the requirement to remain outside a confined space at all times while authorized entrants are working in the space.
2. **Personnel Count.** Attendants will understand the need to maintain an accurate count of all persons in a confined space at all times.

3. **Hazard Recognition.** Attendants will be able to recognize the hazards associated with working in a confined space.

4. **Monitoring.** Attendants will be able to use and interpret any monitoring equipment and understand that monitoring is performed in accordance with specifications contained in the confined space entry permit.

5. **Communication.** Attendants will understand that they must maintain continuous contact with entrants, and understand the methods of communication.

6. **Evacuation.** Attendants will understand the circumstances requiring entrant evacuation. Those circumstances include:

   a. Observing a condition that is not allowed for on a permit
   b. Observing behavioral changes in entrants as a result of exposure to hazards
   c. Detecting an external condition that could endanger entrants
   d. Detecting an uncontrolled hazard in the permit space
   e. Attendant leaving his or her station
   f. Unauthorized personnel ignoring requests by the attendant to leave the permit area

7. **Emergency Notification.** Attendants will understand that they must notify emergency personnel as soon as they have determined the need to evacuate authorized entrants, either because of hazards in the confined space or because the entrants need assistance in the confined space.

8. **Unauthorized Entrants.** Attendants will understand that they are required to warn unauthorized persons away from a confined space, requesting that such persons leave the area, and advising authorized entrants that unauthorized persons have entered the space.

9. **Rescue Procedures.** Attendants will:

   a. Understand that they are not authorized to enter a permit space to attempt to rescue anyone inside the confined space

   b. Know how to use external rescue and protective equipment, and know their rescue responsibilities

   c. Understand the permit rescue plan outlined in the rescue plan document

12.4.3 ENTRY AUTHORITIES

Individuals in charge of or authorizing entry are responsible for:

1. Determining whether the permit for entry is complete

2. Determining whether all necessary precautions, procedures, and equipment are in effect before authorizing entry into a confined space

3. Terminating any entry authorization for which the permit requirements are being violated

4. Concluding entry and terminating a permit upon work completion, including:
    a. Removing all tools and equipment from the confined space
    b. Verifying that all personnel and equipment have been removed from the confined space
    c. Removing all entry caution signs
    d. Closing and securing all entry points
5. Becoming familiar with the permit space rescue plan outlined in the confined space permit

Persons in charge of or authorizing entry may also serve as authorized entrants or attendants upon completing the appropriate training.

12.4.4 ONSITE RESCUE TEAMS

The person responsible for the work must decide whether to use an onsite rescue team or an outside rescue team.

Onsite rescue teams must receive training about the site rescue plan, the hazards of working in a confined space, and the personal protective and rescue equipment required.

At least one team member must have current certification in first-aid procedures and cardio-pulmonary resuscitation (CPR) and training about bloodborne pathogens.

Onsite rescue personnel must receive the same training as authorized entrants.

12.4.5 OUTSIDE RESCUE TEAMS

Outside rescue team members must be made aware of the hazards they may encounter during a rescue so that they can equip themselves properly.

12.5 UNAUTHORIZED ENTRANTS

Unauthorized entrants are not allowed in permit areas. If they enter a permit area, the confined space attendant or person authorizing entry must take the following actions.

1. **Request and Notify**. Request the unauthorized person or persons to leave, then notify the entrants that unauthorized personnel are in the permit area.
2. **Stop Operations and Evacuate**. If the unauthorized personnel fail to respond, stop operations and order evacuation of the permit area.
3. **Discipline**. Begin disciplinary procedures, including termination, for any unauthorized entrants who fail to leave a permit space upon request from the area authority.

12.6 PERMIT SPACE RESCUE PLAN

Before entry into any confined space can be authorized, a task-specific rescue plan must be written specifically for that space. All employees involved in confined space work must be familiar with the rescue plan. All rescue plans must include at least the following:

1. Who is to perform the rescue; an onsite team (list names) or an outside team
2. How the rescue team is notified
3. Rescue equipment available
4. Special hazards of the permit space that could be encountered during a rescue

At no time may any authorized rescue person enter a confined space for rescue purposes unless wearing a self-contained breathing apparatus (SCBA) or an airline respirator with an escape pack, or unless atmospheric measurements have confirmed that the LEL and the levels of O_2 and any hazardous gases are in the proper range to permit entry into the confined space without the aid of such equipment.

12.7 CONFINED SPACE ENTRY

The following general requirements must be completed before a confined space entry permit can be issued.

- A job task analysis (JTA) is prepared in accordance with this manual
- All associated hazards are identified and controlled
- All employees engaged in confined space work are thoroughly trained
- A rescue plan is prepared
- All other applicable permits are obtained, including hot work permits or other task-specific work permits
- The confined space is prepared in accordance with subsection 12.3

In addition, the Construction Manager or other designated authority issues the entry permit only after the following specific requirements have been met.

12.7.1 VENTILATION

The job supervisor or person in charge of entry must determine that proper ventilation is maintained at all times employees are operating in confined spaces.

- **Before Start of Work.** Ensure that proper venting and exhausting systems are in place.
- **Venting/Exhausting.** Ensure that air, not oxygen, is vented or exhausted before and during confined space work to avoid concentrations of toxic or hazardous gases or dusts that could exceed permissible limits or result in an oxygen-deficient atmosphere.

- **Explosive Atmospheres.** Ensure that fresh air is supplied to any space that may contain explosive vapors, rather than having the vapors be exhausted through the fan only.
- **Ventilation Ducting.** Ensure that ventilation ducting is arranged to avoid restricting personnel evacuation from the confined space and to prevent risk of exposure to hazardous conditions to persons working nearby.
- **Respiratory Protection.** Ensure that, where adequate venting or exhausting cannot meet standards, personnel are wearing appropriate respiratory protection.

12.7.2 TOXIC MATERIALS

Table 9-1 provides definitions of the respiratory protections required for entering atmospheres containing various levels of toxic materials. Permissible levels for all these materials are defined in Material Safety Data Sheets supplied by the manufacturers of the materials.

12.7.3 FLAMMABLE GASES, VAPORS, OR MISTS

Table 12-2 provides definitions of requirements in regards to explosive levels of flammable gases, vapors, and mists. If there is potential for an explosive atmosphere, refer to the guidelines in paragraph 12.7.1, Ventilation. Also note that continuous monitoring of the atmosphere must be maintained.

Table 12-1 – Respiratory Protection Against Toxic Atmospheres

Atmosphere	Definition
Below Threshold Limit Value	Atmospheres containing toxic materials below the TLV may be entered without respiratory protection only after oxygen and flammable gases are determined to be at permissible levels.
Below IDLH/Above TLV	Atmospheres containing toxic materials below levels immediately dangerous to life or health (IDLH), but above the TLV, may be entered when respiratory equipment, as defined in the respiratory protection program, is worn and when flammable gases and oxygen are at permissible levels.
At IDLH (generally forbidden)	Atmospheres containing toxic materials IDLH may be entered only by employees protected by equipment approved for such exposure, when flammable gases are at permissible levels, and only after receiving written approval to enter the IDLH atmosphere from the Parsons construction manager and the designated client representative as well as any other project authority required. Emergency rescues may also be required in IDLH atmospheres.
Corrosive/Absorption Hazards	Atmospheres that contain or could contain corrosive materials or materials that are toxic through skin absorption require personal protective equipment to prevent skin and/or eye contact.
Unknown Toxins	Entry is prohibited in confined space atmospheres where the toxicity is unknown.

Table 12-2 – Explosive Levels of Gases, Vapors, and Mists

Level	Definition
Less than 10% LEL	Atmospheres containing flammable gases, vapors, or mists less than 10% (1/10) of the lower explosive limit (LEL) may be entered without respiratory equipment only after oxygen and toxic materials are determined to be at permissible levels.
At or Above 10% LEL	Atmospheres containing flammable gases, vapors, and mists above 10% (1/10) of the LEL may not be entered until the atmosphere is properly cleaned and purged and flammable gases, oxygen, and toxic materials are determined to be at permissible levels.

12.7.4 OXYGEN LEVELS

Table 12-3 provides definitions of entry requirements in regard to oxygen levels.

Table 12-3 – Permissible Oxygen Levels

Oxygen Level	Definition
19.5% to 23.5%	Atmospheres with an oxygen content of 19.5% to 23.5% at sea level may be entered without respiratory equipment if flammable and toxic materials are determined to be at permissible levels.
Deficient	Atmospheres with an oxygen content of less than 19.5% at sea level may be entered only by workers wearing respiratory equipment in accordance with the respiratory protection program, and after the introduction of a constant flow of fresh air. Respiratory equipment must be chosen for its ability to handle any toxins that may be present. Flammable materials must be at permissible levels. Pure oxygen must not be used to raise the level of oxygen in an atmosphere. Instead, air must be vented or exhausted before and during confined space work. Refer to paragraph 9.7.1.
Enriched	Atmospheres with an oxygen content greater than 23.5% at sea level may not be entered until it has been determined that no fire hazard exists, that flammable and toxic materials are at permissible levels, and until fresh air has been introduced to bring the oxygen level to within 19.5% to 23.5%.

12.7.5 HOT WORK

When hot work is required in a confined space, it must be in accordance with the hot work entry permit procedure. Hot work may also require a separate permit.

If hot work involves the generation of toxic gases, vapors, or fumes, ventilation or respiratory protection is required. The type of contaminant generated determines the type of respiratory equipment used.

In addition, the following precautions must be taken before any hot work is started.

- **Fire Extinguishers.** Fire extinguishers of the proper type are used.
- **Fuel Gas.** Oxygen, acetylene, or other fuel gas may not be taken into confined spaces.
- **Fuel Gas Shutoff.** The gas supply to a torch must be positively shut off at the cylinder whenever the torch is not in use or is left unattended. At change of shift and overnight, all torches and hoses must be removed from a confined space.
- **Flammable Gas Equipment.** Flammable gas equipment, gauges, and hoses must be inspected and found free of defects by the user before each use.

12.8 TOXIC OR FLAMMABLE MATERIALS IN CONFINED SPACES

Frequently, work in confined spaces requires the use of toxic or flammable materials, including coatings, linings, paints, cements, and solvents. The following guidelines apply when using these materials.

12.8.1 QUANTITIES

Any toxic or flammable materials brought into or used in a confined space are limited to the smallest amount consistent with efficient use during each shift. Only approved containers and dispensers may be used. Toxic or flammable materials may not be stored in confined spaces.

12.8.2 CONTAINERS AND DISPENSERS

Containers must be designed to minimize evaporation and spillage. Safety cans or small squeeze bottles are preferable when appropriate.

12.8.3 VENTILATION

Continuous ventilation must be provided in sufficient quantity and design to control fire and health hazards.

12.8.4 TESTING

Atmospheres must be tested or evaluated for the existence of hazards. In no instance may flammable vapor concentrations exceed 10% (1/10) of the LEL. Confined space atmospheres must be evaluated at regular intervals to ensure that no hazardous materials build up.

12.8.5 SPRAY OPERATIONS

Spraying toxic or flammable substances such as paint is not recommended.

12.8.6 IGNITION SOURCES

All ignition sources must be removed from a confined space when flammable liquids are being used.

12.8.7 RESPIRATORY PROTECTION

Respiratory protective equipment must be used as defined in the respiratory protection program or as required by this procedure.

12.9 MONITORING

Levels of oxygen, flammable gases, and toxic materials in a confined space must be monitored and logged. The frequency of monitoring must be specified on the confined space entry permit. Monitoring frequency can be continuous or intermittent.

- **Continuous Monitoring.** If there is a risk of an IDLH (immediately dangerous to life and health) atmosphere, monitoring should be conducted on a continuous, real-time basis.
- **Intermittent Monitoring.** Whether intermittent monitoring can be used depends on the degree of risk anticipated. Intermittent monitoring can range from four times each hour (every quarter hour) to once every four hours depending on the nature of the hazards.

12.10 IMMEDIATELY DANGEROUS TO LIFE AND HEALTH CONDITIONS

Work in IDLH atmospheres is forbidden except in emergencies or when it is impossible to bring IDLH to acceptable levels. Work in IDLH atmospheres, other than emergency rescue, requires the written approval of the Parsons Construction Manager, the designated client representative, and any other necessary approvals. Atmospheres must be ventilated to lower the toxicity of IDLH atmospheres. The following precautions must be taken in IDLH conditions.

- **Respiratory Protection.** Only self-contained breathing apparatuses (SCBAs) or airline respirators with escape bottles may be used in IDLH atmospheres.

  All rescue personnel must be trained in the use of a self-contained breathing apparatus or airline respirators with escape bottles.

- **Airline Respirators.** In confined spaces where workers use only airline respirators, a breathing air attendant from or assigned by the department responsible for the work must be in constant attendance to monitor the breathing air stations or low pressure alarms near the workers.

- **Safety Harnesses.** Workers entering confined spaces with IDLH atmospheres must wear approved safety harnesses, wristlets, or vests with lifelines. Each employee/lifeline must be manned by an employee outside the enclosure.

- **Explosive Atmospheres.** No work may be done in environments containing explosive gas atmospheres greater than 10% (1/10) of the LEL indicated by a combustible gas indicator. Appropriate dilution ventilation must be provided.

12.11 SIGNS

Signs must be posted near permit spaces notifying employees of the hazards present and that only authorized entrants may enter the permit area.

12.12 SIGN IN/OUT SHEET

Authorized entrants must sign in and out when entering or leaving a confined space area.

12.13 FORMS

The forms in Exhibit 12-1 may be used in whole or in part as guidelines to develop site-specific confined space procedures. All site-specific forms must comply with OSHA and client regulations.

SECTION 13
FIRE SAFETY

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13-1 Approved Fire Extinguishers 13-2

EXHIBIT

13-1 Fire Safety Forms

Figure 13-1-1 Fire Extinguisher Inspection Form E13-1-1

Figure 13-1-2 Hot Work Permit Form E13-1-2

FIRE SAFETY

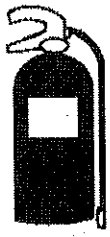
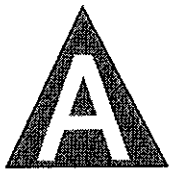
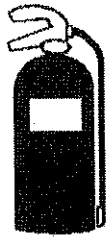
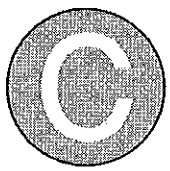
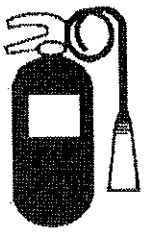
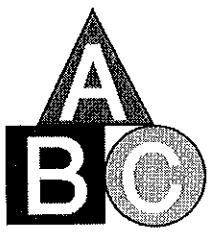
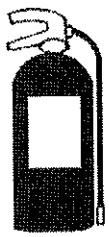
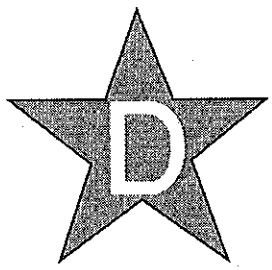
13.1 FIRE PROTECTION AND PREVENTION

All contractors are required to comply with OSHA 29CFR 1926 Subpart F – Fire Protection and Prevention and other applicable OSHA Standards. Contractors are to inform their employees of the proper fire notification and evacuation procedures and the location and use of fire equipment for their assigned work areas. Contractor's Fire and emergency notification and evacuation procedures must be conspicuously posted at all jobsites.

All fires must be reported immediately.

Contractors are required to adhere to the following proper precautionary measures; doing so will help keep fire losses to a minimum:

1. Good housekeeping practices help identify and minimize fire sources and provide easier control when emergencies arise. Make a daily check of tool houses, change shanties, offices, etc., to eliminate any accumulation of rubbish, oily rags, combustible scrap, etc.
2. Install (or have available) appropriate fire extinguishers (Figure 13-1) in suitable locations and periodically check working order. Extinguishers must be serviced after each use.
3. Establish a regular schedule for servicing and maintaining fire extinguishers as each job progresses. Remember that water extinguishers must be protected with antifreeze solutions if exposed to freezing weather.
4. Periodically check the wiring and connections in all tool rooms, shanties, offices, etc. Report all electrical defects to the appropriate supervisors.
5. Instruct all personnel to thoroughly inspect work clothing at the end of each shift to locate and remove any hot slag, molten metal, etc.
6. Ensure that clothing soiled with oil, grease, or paint is cleaned regularly or as soon as possible after it is soiled.
7. Never store paint, oil lubricants, or other highly flammable materials in areas where they could be exposed to excessive heat. Keep highly flammable materials in a separate location isolated from other buildings. Establish a procedure for handling and storing flammable liquids. All containers of flammable liquids must be clearly labeled.
8. Prohibit smoking in highly flammable areas. Provide limited smoking areas and post proper signs in accordance with OSHA 29 CFR 1926 Standards.
9. Instruct all personnel, particularly key employees and watchmen, in the proper use of firefighting equipment.

 Water Type		Ordinary Combustible Fires
 Dry Chemical		Flammable Liquid Fires (gas and grease)
 CO_2 Type (Plastic horn only)		Electrical Equipment Fires
 Multipurpose Dry Chemical Type		For • Ordinary Combustible Fires • Flammable Liquid Fires • Electrical Equipment Fires
 Dry Powder Type		For Combustible Metal Fires (these metals in finely divided form need special fire attack)
Use Only Underwriters Approved Extinguishers		

PCI/H&SM/AFP

Figure 13-1 – Approved Fire Extinguishers

10. Establish regular inspections to detect fire hazards and take immediate corrective actions upon detection of such hazards.

11. Be certain that all personnel know the location of the nearest fire alarm and know how to sound the alarm.

12. Ensure that heaters are constructed with a stable base so they cannot be easily overturned. Provide protection against hot ashes, sparks, etc. Ensure that fires are extinguished at the end of each shift or when an area is vacated. Do not use gravity-fed heaters.

13. Before starting any burning or welding, look around to make certain that flames, sparks, or hot metal will not be likely to start a fire. Remember that fires resulting from this type of work are often delayed in starting. Inspect the area thoroughly after each operation is completed.

14. Ensure that a suitable fire extinguisher is always ready for instant use where welding or burning is done. Where combustible materials are present near an operation, a helper or extra person should be on hand to guard against fires.

15. Each crane, forklift, or other mobile equipment on site should have one approved fire extinguisher, in good condition.

16. Never attempt to fuel any equipment while it is in operation or while the engine is running. Avoid spilling fuel on a hot engine.

17. Remember that the first few seconds in a fire situation are the most important. A few seconds saved at the start of a fire may make the difference between a comparatively minor event and a major loss.

18. If applicable provide any special firefighting equipment required by site conditions or owner requirements, including water barrels, fire hose on water trucks, hose carts, fire trucks, standpipe systems, clothing, self-contained breathing apparatus, etc.

19. Train employees in the use of firefighting equipment.

20. Instruct personnel to call the client or local fire department as soon as a fire is suspected. As applicable to site location and client requirements, post the telephone number of the fire department at each telephone location.

21. Take great care to avoid the hazards associated with:

    a. Temporary and permanent heating devices
    b. Electrical wiring and equipment
    c. Volatile liquids and gas storage
    d. Fueling operations
    e. Handling flammable compounds
    f. Poor housekeeping
    g. Welding and cutting
    h. Spilled greases and oils
    i. Spontaneous combustion

j. Explosives, gases, dust
k. Storage of flammable building materials

13.1.1 FLAMMABLE LIQUID CONTAINERS

When flammable liquids are handled or used in small containers such as five-gallon cans, such cans must be of an approved type, painted red, with yellow wording: *DANGER - KEEP AWAY FROM FIRES,* equipped with a double perforated flame arrestor and the cap must be spring loaded to close tightly. A list of the contents must be affixed to the can.

Products such as motor oil, lubricating oil, and greases, which are less volatile and less flammable, may be handled in containers other than the safety type described above. However, the contents must be labeled on the can or container. Such cans must also be labeled *KEEP AWAY FROM FIRES.*

Where flammable liquids are stored or handled in larger quantities, such as in barrels, drums, or tanks, such containers must be labeled to show the contents and have appropriate fire precaution warnings affixed.

13.1.2 FIRE EQUIPMENT INSPECTION AND USE

Each Contractor must conduct a survey of their work area before work begins to determine the appropriate fire protection equipment need and is provided to protect their employees, other workers in the area and the facility.

Only approved fire protection equipment may be used to ensure conformance with local, state, and federal regulations, client requirements, all relevant fire codes, and good industry practice.

Asbestos composition fire blankets may not be used.

All firefighting equipment must be inspected monthly and inspection documentation maintained (refer to Exhibit 13-1). Defective equipment must be removed immediately from service and replaced with properly functioning equipment. Defective equipment should be repaired as soon as possible.

All fire extinguishers must be replaced immediately after use and recharged as soon as possible.

Free and open access must be maintained to all fire protection equipment.

The location of all fire protection equipment must be clearly marked for ready identification.

If present, fire pumps and systems must be tested weekly and records kept.

General fire protection equipment may not be used for other than its originally designed purpose.

13.2 HOT WORK PROCEDURES

At various times on Teal Construction sites it is necessary to perform hot work such as welding, cutting, and grinding. Before any hot work can be performed, certain precautions must be taken and conditions met to determine that hot work efforts can be performed safely.

Contractors are required to use the following guidelines to help prevent injury to employees and damage to property.

- An initial site survey must be made by a designated competent person to determine that the area is free of flammable and combustible materials.
- Good housekeeping practices must be maintained at all Teal Construction sites that require hot work.
- Adequate fire extinguishing equipment must be in place and readily accessible at all Contractors hot work locations, and employees must be properly trained in the use of such equipment.
- A fire-watch must be provided as necessary when conditions warrant. The fire-watch members must be properly trained to use the required fire extinguisher and hose, and be familiar with the position's responsibilities.

13.3 COMPRESSED GAS CYLINDERS

This subsection contains general guidelines and requirements governing the storage and use of compressed gas cylinders.

13.3.1 STORAGE IN BUILDINGS

- Cylinders must be kept away from radiators and other sources of heat.
- Cylinders must be stored in well-ventilated, well-protected, dry locations, at least 20 ft from combustible materials such as oil or excelsior, or separated by fire-resistant barriers at least 5 ft high with fire resistance ratings of at least 30 minutes. Refer to paragraph 13.3.3 for examples of noncombustible barrier materials.
- Cylinders must be stored in assigned places with signs clearly labeled with the name of each gas. Cylinders may not be stored near elevators, stairs, or gangways. Storage spaces must be located so that cylinders will not be knocked over or damaged by passing or falling objects, or subjected to tampering by unauthorized persons.
- Cylinders may not be stored in unventilated enclosures such as lockers and cupboards.
- Cylinders of unlike compressed gases must be stored in separate, clearly designated areas.
- Empty cylinders must be stored with valves closed.
- Empty cylinders must be stored in areas separate from fully-charged cylinders.
- Where cylinder design includes a cap, valve protection caps must be in place and must be hand-tight, except when cylinders are in use or are connected for use.
- Compressed gas cylinders must be stored upright and secured in position at all times except for short periods while being hoisted or carried.

- Cylinders must be hoisted in approved cradles or baskets. They must never be hoisted with slings, ropes, or chains.
- Appropriate guard railing and safe access must be provided for storage areas at dock height.
- Only approved apparatus such as torches, regulators, pressure reducing valves, generators, and manifolds may be used on compressed gas cylinders.
- Compressed gas cylinders must be labeled to identify gas content in accordance with *ANSI B57.1-1954*. Color coding may not be used to identify compressed gas cylinder contents. The reason is that a supplier may provide several different-colored cylinders containing the same gas, or may provide several different gases in like-colored containers. Therefore, clear labeling of each cylinder is the only means of ensuring that it is properly stored and that its contents are properly used.
- If a compressed gas cylinder is not properly labeled, it may not be used. Instead, the user must return it immediately to the supplier. While waiting for return to the supplier, the cylinder should be placed in a storage area especially designated for returns and tagged *DO NOT USE*.

13.3.2 FUEL-GAS CYLINDERS

- Warning signs must be placed conspicuously in fuel-gas cylinder storage areas. All such warning signs should contain the following or equivalent wording.

DANGER
NO SMOKING, MATCHES
OR OPEN FLAMES

- A fire extinguisher of appropriately rated capacity and type must be installed no closer than 25 ft or farther than 75 ft from any fuel-gas storage locations.
- Acetylene cylinders must be stored with valve end up.
- Except when in actual use or when attached for use, the total capacity of cylinders in a building under construction must not exceed 2,000 cubic feet or 300 lb of liquefied petroleum gas.

13.3.3 OXYGEN

Oxygen cylinders must be stored separate from fuel-gas cylinders or combustible materials, especially oil or grease. The distance separating the oxygen and fuel-gas containers must be a minimum of 20 ft. A noncombustible barrier at least 5 ft high with a fire-resistance rating of at least 30 minutes may also be used to separate these gases. Examples of appropriate noncombustible barrier materials include steel plate, concrete walls, and concrete blocks.

13.3.4 ANTI-FLASHBACK REQUIREMENTS

Anti-flashback valves must be used on all compressed gas burning and welding equipment. The valves must be installed at the base of regulators and not at the torch barrel.

13.3.5 TRAINING

All Contractors with workers who have reason to handle compressed gases must be trained to anticipate the hazards associated with these materials.

SECTION 14
WELDING

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WELDING

14.1 SAFE WELDING

All welding processes have inherent potential health and safety hazards. The hazards vary, depending on the type of welding and the control measures being employed. The principal hazards are to the eyes and skin from ultraviolet radiation, molten metal, and the electric arc.

Adverse health effects also are common from breathing metal fumes and gases. The hazard potential from the metal fumes generated by a welding operation depends on the types of metals being used; the concentration of metals in the welder's breathing zone, and the duration of exposure.

Ozone and oxides of nitrogen are toxic gases produced by the welding of some metals. They can cause a condition known as metal fume fever that promotes symptoms similar to the flu, including a metallic taste in the mouth, dryness in the nose and throat, muscle and joint pain, fever, chills, and nausea. These symptoms generally disappear within 24 hours.

Most welding is performed using coated rods or electrodes whose coatings and cores contain metal oxides, hydroxides, carbonates, fluorides, and organic materials. Exposure to fluorides irritates eyes, nose, and throat. Also, some silver solders contain cadmium. Even a brief overexposure to cadmium can produce severe lung irritation.

The electric arc generates ultraviolet radiation (UV). Skin exposure to UV can cause a severe burn similar to sunburn. UV also can damage the eyes, causing a condition known as "welder's flash" or "arc eye." Flash burns are painful, and repeated exposure may result in permanent eye damage.

Figure 14-1 briefly describes the hazards inherent in various welding processes. Each contractor conducting welding work at a Teal Construction site will be required to have precautions and procedures necessary to minimize those hazards. The following paragraphs cover those type precautions and procedures necessary to have a safe welding program.

14.1.1 WELDING AND CUTTING OPERATIONS

Before beginning welding operations, contractors should review the following guidelines to ensure the safe completion of the welding task.

- Before starting to cut or weld, inspect the work area to ensure that sparks or molten metal will not fall on combustible materials. If the necessary safeguards are not readily available, refer the situation to the task or craft supervisor.
- Do not cut or weld in a hazardous area without obtaining written authorization from the responsible authority.

Type of Welding	Hazard	Source	Material	Effect	Control
Arc acetylene	Fumes	Metal being welded; electrode used; coating on metal; flux; filler metals	Cadmium, cobalt, lead, antimony, chromium, copper, iron, beryllium, magnesium, manganese, tin, zinc, fluorides	Metal fume fever, irritates lungs; dry throat and cough, nausea, headache, chills with fever, aching in joints, loss of appetite	Local exhaust ventilation; respirator if in confined area
Arc especially inert gas weld	Non-ionizing radiation	Welding arc	Infrared and ultraviolet	Irritates and damages eye tissue; can cause painful sunburn and possibly skin cancer	Tinted glass to shield welder; proper eye protection and body covering including all exposed skin; separate welders from other workers; welding screens
Arc acetylene	Toxic gases	The arc, burning process or changes in the atmosphere	Acetylene, arsine, carbon dioxide, carbonic acid, carbon monoxide, nitrogen dioxide, ozone, phosgene, phosphine	Some symptoms: headache; nausea; irritates lungs, eyes, nose, and skin; dizziness and lack of appetite	Respirator if in confined area; good local exhaust ventilation
Arc acetylene	Metallic sparks, molten metal	Sparks from heated metal; hot metal	All metals	Burns, fires	Eye protection; clothing: pants, long sleeves and socks; gloves
Arc	High voltage	Splices, wires		Shocks, fires	Keep electrodes covered, keep all electric cable splices and wires in good condition, avoid welding in damp areas
Arc	Solvent vapors	Cleaning and degreasing of metals before welding; ultraviolet rays in welding decompose degreasing solvents	Trichloroethylene and other chlorinated hydrocarbons; degreasing solvents can produce deadly phosgene gas on exposure to ultraviolet rays of arc	Can be fatal; irritates skin, eyes, nose, throat and chest; dizziness; chills, thirst; delayed effect; fluid in lungs and death	No welding within 200 ft of degreasing operations; if gas smelled, welding should be stopped immediately and area evacuated

Figure 14-1 – Welding Safety Chart

- Ensure that suitable fire-extinguishing equipment is available in the work area.
- Inspect all cutting and welding equipment at the start of each shift.
- When cutting or welding, wear approved eye protection with suitable filter lenses. Refer to the information on eye protection in subsection 5 (PPE) of this manual.
- Wear protective clothing that covers all exposed areas of the body. Fire retardant clothing may be required on some Teal Construction sites.
- Keep all leads and hoses up off floors, walkways, and stairways. Contractors are responsible for ensuring that their equipment complies with safe practices at all times.
- Never weld or burn on barrels, tanks, piping, or other systems that may have contained either combustible or unknown products without first obtaining approval from their Site Safety Manager or other responsible authority.
- Place spent welding rods in suitable containers. They should never be left on walking or working surfaces.

14.1.1.1 HANDLING AND PLACING GAS CYLINDERS

The following are guidelines for safe handling and placing of gas cylinders. These guidelines must be adhered to at all times.

- Ensure that cylinder valves are closed and protective caps are in place when not in use.
- Do not use protective caps to lift cylinders.
- Secure cylinders to be hauled by a powered vehicle in a vertical position. Rolling cylinders onto a forklift is prohibited.
- Do not use chokers to haul cylinders.
- Use cylinder trucks to secure cylinders in a vertical position while in use.
- Ensure that cylinders are never placed where they can become part of an electrical circuit.
- Keep cylinders away from actual work so that no sparks, hot slag, or flame can reach them. If cylinders cannot be isolated, fire resistant shields must be provided for them.
- Secure all cylinders in an upright position.

14.1.1.2 GAS CYLINDER USE

The following requirements are to be followed when using gas cylinders.

- Crack the gas cylinder valve before connecting a regulator.
- After connecting the regulator, open the cylinder valve slowly, not more than 1-1/2 turns. If removable, leave key on valve.

- Before removing a gas regulator, close the cylinder valve and bleed the regulator and hose.
- Tag cylinder valve leaks and remove leaking cylinders from service.
- In the event of a fuse plug leak, leave cylinders in service and apply tags stating *DO NOT USE.*
- Inspect regulators, hoses, and torches before each shift. Any suspect hose must be removed from service. All parts must be free of grease and oil.

14.1.2 WELDING AND CUTTING

To ensure safety when welding and cutting, the guidelines below must be followed.

- Do not use pipelines containing gases or flammable liquids, or conduits containing electrical circuits, as ground returns during arc welding.
- When not in use, remove electrodes from holders and place them where they cannot make electrical contact with employees or conducting objects.
- Ensure that all welding cables and connectors are capable of handling the maximum current requirements for the work in progress.
- Ensure that all arc welding and cutting cables are of the completely insulated, flexible type.
- Use cable where there is a minimum of 10 ft from the electrode holder free of any repairs or splices.
- Do not dip hot electrode holders in water.
- Report any faulty or defective equipment to the your immediate supervisor.
- Welding and cutting are not permitted in areas where flammable paints or other flammable liquids are being stored or used.
- Instruct fire watches assigned to guard "hot" jobs of hazards in hot areas.
- If an object is to be cut, welded, or heated, and cannot be moved to an area with no fire hazard, a means of confining the heat, sparks, and slag must be provided to protect immovable fire hazards. Check with the appropriate supervisor to determine whether a hot work permit is needed.
- Remove all containers that have held flammable liquids from open flame areas.
- Keep passageways, ladders, and stairs clear of hoses and cables.
- Ensure that boxes used for storing gas hose are properly ventilated.

14.1.3 VENTILATION

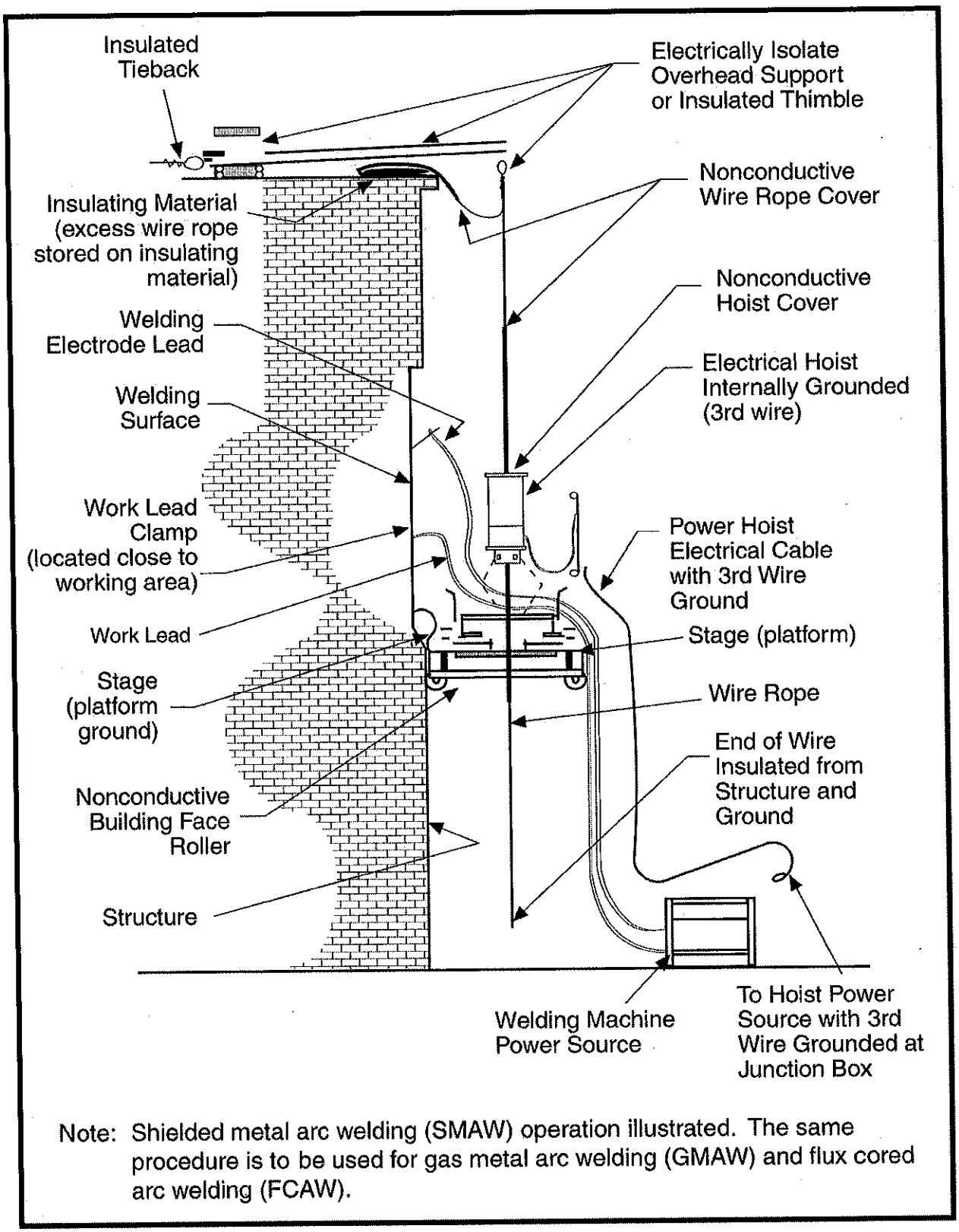
The following are ventilation requirements for welding.

- Ensure that adequate ventilation is provided for employees working with welding and cutting equipment.
- Ensure that contaminated air exhausted from a working space is discharged into the open air or otherwise clear of the source of intake air.
- Do not use oxygen for ventilation, comfort cooling, blowing dust from clothing, or for cleaning a work area.
- Ensure that all necessary precautions are taken to prevent the accumulation of gases when cutting torches are used.
- Do not take compressed gas cylinders into confined areas.

14.2 ELECTRIC WELDING ON SUSPENDED PLATFORMS

To reduce the possibility of a welding current arcing through a suspension wire rope during welding from suspended scaffolds, the following precautions must be taken (see Figure 14-2).

1. Use an insulated thimble to attach each suspension wire rope to its hanging support (such as cornice hook or outriggers). Insulate excess suspension wire rope and any additional independent lines from grounding.
2. Require that the suspension wire rope be covered with insulating material at least 4 ft above the hoist. If a tail line exists below the hoist, it must be insulated to prevent contact with the platform. The portion of the tail line that hangs free below the unit must be guided or retained, or both, so that it does not become grounded.
3. Cover each hoist with protective covers made from insulating material.
4. In addition to the work lead attachment required for the welding process, a grounding conductor must be attached from the scaffold to the structure. The size of this conductor must be equal to or greater than the size of the welding process work lead. It must not be in series with the welding process or the work piece.
5. If a scaffold grounding lead is disconnected at any time, the welding machine must be shut off immediately.
6. At no time allow an active welding rod or uninsulated welding lead to come in contact the scaffold or its suspension system.



Note: Shielded metal arc welding (SMAW) operation illustrated. The same procedure is to be used for gas metal arc welding (GMAW) and flux cored arc welding (FCAW).

PCI/H&SM/SPWP

Figure 14-2 – Suspended-Platform Welding Precautions

SECTION 15
OPERATING PROCEDURES

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OPERATING PROCEDURES

This section provides the minimum requirements necessary to prevent or reduce the risk of injury while accomplishing construction projects.

15.1 APPLICABILITY

This section is applicable to all types of work (including maintenance, operations, construction, and research) where an employee may be exposed to hazards inherent in Teal Construction activities.

15.2 REQUIREMENTS

15.2.1 RESPONSIBILITIES

All Contractors are responsible for ensuring that:

- All employees are briefed, understand their responsibilities and are capable of carrying out their duties prior to any project activities.
- Only approved Teal Construction drawings are used for the activity and they are current and readily available.
- All necessary materials and tools have been checked, are ready and available.

All contractors' employees are responsible for:

- Being familiar with the process and asking their supervisor if they are not sure what their role in the process is to be.
- Reporting and removing defective components from service.
- Complying with the requirements of this section.

15.3 OPERATING POCDURES

15.3.1 COMPRESSED AIR

15.3.1.1 Air hose connections will be secured in position by placing a retaining pin or tie wire through all crow's feet.

15.3.1.2 Shut off air supply and bleed all air pressure before disconnecting hoses, tools, or installing jackhammer/rivet buster/chipping hammer points.

15.3.1.3 A safety retainer will be provided on all air tools to prevent the bull point, chisel or spade from flying off.

15.3.1.4 Do not use air pressure for dusting clothes or blowing dust from hair, neck or arms.

15.3.1.5 Never turn a blast of air toward a fellow worker as a prank.

15.3.1.6 Air used for cleaning personal belongings / clothing is to be restricted to a pressure no greater than 30 PSI.

15.3.2 Concrete Work

15.3.2.1 When two or more men are handling concrete forms together, they will always lift and let down at the same time to avoid mashed fingers or toes.

15.3.2.1 Workers in or near wet concrete will wear rubber boots

15.3.2.3 Workers exposed to dry cement will wear appropriate eye protection and respirators if exposure warrants.

15.3.2.2 In case of cement burn, wash area thoroughly with soap to remove all cement.

15.3.2.3 Cement in the eye, hold the victim's eye open and flush out with water and take to the company doctor immediately.

15.3.2.4 Employees will not ride on concrete buckets for any purpose or stand under suspended buckets or concrete boom chutes.

15.3.3 Cables/Chains/Ropes

15.3.3.1 All hooks, rings, shackles and chains will be inspected prior to use for fatigue cracks, wear and strain. Regular inspections will be made while in service. Remove from use and discard if there are any signs of defect.

15.3.3.2 All cables will be inspected before use. Cables with six broken strands in one lay or three broken wires in one strand shall be removed from service. (A lay is the length along the cable in which one strand makes a complete revolution around the cable). Also, look for "bird-caging" signs of corrosion, and severe kinking, crushing or abrasion. Any cable found defective will be removed from service.

15.3.3.3 U-bolt clips will be checked for slipping or

15.3.4 Daily Inspections

15.3.4.1 Personal Fall Protection – Harnesses, lifelines, safety cables and connections are to be inspected daily.

15.3.4.2 Scaffolds – All scaffolds or scaffolding are required to be inspected prior to use on a daily basis or if appropriate prior to each shift.

15.3.4.3 Tools, Power or Hand – All tools are required to be inspected prior to use. Electrical tools are subject to Electrical Section of this section.

ANY EQUIPMENT AND/OR TOOL THAT IS DEFECTIVE IS NOT TO BE USED FOR ANY REASON AND IS TO BE TAKEN OUT OF SERVICE IMMEDIATELY.

TEAL CONSTRUCTION COMPANY
800-364-8325

TEAL CONSTRUCTION COMPANY

Superintendents Daily Safety Inspection Check List

Location: _____ Job # _____ Date: _____

HOUSEKEEPING:

1.Storage of Material — Make a Selection
2.Trash Clean Up — Make a Selection
3.Tripping, Slipping Hazards — Make a Selection
4.Other _____

SCAFFOLDS:

5.Base Plates & Mud Sills — Make a Selection
6.Guardrails & Toe Boards — Make a Selection
7.Fully Planked Working Levels — Make a Selection
8.Scaffold Components / Sound — Make a Selection
9.Properly Supported 4:1 Height — Make a Selection
10.Access Ladder — Make a Selection

LADDERS:

11.Tied Off — Make a Selection
12.Extends 3 Ft — Make a Selection
13.Slip Resistant Feet — Make a Selection
14. 1/4 Working length Angle — Make a Selection
15.Rungs & Steps Sound — Make a Selection
16.No Electrical Exposures — Make a Selection
17.Other _____

JOB OFFICE SET UP:

18.Emergency Action Plan — Make a Selection
19.Blood Borne & First Aid Kits — Make a Selection
20.OSHA & State Posters — Make a Selection
21.Emergency #'s Posted — Make a Selection
22.MSDS/First Aid Signs Displayed — Make a Selection
23.Hard Hats Required Sign Displayed — Make a Selection

TRENCHES & Excavation:

24.Access / Egress — Make a Selection
25.Barricades — Make a Selection
26.Shoring / Sloping Benching — Make a Selection
27.Water — Make a Selection
28.Other _____

AERIAL LIFTS:

29.Controls Tested — Make a Selection
30.Authorized Person — Make a Selection
31.Restraint System — Make a Selection
32.Safety Chains Uses — Make a Selection

FIRE PROTECTION:

33.Extinguisher Charged — Make a Selection
34.Extinguisher Tagged — Make a Selection

PERSONAL PROTECTIVE EQUIPMENT:

35.Safety Glasses w/ Side Shields — Make a Selection
36.Full Body Harness — Make a Selection
37.Goggles / Face Shields — Make a Selection
38.Long Sleeve Shirts — Make a Selection
39.Work Boots — Make a Selection
40.Hard Hats — Make a Selection
41.Hearing Protection — Make a Selection
42.Gloves — Make a Selection
43.Respirators — Make a Selection

Flammable Liquids:

44.Approved Containers — Make a Selection
45.Warning Signs — Make a Selection
46.Proper Storage — Make a Selection
47.Properly Labeled — Make a Selection
48.Other _____

TOOLS & EQUIPMENT:

49.Audible Warning Device — Make a Selection
50.Working Tool Safety Guards — Make a Selection
51.Warning Signs — Make a Selection
52.Grounding Required — Make a Selection
53.Electrical Cords — Make a Selection
54.Double Insulated Tools — Make a Selection
55.GFI Protection — Make a Selection
56.Other _____

Comments:

Superintendent: _____ Signature: _____

Complete Form Daily and Keep in Safety Binder Onsite at all Times

Additional Comments #1

Additional Comments #2

Additional Comments #3

Additional Comments #4

Additional Comments #5

TEAL CONSTRUCTION COMPANY

Request for MSDS / Written Hazard Communication Program

Date: _____

To: _____

Attn: _____

Fax/Email: _____

RE: Request for MSDS / Written Hazard Communication Program

Project: _____

As you are aware, OSHA requires employers to provide training to their employees concerning the hazards of chemicals and / or other hazardous materials being used on this job site and MSDS (Material Safety Data Sheets) for those materials.

29 CFR 1926 OSHA Construction Industry Regulation for Hazard Communication requires:
1910.1200 (e) Written hazard communication programs

Employers shall develop, implement, and maintain at each workplace, a written hazard communication program which at least describes how the criteria specified in paragraphs (f), (g), and (h) of this section for labels and other forms of warning, material safety data sheets, and employee information and training will be met, and which also includes the following:

(i) A list of the hazardous chemicals known to be present using an identity that is referenced on the appropriate material safety data sheet(the list may be compiled for the workplace as a whole or for individual work areas); and,

(ii) The methods the employer will use to inform employees of the hazards of non-routine tasks (for example, the cleaning of reactor vessels), and the hazards associated with chemicals contained in unlabeled pipes in their work areas.

☐ We do not have your MSDS for this project.

☐ We do not have your Hazard Communication program for this project.

Please furnish this to me as soon as possible.

Sincerely,

Project Superintendent

TN 11-13 Keep this form along with attached fax record on file at job site.

TEAL CONSTRUCTION COMPANY

Safety Violation Notification

To: _____ Time: _____ ☐ AM ☐ PM

(Subcontractor's Company Name)

_____

_____

_____

From: _____

Date: _____

Project Name & Number: _____

Pictures of Violations Taken? ☐ Yes ☐ No

Notification for this violation. ☐ 1st Violation ☐ 2nd Violation ☐ 3rd Violation

Description of Violation: (Include Names of Those Involved)

Corrective Action Taken:

Date & Time: _____

cc: Safety Director
Project Manager
Subcontractor Field
File Copy

TN 11/13

Keep this form along with attached fax record on file at job site. Forward to CC Listed.

TEAL CONSTRUCTION COMPANY

Safety Guidelines

INCIDENT REPORT

Date: _____ Job #: _____

Time: _____

Location: _____

Supervisor: _____

Report Filed By: _____

Specific Details of Incident:

Name of Employee(s): _____

Name of Employer: _____

Machine or Equipment Involved:

Corrective Action Taken:

Were there any Injuries: (If Yes File Supervisors Investigation of Accident) ☐ Yes ☐ No

Was there any Property Damage: (If Yes Complete next Section) ☐ Yes ☐ No

Description of Property Damage:

List any Witnesses:

Signature: _____ Date: _____

TN 11/13/13

TEAL CONSTRUCTION COMPANY
Job Site Safety Audit

Inspection Date: _____ Time: _____ Weather: _____

Project Name: _____ Project Number: _____

Superintendent: _____

Subcontractors	Foreman	Number of Emplyees

Safety Concerns

Tool Box & Safety Meeting Records	☐ Incomplete / Not Available	☐ All In Order
Subcontractor MSDS & Safety Programs	☐ Incomplete / Not Available	☐ All In Order
Supt. Daily Safety Inspection Records	☐ Incomplete / Not Available	☐ All In Order

Corrections Made

Superintendent: _____ Inspector: _____

TN 11/19/2013

TEAL CONSTRUCTION COMPANY

SAFETY GUIDELINES

Attachment "A"

FIRST REPORT OF INJURY

Is this a Teal Employee ? ☐ Yes ☐ No

If this is a subcontractor: ☐ Yes ☐ No Name: _____

If other - describe: _____

1 Employee's Name (Last)	First	MI	2. Sex ☐ Male ☐ Female	15. Date of Injury (m-d-y)	16. Time of Injury	17. Date Lost Time
3. Social Security Number	4. Home Phone Number	5. Date of Birth (m-d-y)	18. Nature of Injury		19. Part of Body Injured or Exposed	
6. Does the Employee Speek English? If No, specify Language ☐ Yes ☐ No			20. How and Why Injury / Illness Occurred			
7. Race ☐ White ☐ Black ☐ Asian	8. Ethnicity ☐ Native American ☐ Hispanic ☐ Other		21. Was Employee Doing his regular job? ☐ Yes ☐ No		22. Worksite Location of Injury (stairs, dock, etc)	
9. Mailing Address (Street or P.O. Box			23. Address Where Injury or Exposure Occurred Name or Business if incident Occurred on a Bussiness Site. (Street or P. O. Box)			
City	State	Zip Code	City		State	Zip Code
10. Marital Status ☐ Married ☐ Widowed ☐ Seperated ☐ Single ☐ Divorced			24. Cause of Injury (fall, tool, machine, etc. ?)			
11. Number of Dependent Children	12. Spouse's Name		25. List Witnesses			
13. Doctors Name			26. Return to Work		27. Did Employee Die? ☐ Yes ☐ No	
14. Doctors Mailing Address (Street or P.O. Box)			28. Supervisor's Name			
City	State	Zip Code	29. Date Reported			
30. Date of Hire (m-d-y)	31. Was the employee hired or recruited in Texas? ☐ Yes ☐ No		32. Length of Service in Current Position		33. Length of Service in Occupation	
34. Employee Payroll Classification Code			35. Occupation of Injured Worker			
36. Rate of Pay at this Job	37. Full Work Week is:		38. Last paycheck was:		39. Is the employee an Owner, Partner, or Corp. Official ☐ Yes ☐ No	
40. Name and Title of Person Completing this Form		Phone	41. Name of Business			
42. Business mailing Address (Street or P.O. Box)			43. Business Location (If different from mailing address) Street or P.O. Box			
City	State	Zip Code	City	State	Zip Code	Country
44. Federal Tax Identification Number	45. Primary Standard Industrial Classification (SIC)		46. Specific SIC Code (4 Digits)		47. Texas Comptroller Taxpayer	
48. Worker's Compensation Insurance Company			49. Policy Number			
50. Did you request accident prevention services in past 12 months?						
51. Signature and Title			Date:			

TN 11/19/2013

Teal Construction Company

Safety Guidelines
Attachment "B"
EMPLOYERS SUPPLEMENTAL REPORT OF INJURY

EMPLOYEE INFORMATION

1. Employee's Name (Last)	First	MI	Telphone No

2. Social Security No.	3. Date of Injury (m-d-y)

4. Employee's Mailing Address (Street or P.O. Box)

City	State	Zip Code

TO EMPLOYER. Based on above rule requirements, check boxes which show reasons for filing Supplemental Report of Injury this date.

- ☐ employee returned to work — Complete Block 5a or 5B; Complete Blocks 6 and 7
- ☐ change in weekly earnings after injury — Complete Blocks 5a or 5b; Complete Blocks 7 and 8
- ☐ employee terminated / resigned — Complete Block 5a or 5c; Complete Block 7; Complete Block 9
- ☑ additional day(S) of — Complete Block 5a; Complete Block 7

5 a) if initial filing, first day of disability due to injury (m-d-y)	5 b) if second or subsequent filing , give frist day of disability due to injury (for this period only (m-d-y)

6. Date of Return to Work _____ (m-d-y)

☐ Full Duty. Full Pay. ☐ Limited Duty. Full Pay. ☐ Reduced Pay

7. Weekly and Hourly Earning at Time of This Report

Weekly $ _____ Hourly $ _____

☐ Same as Preinjury Wage ☐ Decrease from Preinjury Wages

☐ Increase from Preinjury Wages

8. No. of Hours Working Weekly at Time of This Report

☐ Same as Preinjury _____ Hours

☐ Increase from Preinjury Hours Worked weekly

☐ Decrease from Preinjury Hours Worked Weekly

9. If the employee resigns or is terminated, fill in the appropriate section.

☐ Date of Resignation (m-d-y) _____

☐ Date of Termination (m-d-y) _____

10. If applicable, eight days of disability began on (m-d-y) _____ (m-d-y)

9a. Reason for Resignation or Termination.

11. Has injured employee died? If so give date of death.

☐ Yes ☐ No _____ (m-d-y)

12. Was employee on limited duty at time of termination?

☐ Yes ☐ No

EMPLOYER INFORMATION

13. Employer's Business Name	Telephone Number

15. Employer's Business Mainling Address (Street or P.O. Box)

City	State	Zip Code

16. Name of Workers' Compensation Carrier for Above Injury

17. The information provided in this report is accurate to the best of my knowledge. It may be relied upon for evaluation of the named employee's eligibility for benefits.

Signature and Title of Person Completing this Form _____ Date _____

TEAL CONSTRUCTION COMPANY

Safety Guidelines
ATTACHMENT "C"
SUPERVISOR'S INVESTIGATION OF ACCIDENT / INCIDENT

Employee Name: _____
Social Security Number: _____
Address: _____
Phone Number: _____ Relative Phone # _____
Job Position / Title: _____
Task: _____
Tools Being Used: _____
Location: _____
Location Address: _____
Supervisors Name: _____
Date/Time of Incident, Injury or Illness: _____
Date/Time of Incident, Injury or Illness Reported: _____
Name(s) of Witnesses: _____
Witnesses Phone Number(s): _____

Incident Resulted In: ☐ Injury ☐ Illness ☐ Fatality ☐ Property Damage ☐ N/A

First Aid Given? ☐ Yes ☐ No

Medical Treatment Required? ☐ Yes ☐ No

Workdays Lost? ☐ Yes ☐ No

Describe How the Incident Occurred:

What Actions, Events, or Conditions Contributed most Directly to this Incident?:

Corrective Action:

Corrective Action follow-up Date: _____

Employee Signature: _____ Date: _____

TN 11/20/2013

TEAL CONSTRUCTION COMPANY

Safety Guidelines

ATTACHMENT "D"

MEDICAL QUESTIONNAIRE

Supervisor Signature: _____ Date: _____

PLEASE ANSWER THE FOLLOWING QUESTION IN YOUR OWN HANDWRITING:

NAME: _____ SS# _____

ADDRESS: _____

CITY: _____ STATE _____ ZIP CODE _____

AGE: _____ CRAFT: _____ ☐ JOURNEYMAN

☐ HELPER

HOURLY RATE: _____

DATE OF OCCURRENCE: _____

EXACT TIME: _____ ☐ A.M. ☐ P.M.

WHERE DID OCCURRENCE HAPPEN? (EXACT LOCATION)

_____

_____

_____

_____

WHO WAS WORKING WITH YOU? LIST NAMES. _____

_____

_____

_____

IF LIFTING, WHAT DID YOU LIFT? _____

HOW MUCH WOULD YOU SAY IT WEIGHED? _____ LBS.

DESCRIBE IN YOUR OWN WORDS EXACTLY WHAT HAPPENED: _____

_____

_____

_____

_____

_____

TEAL CONSTRUCTION COMPANY

Safety Guidelines

ATTACHMENT "E"

WAIVER OF IMMEDIATE
PROFESSIONAL MEDICAL ATTENTION

This is to certify that I have received what I consider to be minor injury to my person, while working on the job for Teal construction Company.

I have reported said injury to my supervisor, who has offered me immediate medical attention, which I do not wish to avail myself of at this time.

Signed: _____

Dated: _____

Witness: _____

Date: _____

Time: _____

TEAL CONSTRUCTION COMPANY

Safety Guidelines

NAME OF SUPERVISOR: _____

HAVE YOU EVER INJURED OR HAD A PROBLEM WITH YOU BACK BEFORE TODAY?

IF YES, PLEASE DESCRIBE: _____

_____

_____

_____

_____

_____

_____

_____

THE ABOVE IS TRUE AND CORRECT.

SIGNATURE: _____ DATE _____

WITNESS: _____ DATE _____

TODAY'S DATE IS : _____

Site Specific Safety Plan

Job Name

JOB ADDRESS

This safety program was developed by:

www.csc-safety.com

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1. INTRODUCTION

Safety Objectives

TEAL CONSTRUCTION COMPANY is committed to completing the project with zero (0) accidents or injuries. In order to achieve this goal, the safety and health of all personnel, whether they are employees, subcontractors or members of the general public, must receive primary consideration in all phases of the project, including planning, scheduling and execution of the work.

Compliance with company & client requirements and federal & local safety regulations is mandatory. Employees, Visitors, and Subcontractors will be required to comply with these requirements as a minimum. Exceptions to any of the above for reasons of economic considerations or previous practice will not be considered. Where differences in policy occur between TEAL CONSTRUCTION COMPANY and a customer the more stringent requirement will apply.

Commitment to Safety

The safety and health of every employee, contractor, sub-contractor, partner, customer, visitor and member of the public is a vital aspect of our operations. TEAL CONSTRUCTION COMPANY is committed to strive for excellent performance in safety, health and environmental matters, with an emphasis on the prevention of accidents and injuries.

Our founding principles for safety are based on:

- All injuries and occupational illnesses can be prevented.
- Every member of the supervision and management team is responsible for administering the accident prevention program and will be evaluated accordingly.
- Each employee is responsible for following safe work practices and will be held accountable for his/her acts.
- Accidents and incidents with injury, property or environmental damage potential must be investigated and the root cause must be identified.
- Training is a vital element for a safe and healthy work environment.
- The prevention of accidents, injuries and occupational illnesses is good business.

TEAL CONSTRUCTION COMPANY is proud of our safety program and expects everyone from the newest employee to its most senior tenured executives to adhere to all the policies and procedures when it comes to safety.

The information contained herein provides guidelines for all of the company's personnel and operation. This manual should be kept readily accessible for reference for all work assignments.

The safety manual will be periodically reviewed for the most effective and up to date guidance on safety matters. As regulations change or company policies are revised, so will the manual. It will be a living document.

If any employee ever considers a job task to be unsafe, they have the right to and are encouraged to shut down the job and report it to his or her immediate supervisor for resolution. We welcome suggestions from employees to further help provide safe and healthful conditions and practices.

2. PROJECT MANAGEMMENT TEAM CONTACTS

Title	Name	Office #	Direct Contact
Project Manager			
Superintendent			
Safety Representative			

3. MEDICAL SERVICE LOCATION & CONTACTS

Service	Contact Number	Name	Address
Hospital			
Fire Department			
Other			

4. COMPANY EMERGENCY RESPONSE CONTACTS

Name	Contact Number	Title

5. SITE LOGISTICS

Identify the location of each station and provide the site-specific details for the each category listed below.

Site Egress	
Office Station	
Safety Data Sheet Station	
OSHA Posting Station	
1st Aid Kit Station	
Potable Water	
Portable Toilets	
Fire Protection	
Rally Points	

6. SITE SPECIFIC SPECIAL SAFETY CONCERNS/ HAZARDS

Identify site specific safety concerns and hazards that require special / additional safety measures. Provide a description of the safety concern and measure to control the hazard.

N/A		Place an X in the box to the left if you do not have any site specific safety concerns.

Safety Concern	Safety Control

7. PROJECT SCOPE OF WORK

Provide a detailed description of the project scope of work:

8. GENERAL SAFETY REQUIREMENTS

Safety Requirements- The following requirements apply to TEAL CONSTRUCTION COMPANY Personnel and Subcontractors. These are not all of the safety requirements for this project, but an overview. Other safety requirements can be found in the TEAL CONSTRUCTION COMPANY Safety, Health and Hazardous Communication Program, and contract agreements. Where customer policy and procedure requirements are defined the more stringent, will prevail.

Site Safety Orientation - All employees working on the site must complete, at a minimum, the Site Safety Orientation (where required), prior to being allowed onto the site. Employees will be defined as anyone that is assigned on-site and who performs work. Completion of the site safety orientation is a prerequisite to entry for all workers. **Site Visitors** – Site Visitors will be defined as anyone that is not assigned on-site and who does not perform work. A company representative must escort visitors. An example of a site visitor is: managerial/consulting type person, delivery personnel, vendors, suppliers, office temporaries, etc.

Topics include:

- Site rules
- Communication and authority protocols,
- Permitted routes of movement,
- Signs and warnings,
- Housekeeping and debris handling,
- Emergency procedures

Site Visitors – Site Visitors will be defined as anyone that is not assigned on-site and who does not perform work. A company representative must escort visitors. An example of a site visitor is: managerial/consulting type person, delivery personnel, vendors, suppliers, office temporaries, etc.

Personal Protective Equipment (PPE) – The following minimum PPE is required while working on any TEAL CONSTRUCTION COMPANY site location:

Dress Code- Employees will work fully clothed; shirt, long pants, work shoes, or boots. Clothes must be in good condition. Loose or ragged clothing, which may become a hazard around moving equipment or catch fire easily, is not allowed. Shirts must have sleeves extending over the musters approximately four (4) inches minimum. (i.e. t-shirt). Tank tops, sleeveless shirts, and cutoffs, which expose the abdomen and lower back, are prohibited. Work shoes and boots are to be constructed of leather or other strong durable material and be in good condition. Canvas shoes, sandals, or open-toed shoes are not allowed. Waterproof rubber boots may be worn when conditions require them. Long hair extending beyond the top of the shoulders must be tied back and tucked inside the shirt collar or under the hardhat.

Head Protection- Hard hat (ANSI Z-89 approved) required at all time. Chemical goggles attached to the hardhat as required. Metal hard hats are not approved for use. Hard hats must be worn with the visor (bill) facing forward. Modifications to the hardhat are prohibited.

Eye & Face Protection (ANSI Z-87 approved) required at all time. For some tasks, safety glasses do not provide adequate protection. Site Supervisors must evaluate potential hazards associated with specific tasks and establish minimum acceptable protection for those tasks. Some examples are insulation work, sandblasting, some woodworking tools, powder actuated tools, impact wrenches,

handling chemicals, grinding, chipping, concrete breaking, high pressure air or water blasting or cleaning, opening process lines or systems, battery charging and jump starting, welding, burning, and cutting.

> Note: Also, as conditions of employment, employees that must wear prescription glasses are required to provide proof that their glasses meet the ANSI Z-87 guidelines. Shaded glasses shall not be worn at night, indoors or in poorly lighted areas. The employer is required to provide OTG's(Over The Glass- Safety Glasses) if the employees prescription glasses do not meet the ANSI Z-87 guidelines

Approved Safety Vests and Flame Retardant Clothing (FRC) as required by the site. Other PPE must be made available, such as double eye protection, double hearing protection, respiratory protection, hand protection, and full body harnesses with double locking lanyards and a deceleration device for fall arrest equipment.

Respiratory Protection - Employees required by their employer to wear a respirator must be trained in the proper use of the respirator and medically evaluated before use. Employees exposed to airborne particles, toxic fumes, and gases, vapors, or potential oxygen deficient atmospheres exceeding allowable limits shall wear a respirator applicable for the particular hazard when required.

Hearing Protection- Approved hearing protection such as ear plugs shall be worn when operating tools create high noise levels or working in areas designated as high noise level areas. If the surrounding noise level in your work area makes conversation difficult between you and another employee without raising your voices and the two of you are within three feet of each other hearing protection must be worn.

Hand Protection- Adequate hand protection shall be worn when the task may cause a hand injury. All employees working on site must wear gloves/hand protection when required.

Competent Person – TEAL CONSTRUCTION COMPANY shall designate a competent person for this site. The designated competent person will be on site with the crew at all time. The competent person will implement the company policies & procedures and also have the authority to stop work and address safety hazards.

Emergency Responder – TEAL CONSTRUCTION COMPANY shall designate an emergency responder for this site. The designated emergency responder shall provide 1st Aid Support for minor injuries and will assist in determining when advanced treatment is required. The designated emergency responder will maintain a valid 1st Aid, CPR & AED Training Certification. A stocked 1st Aid Kit, Eye-Wash shall be maintained stocked and readily available on site. A bloodborne pathogen kit shall also be readily available (as required).

Drinking Water – Drinking water will be provided by TEAL CONSTRUCTION COMPANY in approved water receptacles. TEAL CONSTRUCTION COMPANY employees shall only drink from those water receptacles that have been designated for use. Water containers are to be cleaned and sanitized daily. After being refilled, the lids shall be taped shut and dated. Disposable drinking cups & a trash

receptacle shall also be provided.

Sanitary Facilities/ Portable Toilets – TEAL CONSTRUCTION COMPANY will ensure the proper number of appropriate and adequate sanitary facilities are available to craft employees per OSHA 29CFR1926.

Employee Identification - All contractors must visibly wear site specific identification badges (where required). Site specific PPE/ Clothing shall also be worn as required by the general contractor.

Job Safety Observations– The Site Supervisor is responsible for conducting daily safety observations as work is in progress. Site safety audits will be conducted by the Safety Department on a random basis. It is the responsibility of the Site Supervisor to ensure corrective measures are taken on all safety deficiencies.

Work/Permits – Site Specific work permits may be required for certain types of construction activities such as Cold Work, Hot Work, Confined Space Entry and Electrical Lock-Out/Tag-Out. All permits (as they are identified) must be obtained from the customer Operations or Other designee personnel prior to beginning the aforementioned activities.

Company Vehicles - The vehicle operator must have a valid driver's license to include a Commercial Driver License (CDL) with appropriate endorsements when applicable. Vehicles must be current on annual inspections and must be maintained in a safe operating condition. Any vehicle observed to be non-compliant shall not be operated.

Vehicle and Equipment Operation – No One shall be allowed to operate motorized equipment unless they are trained and authorized by the company to do so. Employees operating vehicles or equipment are solely responsible for the safe operation of the vehicle or equipment including personnel and loads transported.

Vehicle and Equipment Inspection- Operators of vehicles and equipment shall inspect the vehicles and equipment for defects at beginning of each shift. Defective vehicles or equipment shall not be used. Drivers and operators of vehicles and equipment shall strictly observe project speed limits and all posted traffic control signs.

Seatbelts- Seatbelts must be worn while operating vehicles and mobile equipment. The number of passengers riding inside a vehicle will be limited to the number of seatbelts available. Individuals will not ride in the bed of trucks. Equipment provided with only an operator's seat shall not be used to carry passengers unless an approved personnel platform or seat has been provided for passengers.

Audible Alarms- Vehicles and equipment with a restricted view to the rear shall be equipped with an operable backup alarm, which is audible above surrounding work noise levels. Blades and buckets of earth moving equipment shall be lowered to the ground when unattended and at the end of the workday. Engines shall be shut down during refueling operations. Equipment and vehicles shall be shut down if operator dismounts. Employees shall not mount or dismount from moving vehicles or equipment.

Unattended Vehicles – No vehicle shall be left unattended with the motor operating. 'Unattended' is defined as no operator physically in the driver's seat of the vehicle in a position to control it.

Pedestrian Traffic - Pedestrians shall have the right of way over vehicles and bicycles. All traffic must yield to pedestrians. All pedestrians shall walk on sidewalks whenever possible, or near the left side of roadways facing oncoming traffic unless designated walkways have been established.

Electrical Safety – Ground Fault Circuit Interrupters (GFCI) will be required when using portable electric tools, lights, extension cords, or other portable electrical equipment. All three wire tools shall be equipped with a ground prong. Personnel shall inspect electrical equipment for damage or visible

defects prior to use. Tool & Electrical equipment repair [Electrical Work] shall be conducted by qualified personnel. **Hot work is not permitted**. Only qualified personnel authorized by the company shall conduct Lock Out Tag Out.

Scaffolding- TEAL CONSTRUCTION COMPANY shall designate a competent person who will supervise the erection & dismantling of scaffolding. The scaffolding shall be inspected and tagged by the competent person prior to start of each shift, when a scaffold has been erected or when a scaffold has been altered or repaired. Scaffold safety training for the scaffold erection crew and for all scaffold users shall also be provided.

Fall Protection – All elevated work above 6' shall require 100% fall protection. This includes work performed on scaffolding. Engineered systems to alleviate a potential fall shall be the preferred method. In the event engineered systems cannot be installed, the following control methods shall be implemented:

- "Personal fall arrest or restraint system shall be installed", that include a full body harness, lanyard [double locking hook] and an approve anchor point/device [5,000 pounds strength]
- Employee Training- Fall protection training specific to the equipment.
- Supervisors and employees shall identify an adequate anchorage points prior to installing the fall protection system.

Excavation – All employees shall follow the site-specific excavation procedures established by the customer. Verification of all underground utilities and material will be the initial priority before beginning any excavation activities. Unless otherwise determined all soil classification will be considered Class "C" Soil. If personnel cannot verify locations of underground utilities then it's the Job Site Supervisor's responsibility for locating such underground utilities using approved probing (locating) methods. The Designated Competent Person shall inspect the work site prior to any employees entering the excavation. A "Confined Space Permit" must be obtained for excavations 4' or greater in depth that obtain an atmospheric exposure. Soil to be excavated will be evaluated to determine if hazardous materials are present. If soil is contaminated, special removal and handling procedures shall be followed. Only trained and authorized employees can work near soil that has been classified as hazardous material.

Fire Prevention – TEAL CONSTRUCTION COMPANY has a goal of zero fires. All fires regardless of size are taken seriously and must be reported. Job planning shall include measures to prevent fires. The location and control of combustibles must be factored into this planning process. Combustibles or Flammables are not allowed in or near spark or flame producing activities Gloves, rags, coats, shirts, or other combustibles shall not be placed on or near hot surfaces. Housekeeping must be maintained so that trash is not allowed accumulate or blow around. 100% spark containment is required for welding/burning/sparking activities within the process area. Any combustibles must be at least 35 feet from all welding, burning, or sparking operations. Combustibles that cannot be moved must be covered.

9. SUBCONTRACTOR CONTACT LIST

Company	Contact Name	Direct Number

10. ADDITIONAL NOTES

N/A		Place an X in the box to the left if you do not have any additional notes.

11. SAFETY PLAN COMPLETION & APPROVAL

Completed & Approved by:

Name _____ Title _____

Contact Number _____ Date _____

This document must be completed and reviewed with the project team prior to commencing work.

Note: Copies of the personnel safety training documentation and also a site logistics map & lift plan may also be added to the back of this site specific crane safety program.

This document is to be copied and the original sent to the Safety Department. A copy of the plan shall be posted in the project office where it can be viewed by all persons on the job site.

If the job scope changes, additional entries or supplements of the plan must be submitted for approval before changes are initiated.

Designated Competent Person Acknowledgement Form

Project Name: _____ **Project Number:** _____

Project Address: _____

Site Supervisor: _____**Contact Number:** _____

OSHA'S Definition of a Competent Person

One who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

Requirement

The COMPANY NAME designated competent person shall be onsite with COMPANY NAME personnel at all time when scaffolding is being erected / dismantled and or in use. If the competent person is required to leave the site, the company shall designate a secondary competent person to remain on site with the crew or the work shall be stopped until the competent person returns. This form shall be completed by an officer of our company.

Responsibility

The designated competent person is responsible for recognizing and correcting safety hazards associated with scaffold used on our jobsite. The designated competent person shall also inspect the scaffold systems daily prior to allowing COMPANY NAME personnel to occupy them.

Our designated competent person shall also be responsible for the following:

- Only allowing COMPANY NAME personnel to use the scaffold system.
- Not allow other contractor personnel to use the scaffold system unless prior approval is provided by COMPANY NAME project management team.
- Require the use of personal fall protection in areas on the scaffold where fall protection is required due to temporary platform/ scaffold component removal.
- Confirm that all site personnel working on the scaffold system have scaffold user safety training.
- Confirm that all site personnel working on the scaffold system are equipped with the required personal protective equipment and use the PPE as required.

- Verify all equipment & tools that will be used by our personnel on the scaffolding system are inspected prior to use and maintained in good working condition and are secured to protect personnel working at the lower levels. .

- Report all near miss, property damage and personnel incidents to the site project management team immediately.

Acknowledgment – Company Officer

I, _____ representing, _____
Officer of the Company (Print Name) COMPANY NAME (Subcontractor)
has designated the personnel listed below as our competent person for this project. I acknowledge that our company has this individual meets OSHA's Competent Person requirements. I also acknowledge that this individual has the authority to stop work and correct hazards associated with our scope of work.

Acknowledgment – Designated Competent Person

I acknowledge that I understand my responsibility as the designated competent person for this site. I also understand that I have the authority to stop work and correct safety hazards associated with our scope of work.

I hereby accept the responsibility and duties for the position of competent person, and agree to conduct these functions to the best of my ability, taking in to consideration the safety of the employees under my direct supervision and myself.

_____ _____
Competent Person (Print Name) Competent Person (Signature)

_____ _____
Contact Phone Number Date

Authorization- Company Officer

I hereby attest that the information contained in this form is true, complete and correct to the best of my knowledge and authorize_____ (Print Competent Person's Name) to represent our company as the designated competent person for this work site.

_____ _____
Company Officer (Print Name) Company Officer (Signature)

_____ _____
Contact Phone Number Date

Designated Competent Person Acknowledgement Form

Project Name: _____ **Project Number:** _____

Project Address: _____

Site Supervisor: _____**Contact Number:** _____

OSHA'S Definition of a Competent Person

One who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

Requirement

The COMPANY NAME 's designated competent person shall be onsite with COMPANY NAME personnel at all time when scaffolding is being erected / dismantled and or in use. If the competent person is required to leave the site, the company shall designate a secondary competent person to remain on site with the crew or the work shall be stopped until the competent person returns. This form shall be completed by an officer of our company.

Responsibility

The designated competent person is responsible for recognizing and correcting safety hazards associated with scaffold used on our jobsite. The designated competent person shall also inspect the scaffold systems daily prior to allowing COMPANY NAME personnel to occupy them.

Our designated competent person shall also be responsible for the following:

- Only allow personnel authorized by COMPANY NAME to enter and work in excavations.
- Inspect the work area for signs of cave-ins and atmospheric hazards prior to allowing personnel to enter excavations.
- Conduct soil testing as required when classifying soil for sloping & benching.
- Verify all site personnel are equipped and use the required personal protective equipment.
- Verify all equipment & tools that will be used by our personnel are inspected prior to use and maintained in good condition.

- Provide and require the use of shoring/ shielding systems in accordance with the OSHA regulations.
- Provide and require the use of approved egress for personnel as required.
- Report near miss, property damage and personnel incidents that might occur to the site project management team immediately.

Acknowledgment – Company Officer

I, _____ representing, _____
Officer of the Company (Print Name) Subcontractor
has designated the personnel listed below as our competent person for this project. I acknowledge that our company has this individual meets OSHA's Competent Person requirements. I also acknowledge that this individual has the authority to stop work and correct hazards associated with our scope of work.

Acknowledgment – Designated Competent Person

I acknowledge that I understand my responsibility as the designated competent person for this site. I also understand that I have the authority to stop work and correct safety hazards associated with our scope of work.

I hereby accept the responsibility and duties for the position of competent person, and agree to conduct these functions to the best of my ability, taking in to consideration the safety of the employees under my direct supervision and myself.

_____ _____
Competent Person (Print Name) Competent Person (Signature)

_____ _____
Contact Phone Number Date

Authorization- Company Officer

I hereby attest that the information contained in this form is true, complete and correct to the best of my knowledge and authorize_____ (Print Competent Person's Name) to represent our company as the designated competent person for this work site.

_____ _____
Company Officer (Print Name) Company Officer (Signature)

_____ _____
Contact Phone Number Date