Civil Works Contracting Safety and Health Manual 2026

Civil Works Contracting LLC

Rev 11: 08.10.2026

This document is approved for use by: **Civil Works Contracting LLC**

Amendments

All copies of this Safety Manual must be kept under strict control to prevent the system from becoming unreliable. The following procedures will ensure that this system remains current and valid.

- All copies of the Health and Safety Manual will be clearly numbered, and the Holder recorded.
- Each page in the manual will carry its own number.
- The Safety Director will be responsible for all revisions and additions being recorded.
- Changes can be suggested by any employee but must receive signed approval before being entered into the manual

Table of Amendment					
Document No	**Page No**	**Issue**	**Date**	**Description of Change**	**Authorization**
Rev 6	Entire document	1	08.10.2021	Developed new Health and Safety Manual format that includes 2021 programs updates in the following sections: Safety Committee, Safety Recognition, Crisis Management Program, MEWP, Designated Operator Program. Reformatted manual in sections and removed all forms as they will now be completed on Sitedocs (electronic paperless system)	Former HSE Manager
Rev 7	218	2	8.25.2021	Added working over or near water program. Added language updates on Safety Committee/Loss Control, updated Color Code Chart (pg80)	Former HSE Manager
Rev 8	14-20		4.22.2022	Add the fleet safety policy	Former HSE Manager
Rev 9	7	4	3.23.2023	Added language updates on employee competence verification	Former HSE Manager
Rev 10	148	5	7/8/2025	Added Respirable Silica Exposure Control Plan. Formatting corrections, Language updates. Updated Safety Manual title. Update exit sign color (pg224) Updated MSDS to SDS (2 locations)	Former HSE Manager
Rev 11	17, 20, 39, 40-42, 57-58, 248-260	6	08/010/2026	- Miscellaneous typos throughout document - Changed/removed safety consultant language for incident reporting - Changed Chris Scerri Title from President to Founder/CEO - Changed HSE Manager and safety coordinator to HSE Director and Department - Added site specific safety plan creation and implementation to Field Supervisor responsibilities - Added JHA policy to Jobsite Safety Program - Edited “Audits” section and language to accurately reflect current CWC policy/practice to Jobsite Safety Program - Updated OSHA inspections section - Added Fatigue Risk Management Program, added Job-Site Security Policy,	Adam Ottaviano, CSP HSE Director

Rev 12	268-281	7	09/18/2026	-Update to current rigging policy - all active rigging and lifting devices must be: **Visually inspected by the user before each use, each shift, and as necessary during use. Formally inspected and documented at least once per month in HeavyJob.**	Adam Ottaviano, CSP HSE Director

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Chapter 1 - Chapter 1 - Safety Mission and Policy

1.1 Safety Philosophy and Culture

Safety Commitment

Civil Works Contracting has been engaged in construction for over three decades. Great pride has been taken in a continuing concern for the safety and health of our employees. No single feature of our work is of greater importance.

Our commitment is to make our projects and operations as safe as humanly possible. Construction projects, by their nature, present an environment where people can get injured. There are no accidents, just incidents. Civil Works Contracting expects all employees to follow

our Safe Work Practices. Consistent SAFETY AWARENESS prevents illness and injuries to employees and their fellow workers. It is mandatory that every person employed by Civil Works Contracting be continually aware of this commitment to safety.

At Civil Works, we value our employees as human beings critical to the success of their families and the local community as well as the company. As such, Civil Works Contracting will make every reasonable effort to provide a safe and healthful workplace that is free from any recognized or known potential hazards. Civil Works Contracting Employees are required to report any unsafe work practices or safety hazards encountered on the job. All incidents, no matter how slight, must be immediately reported to the supervisor on duty. A key factor in implementing this policy is the strict compliance to all applicable federal, state, local and company policies and procedures.

All employees are responsible for working safely and productively, as well as for the recognition and awareness of hazards in their work areas. Employees are also responsible for following safe work practices, including the use of Personal Protective Equipment (PPE) where necessary. Upon hire, all employees are required to sign our Employee Acknowledgement Form (Chapter 11), stating that they have read and understand the contents of this Safety and Health Manual. Failure to comply with these policies will result in disciplinary action, up to and including termination.

It is our belief that any safety and health program must have total employee involvement. Therefore, this program has management's highest priority, support, and participation.

The result of our safety efforts affects our overall success in the construction industry. Our goal is an incident free workplace with the traditional outstanding Civil Works Contracting quality and timeliness.

Christopher Scerri, Founder/CEO

Safety Goal and Principles

Safety Goal

Civil Works Contracting LLC is committed to safe and healthful workplace for all employees. Our goal is to achieve the highest standard of safety throughout all phases of our operations and to ensure that all employees work safely on jobsites free of avoidable hazards. When hazards are unavoidable, we take a proactive approach to prevent incidents. Furthermore, we are ready to respond quickly and effectively to any mishaps to minimize the extent of incidents or injuries, and to prevent similar mishaps.

Safety begins at the top and goes downward throughout the company at Civil Works Contracting. The primary safety goal is to continue operating a profitable business while protecting employees from injuries, illness, or harm. This goal can be achieved in part by delegating responsibility and accountability to all involved in the company's operation.

To reach our goal of a safe workplace, everyone needs to take responsibility and be accountable.

Responsibility means having to answer for activities and results. Accountability refers to the actions taken by management to ensure the performance of responsibilities

The benefits of achieving our safety goals are:

- Minimizing injuries and incidents
- Minimizing the loss of property and equipment
- Elimination of potential fatalities
- Elimination of potential permanent disabilities
- Elimination of potential Occupational Safety and Health Administration (OSHA) fines
- Reductions in workers' compensation costs
- Reductions in operating costs
- Maintaining the best safety and health conditions possible in the workplace.

Safety Principles

Civil Works Contracting subscribes to the following principles:

- All accidents are preventable through implementation of effective safety and health control policies and programs.
- Safety and health controls are a major part of our work every day.
- Incident and Injury prevention is good business. It minimizes human suffering, promotes better working conditions for everyone, holds Civil Works Contracting in higher regard with customers, and increases productivity. This is why we will comply with all safety and health regulations that apply to the course and scope of our operations.
- Management is responsible for providing the safest possible workplace for employees. Consequently, the management of Civil Works Contracting is committed to allocating and providing all the resources needed to promote and effectively implement this safety policy.
- Employees are responsible for following safe work practices and company rules, and for preventing accidents and injuries. Management will establish lines of communication to solicit and receive comments, information, suggestions and assistance from employees where safety and health are concerned.
- Management and supervisors of Civil Works Contracting will set an exemplary example with good attitudes and strong commitment to safety and health in the workplace. Toward this end, management must monitor company safety and health performance and work environment and conditions to ensure that program objectives are achieved.
- Our safety program applies to all employees and individuals affected or associated in any way by the scope of our business. Everyone's goal must be to constantly improve safety awareness and to prevent accidents and injuries.
- Everyone at Civil Works Contracting must be involved and committed to safety. This must be a team effort. Together, we can prevent accidents and injuries. Together, we can keep each other safe and healthy in the workplace.

1.2 Continual Improvement of Safety and Health Performance

Civil Works Contracting has made a commitment to making tangible improvements in our safety performance. This process measures our success toward meeting our safety goals and objectives and re-focuses our efforts toward continuous improvement in the areas of management commitment, employee involvement, training, and hazard elimination and control. On an annual basis, the Civil Works Contracting Management is committed to conducting a comprehensive review of our Safety Program, Process and People. The following model guides our efforts:

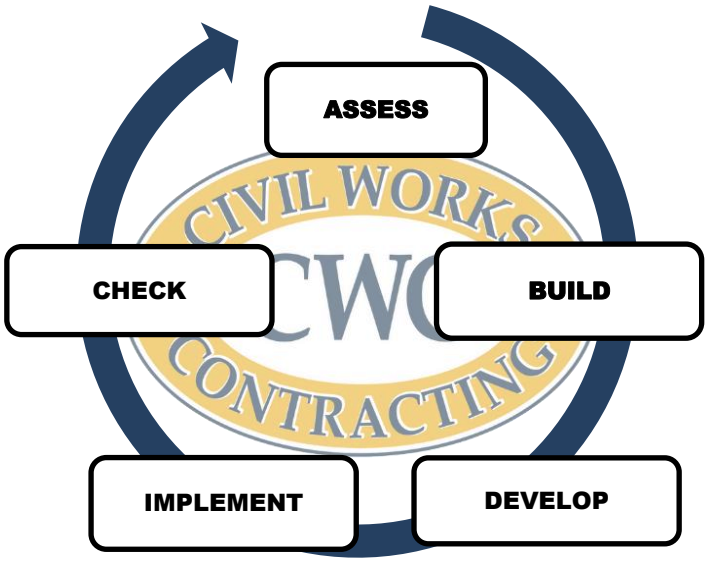
Assess: Conduct employee and client perception surveys, internal audits and evaluate overall effectives.

Build: *A strategic plan* with clearly defined goals and objectives for sustainable success from the identified root causes of the internal audit and perception surveys.

Develop: Tactical gains with a team approach using a safety committee that represents all areas of the company will be used to promote employee involvement.

Implement: rollout and educate all employees on improvement areas.

Check: periodically review success measures and expected outcomes.



1.3 Safety Roles and Responsibilities

Management

Civil Works Contracting senior management places the utmost value on the safety and health of our employees, subcontractors, clients, and the public. We are committed to providing the leadership necessary to promote a strong safety culture throughout the company, setting a high standard for safety and health practices, and leading by example.

In addition to implementing and enforcing Civil Works Contracting Safety Program policies and procedures, we strive to comply with all safety regulations and statutory obligations and do all that is reasonable and practicable to prevent personal injury and property damage and protect our employees from foreseeable work hazards.

Safety responsibilities of senior management include:

- Modeling and teaching safety leadership, and maintaining a high degree of professional safety knowledge
- Providing the necessary resources, budget, planning, preparation, training, and communication to ensure a safe working environment.
- Providing safety training to employees as appropriate for their roles and informing employees of their safety responsibilities.
- Promoting and encouraging safe behaviors and ensuring that all company goals are in alignment with safety goals.
- Taking immediate action to correct an identified safety deficiency or hazard.
- Reporting all workplace injuries and incidents immediately to authorities as required and investigating such incidents to determine root causes. Incorporating lessons learned into additional training and/or revised policies and procedures as needed.
- Encouraging employee involvement in the Civil Works Contracting Safety Program by serving on the Safety Committee, making suggestions, planning safety-related activities, recognizing hazards, serving as training presenters, etc.
- Actively encouraging employees to report unsafe conditions and incidents.
- Assisting as needed with serious subcontractor safety performance issues.
- Planning and executing strategic plans to enhance safety performance and achieve industry-leading results.
- Never compromising safety for schedule, cost, or production reasons.

Health, Safety and Environmental Director (HSE)

Commitment, Involvement and Accountability

Safety administration is managed by the Health, Safety and Environmental Manager (HSE) at Civil Works Contracting, with assistance and involvement of all employees. Safety administrative duties include the development, implementation and oversight of all aspects of the company's Safety Program, ensuring the highest standard of safety support and leadership for Civil Works Contracting.

Safety administrative responsibilities include:

Hazard Identification, Elimination and Control

- Instilling a safety culture in all employees through example and personal contact.
- Working with Civil Works Contracting employees and subcontractors to reduce injuries and foster a safety culture of zero injuries.
- Working with management and the Safety Committee to develop, implement, and evaluate annual safety goals and objectives and fulfill other responsibilities of the Safety Committee.
- Assist the Safety Committee in maintaining an adequate stock of first aid supplies and other safety equipment to ensure immediate availability
- Providing oversight of the enforcement of all Civil Works Contracting safety policies and procedures. Positive reinforcement is preferred; however, the Civil Works Contracting

safety disciplinary policy must be used as necessary to maintain a high level of safety on the job. The Safety Department personnel are authorized to take prompt corrective measures to eliminate or control hazards and correct unsafe behavior, including stopping work if there is an immediate or potential situation of imminent danger.

- Providing oversight to ensure that site-specific safety plans and procedures are developed, implemented and enforced.
- Providing oversight of the pre-work safety planning process. Tracking and trending for proper completion and attention to detail.
- Providing oversight of jobsite supervisory safety inspections.
- Providing oversight and direction to third-party safety consultant. Review third-party jobsite audits for data that would indicate a need for corrective action, training, or changes in policies and procedures.
- With the assistance of the Field Supervisors, monitoring the safety processes for all projects to ensure that, if any safety related issues or problems are noted, there is an action plan in place to correct the issues/problems. Specific items that should be monitored include, but are not limited to:
  - Preemployment drug and alcohol testing
  - New hire safety orientations
  - Pre-work safety planning
  - Weekly safety meetings
  - Site-specific safety plans
  - Subcontractor pre-work meetings
  - Field employee OSHA 10-hour training
  - Field employees' attendance at mandatory safety training and meetings
  - Incident reporting and claims management

Training

- Working with the Field Supervisors, providing oversight of the new hire orientation process.
- Working with the Field Supervisors, providing oversight of the process where Field Supervisors give pre-work safety instructions to their workers.
- Providing oversight of weekly safety meetings to review site/task specific safe work practices and conditions.
- Providing oversight of the training plans for individual jobsites. Tracking and trending Toolbox Talks and other training for applicability and quality.
- Monitoring the safety training needs of management and supervisory personnel and providing guidance in the area of professional development.
- Ensuring that there is an adequate number of first aid certified individuals on Civil Works Contracting jobsites

Subcontractor Management

- Providing oversight of the approval of subcontractors' safety documents and subcontractor pre-work meetings.

Injury Management

- Working with management, field supervisors and insurance carriers, providing oversight of Civil Works Contracting policies and procedures pertaining to incident reporting and claims management, ensuring compliance, and assisting as needed.
- Providing oversight of the review of all injuries to Civil Works Contracting employees and all serious near-miss incidents that occur on Civil Works Contracting projects.

OSHA Compliance

- Working with the HSE Director, management, and Field Supervisors providing oversight in assisting projects with OSHA regulations compliance.

Other

- Mentoring and assisting with professional development of staff.
- Assisting the Company President and company leadership with insight into safety opportunities and challenges facing the company.
- Assisting with business development efforts pertaining to safety.

Field Supervisors

Commitment, Involvement and Accountability

Field Supervisors provide the direction, commitment, motivation, and accountability for the overall safety and health of their crews and subcontractors. As Field Supervisor, you are the official who carries out the provisions of Civil Works Contracting safety and health policies and procedures and keeps our jobsites safe.

<u>The safety responsibilities of Field Supervisors include:</u>

Hazard Identification, Elimination and Control

- Instilling a culture of safety in each employee through example, personal contacts, and group safety meetings.
- Ensuring that all safety rules and policies are enforced and practiced on the jobsite. Positive reinforcement is preferred; however, the Civil Works Contracting safety disciplinary policy must be used if needed to maintain a high level of safety on the jobsite. Field Supervisors are authorized to take prompt corrective measures to eliminate or control hazards and correct unsafe behavior, including stopping work if there is an immediate or potential situation of imminent danger.
- Carrying out the pre-work planning and making management aware of any new conditions or hazards that may arise.

- Conducting a pre-work Crew Meeting prior to starting work onsite to discuss the project scope assigned, rough schedule, hazard and environmental reports, and site safety concerns.
- Working with management to ensure that site-specific safety procedures are implemented and enforced.
- Directing others who have the responsibility of providing the required safety equipment and safe work methods and conditions in their specific areas; Ensuring that the following are maintained onsite at all times:
    - Appropriate PPE for employees and visitors
    - First Aid Kit
    - Fire Extinguisher
- Ensuring that all employees, workers, visitors, sub-contractors, etc. follow all safety rules and regulations on the jobsite.
- Ensuring personal protective equipment (PPE) is available and used correctly.
- Maintaining up-to-date Safety Data Sheets (SDSs) on the jobsite.
- Ensuring that pre-work safety instructions are completed for all tasks on the jobsite and are modified as needed when conditions change.
- Ensuring employees are competent in the tasks they are to perform.
- Submitting and reviewing incident reports with management and the Safety Director.
- Conducting and documenting a regular safety inspection of each jobsite and its equipment. The Field Supervisor must be capable of identifying existing and predictable hazards, of identifying working conditions that are unsanitary, hazardous, or dangerous to employees, and of identifying unsafe behavior.
- Maintaining compliance with Emergency Action Plan and establishing procedures that are site-specific; Identifying and documenting appropriate evacuation routes and safe location for employees to assemble.

Subcontractor Management

- Ensuring that each subcontractor's safety documents are approved and available onsite before the subcontractor starts work.
- Taking a lead role in subcontractor pre-work meetings.
- Incorporating the subcontractor's site-specific safety plans into the Civil Works Contracting site-specific safety plans.
- Ensuring that any subcontractor safety issues are communicated to the subcontractor's management and are corrected.
- Ensuring that subcontractors have adequate Competent Persons for their scope of work.

Injury Management

- Ensuring that prompt medical attention is available for any injured employee.
- Completing incident reports within 24 hours after the occurrence.
- Ensuring compliance with Civil Works Contracting policies and procedures pertaining to incident reporting and claims management.

OSHA Compliance

- Being knowledgeable of and complying with OSHA regulations.

All Employees

Commitment, Involvement and Accountability

As a Civil Works Contracting employee, you are responsible for your own safety and the safety of your co-workers and the general public. You must at all times adhere to Civil Works Contracting safety rules and the instructions of your supervisor.

<u>The safety responsibilities of all employees include</u>:

Hazard Identification, Elimination or Control

- Complying with all safety rules, policies, and procedures that apply to each task.
- Reporting any unsafe conditions or behaviors to your supervisor.
- Stopping work if it becomes unsafe and immediately reporting the unsafe conditions or activities to your supervisor.
- Properly using all safety devices, including PPE.
- Following the instructions of all danger and warning signs and barricades.
- Inspecting all tools, extension cords, rigging, and equipment before each use, and reporting any damage to your supervisor.
- Making safety suggestions to assist the Safety Committee and management with the continual improvement of Civil Works Contracting safety policies, procedures, and practices.
- Assisting with safety audits and inspections as appropriate.
- Know the locations of first aid supplies, fire extinguishers and other safety equipment.

- Accepting constructive criticism / instruction from your supervisor or manager.

Training

- Participating in new employee orientation and all required training for your position (see section Basic and Specialty Safety Training Requirements) and serving as an instructor or presenter as appropriate.
- Asking for clarification if you have questions about safety procedures and/or work methods for the assigned task.
- Notifying your supervisor immediately if you are uncertain about how to safely use a tool or a piece of equipment.

Subcontractor Management

- Reporting any unsafe behaviors involving subcontractors to your supervisor.

Injury Management

- Immediately reporting all incidents, near misses, and work-related injuries to your supervisor.

OSHA Compliance

- Complying with all OSHA standards that apply to your work. Field employees must assist your Field Supervisor with OSHA compliance by looking for and reporting unsafe conditions and behaviors.

1.4 Employee Involvement and Participation

At Civil Works Contracting, effective employee participation is required for our Safety Program to be successful. We strive to create a culture where all employees share a sense of responsibility and are involved in the safety process in meaningful ways.

As a Civil Works Contracting employee, you are encouraged to participate in:

- Equipment inspections
- Training presentations and Toolbox Talks
- Jobsite inspections
- Incident investigations
- Offering safety suggestions

1.5 Safety / Loss Control Committee

Purpose

A Safety / Loss Control Committee exists at Civil Works Contracting to assist management in establishing and maintaining a safe and efficient workplace and environment. Membership is voluntary and open to any employee with the knowledge, abilities, and interest in promoting safety. It is ideal for a person from each functional area of the company to be on the committee;

however, care should be taken to avoid creating too large of a committee. The committee should have an odd number of members to prevent tie votes. Management, safety administration, administrative and field employees should be represented on the committee.

Scope

The Civil Works Contracting Safety / Loss Control Committee is an important part of the Safety Program. If used effectively, the Safety / Loss Control Committee can both improve safety and reduce the cost of operation by:

- Reducing the occurrence, frequency, and/or severity of incidents
- Increasing productivity
- Improving the use of equipment
- Reducing waste
- Enhancing employee satisfaction
- Facilitation employee loyalty, cooperation, and contributions
- Providing analysis of injury and illness data for management
- Identify problems and develop corrective actions

Responsibilities

Responsibilities of the Safety / Loss Control Committee include, but are not limited to:

- Identifying and evaluating annual safety goals and objectives
- Conducting incident investigations and analysis
- Discussing incidents, near-misses, new training requirements, employee suggestions, etc. and making recommendations to management
- Periodically reviewing the quality and results of incident, inspection, audit, and other reports
- Participating in the review of safety policies and procedures and making recommendations to management
- Coordinating special safety training programs and events
- Serving as consultants for the company on loss control issues
- Conducting an annual review and updating of Emergency Procedures, including the Crisis Management Plan and Emergency Action Plan; Coordinating required annual drills and maintaining documentation
- Coordinating first aid training, and other related training, for all designated employees; Providing safety material to assist with employee training requirements
- Maintaining an adequate inventory of emergency equipment and first aid supplies for all locations
- Encouraging feedback from all employees related to safety
- Communicating safety policies, training programs and other safety related matters to all employees; Distributing Safety / Loss Control Committee meeting minutes to Civil Works Contracting employees

Meetings

The Safety / Loss Control Committee meets on a regular basis to accomplish its goals and objectives. Minutes are taken that record all decisions made and actions taken, and a written report is prepared to keep all personnel informed. Committee members and management should receive a copy, and copies should be posted for all personnel. Copies should be maintained for one year.

1.6 Corrective Action Program

Purpose and Expectations

Civil Works Contracting is committed to the fair treatment of employees when their performance does not meet expectations or if they are guilty of misconduct. Poor performance or violations of Company policies or standards may result in disciplinary action which might take various forms, including coaching, counseling, verbal warnings, written warnings, written performance improvement plans, suspension, or termination, based on the circumstances.

Civil Works Contracting subscribes to an open-door policy. You may bring any complaint to your supervisor for resolution. A complaint may be brought by one or more employees concerning any work-related problem where the complaint has not been satisfactorily resolved in an informal manner.

If you find that your problem remains unsolved and you have gone through the above procedure, you are invited to raise the issue with the next level of management. You can then appeal to each successive level up to the President.

There is no need to follow any formal chain of command when filing a complaint regarding harassment or discrimination. You may bypass anyone in your direct chain of command and file your complaint or discuss or express any issue of concern with any member of management at any time. Management will investigate immediately, maintaining the maximum level of confidentiality possible.

Civil Works Contracting prohibits any form of retaliation against any employee for filing a bona fide complaint under this policy or for assisting in a complaint investigation. However, if, after investigating any complaint of harassment or unlawful discrimination, Civil Works Contracting determines that the complaint is not bona fide and was not made in good faith or that an employee has provided false information regarding the complaint, disciplinary action may be taken against the individual who filed the complaint or who gave the false information.

Discipline Levels

1. Violation of safety rules shall result in the following penalties:

1st violation:	Verbal reprimand
2nd violation:	Written reprimand
3rd violation:	Removal from the jobsite

2. Typical corrective action pattern:

   a) Verbal Reprimand - The Supervisor shall be informed that he/she has committed a safety violation which, if repeated, will result in further corrective action. If the infraction continues a formal written notice will be issued to the supervisor of the safety violation notifying the employee that future violations will result in additional steps. Any continued non-corrected actions will be reported by the Safety Department to Civil Works Contracting Management, through the written job site safety inspection forms and verbal conversations.

   b) Written Reprimand - A formal written notice will be issued to the Supervisor of the safety violation notifying the employee that future violations will result in removal from the jobsite. Prior to written notification of from the jobsite, Civil Works Contracting may use documentation of job site safety inspections completed by the Safety Administrator or Superintendent to display a history of the infraction (s).

   c) Removal from the jobsite as a result of a serious safety violation or pattern of safety violations. Decision for type of action will be at the discretion of company management.

3. Whenever corrective action is administered; proper documentation of the action shall be taken. Documented warnings shall include the following: date of occurrence, incident, place, time, and corrective action taken.

4. All corrective action documentation shall be filed in the supervisor's personnel record.

Note: All supervisors who receive corrective action may be required to attend a safe work practice review session, which the company will conduct, on an as-needed basis. This training will be conducted in effort to further employee safety knowledge as well as to raise employee continuing safety awareness.

1.7 Drug-Free Workplace Policy

Purpose and Expectations

Civil Works Contracting is committed to the health and safety of our employees, our clients and the public. Therefore, we cannot tolerate the abuse of alcohol, legal or illegal drugs. Employees are expected to report to work on-time and in the proper mental condition to work. The misuse of alcohol or drugs includes being under the influence of, manufacturing, distributing, or being in possession of alcohol, illegal drugs or drugs not prescribed to you while on company premises or conducting company business. Any illegal substances found may be confiscated and turned over to law enforcement. Civil Works Contracting will cooperate with law enforcement in any investigation involving our employees.

Civil Works Contracting reserves the right to request a drug test from employees after workplace accidents, for cause, or on a random basis. Employees have the right to request a re-test at their own expense in the event of a positive result. Failure to submit to a drug test will be considered resignation from employment.

1.8 Reporting Unsafe Conditions

As a Civil Works Contracting employee, you have the responsibility and obligation to report unsafe conditions. These reports may be made verbally to any supervisor or manager or in writing using the Unsafe Condition Report form, which can be forwarded through your supervisor or sent directly to the Civil Works Contracting HSE Director. You will not be subject to disciplinary action for reporting unsafe conditions, and confidentiality will be maintained.

1.9 Communications with Cross-Cultural Workforce

It is critically important that all employees and subcontractor employees understand the hazards associated with their work and the safety measures required to ensure their safety and health. At Civil Works Contracting, we take the following steps to minimize potential communication barriers:

- Whenever possible, safety training is conducted in, or translated into an employee's native language.
- Subcontractors are not allowed to work on a Civil Works Contracting jobsite without a fluent English-speaking supervisor.
- Safety signs must be posted in both English and Spanish, or any other language(s) represented on the jobsite. Pictograms may be used to convey safety messages with multi-cultural work groups.

1.10 Safety Recognition Program

The engagement and participation of workers is a success key factor in our safety climate. Our people are our most valuable asset, and we will actively find ways to empower them to work safe. Through teamwork, successful projects develop a safety-first culture, which instills a belief that preventing incidents is everyone's responsibility. As part of that team, each person understands they must contribute for the project and their team to be successful.

Civil Works Contracting may offer a Reward Program to recognize personnel and crews who demonstrate the company's safety culture through the management of their project sites and daily completion of their work. Awards may be given when an employee has exemplified a commitment to safety by:

- Submitting complete, accurate, and timely reports
- Providing supplemental documentation for high-risk activities such as excavations, confined spaces, etc.
- Participating in Toolbox Talks and other safety training
- Submitting a safety suggestion
- Providing first aid
- Identifying a safety hazard for correction
- Correcting a safety hazard

Disqualifiers for the Safety Recognition Program include exhibiting disregard for safety or allowing subcontractors to work in an unsafe manner or submitting safety inspection reports that reveal no corrective action for unsafe conditions.

Chapter 2 - Fleet Safety Policy

2.1 Summary Statement

It is the policy of Civil Works Contracting that our passenger vehicles (including vans and light-duty trucks) will be used only for company business and will be operated only by authorized persons who meet the driver criteria in this policy. This policy applies to our company-owned vehicles and private or rental vehicles authorized for use on company business.

All employees must comply with applicable laws and company policies and be "job-ready" when they are on company business. Job-ready means that employees must be physically and mentally able to do their jobs. Employees must not use intoxicants, drugs or medications that could impair their judgment or ability to drive. Please refer to CWC's Drug-Free Workplace Policy. CWC welcomes any request for an accommodation if, for example, your medicine impairs your ability to safely perform your duties. Managers and supervisors have the right to determine an employee's job readiness.

Employees who drive on company business must have a valid drivers' license and a satisfactory driving record. Violations of this policy may result in; revocation or restriction of employee authorization to drive on company business, reassignment, demotion, suspension, or dismissal. All employees must sign a statement stating that they have read and understand this policy and the consequences for violating it.

2.2 Employee's Responsibilities:

Employees who drive on company business must adhere to all parts of this policy. They must do a walk around inspection of any vehicle before driving it and **they must not use a company vehicle for personal business unless it is pre-approved, in writing, by the Fleet Coordinator.**

- When operating company vehicles, employees should remember that their driving habits reflect on all company employees. Company vehicles must be used legally, courteously, and safely.
- Employees are strongly encouraged to plan mini breaks every two hours during long periods of driving and to allow for no more than 10 hours driving per day in good driving conditions. Employees must use and require seat belts to be worn by authorized passengers. Authorized passengers include co-workers, temporary workers, and subcontractors' personnel.
- Employees are responsible for the care of vehicles assigned to them and may be held liable for improper care and abuse of the vehicle. Misconduct could lead to withdrawal of driving privileges and/or disciplinary actions, up to and including dismissal.
- Employees who drive on company business must be 21 years or older and have a current, valid license for the vehicles they drive. Licenses will be photocopied and kept in employees' files.

2.3 Vehicle Use:

Driving for business purposes: Any employee who drives a company vehicle or a personal vehicle for business purposes, must abide by the rules and guidelines of Vehicle Use and Acknowledgment Agreement and any supplemental polices, i.e., Distracted Driving Policy.

Unauthorized Use of Vehicles: Authorized drivers will not allow an unauthorized individual to operate a company vehicle. Disciplinary action may be taken. Additionally, if unauthorized use results in an accident, the responsible employee will be required to make restitution for the damages.

Use of personal vehicles for company business: Designated employees may be called upon to drive their personal vehicles on company business. The Fleet Coordinator/Management must review and approve use of a personal vehicle for any activity that relates to company business.

Drivers operating their personal vehicle for business use will be subject to the same fleet safety standards and MVR guidelines as required of any company driver. Unsafe acts or MVR infractions picked up on personal time will still be considered as counting against the employee's record and may disqualify the employee from driving and require a move to a non-driving position or potentially termination of employment.

Financial Responsibility for Personal Vehicles (Company Non-Owned Vehicles): Employees who drive personal vehicles on company business must provide evidence of automobile liability insurance. Adequate limits must be obtained and will be determined through review by the Fleet Coordinator and our insurance carrier. A current certificate or proof of insurance must be kept in the employee's file and will be updated annually. **Minimum limits of $100,000.000 for bodily injury and $300,000.00 for property damage.**

CWC does not provide liability insurance for employees who use their own vehicles on company business. Employees who use their personal vehicles on company business are responsible for all liability resulting from use of their vehicles.

Any employee who drives a personal vehicle on company business and who does not maintain insurance coverage on that vehicle will be reassigned to a non-driving position or, if a non-driving position is not available, will be terminated.

CWC does not provide any physical damage coverage for a personal vehicle. All repairs will be the responsibility of the employee. Vehicles are expected to be kept in roadworthy condition and in compliance with applicable motor vehicle laws. Customer facing employee positions may require the vehicle to be kept clean and presentable. All wash and detail expenses will be the responsibility of the employee. At no time will unauthorized passengers be allowed to occupy the vehicle during business use without the consent of the Fleet Coordinator.

Rental Vehicles: Rental vehicles will be leased from a CWC-approved vendor. Collision damage waiver must be refused.

Radar Detectors: Any vehicle driven for business purposes is prohibited from having radar or laser detection equipment as it promotes unsafe actions. Employees will face a loss of driving status if found using detection equipment.

Towing: Drivers may only push or pull another vehicle or tow a trailer for work purposes.

Department of Transportation (DOT) regulated vehicles: Any vehicle traveling across state lines with a gross vehicle weight rating over 10,000 lbs. (including any towed items or actual weight of vehicle and any tows) is subject to DOT regulations. Each driver must have a DOT compliant Driver Qualification File maintained by the Fleet Coordinator before being allowed to drive vehicles within this classification.

In addition to a DOT compliant driver file, any driver of a vehicle with a gross vehicle weight rating (including tows) over 26,000 lbs. (or actual weight of vehicle and any tows) must possess a valid commercial driver's license and comply with DOT regulations.

Any vehicle carrying hazard materials at a level to which placarding is required under DOT regulations (regardless of the vehicle's gross vehicle weight rating or actual weight) must possess a valid CDL license with hazardous materials endorsement.

The Fleet Coordinator will be responsible for evaluating the applicability of DOT regulations to this

company's operations and ensure compliance with those regulations. All drivers of DOT regulated vehicles will have responsibilities beyond those outlined in this policy and will receive additional training and information.

Drivers under the age of 21 are prohibited from operating vehicles or trucks that transport hazardous materials.

2.4 Equipment Safety Tracker "Rules of the Road" Policy

Commitment

CWC's commitment to highway safety and employee welfare is a top priority. Equipment Safety Tracking (EST) devices are attached to company vehicles, which monitor them during operation. This system monitors the following items below and documents in video:

- Speed of travel
- Time of arrival
- Length of stop
- Time vehicle is spent idling
- Hard braking/rapid acceleration/hard cornering events
- Location of the vehicle at every stop
- Vehicle Mileage

(If there are jobsite issues or restrictions with the EST, you must communicate those to the Fleet Coordinator.)

All employees who drive vehicles in which an EST unit has been installed are expected to comply with applicable motor vehicle laws, and those employees will also be governed by specific EST rules. These EST rules are in addition to the Company's Fleet Safety Program and any applicable regulatory or government discipline, which may supersede this policy.

Driving habits, patterns and violations of the policy are reviewed in real time and remain on the driver's record for the duration of employment. This means that an EST policy violation remains viable and subject to progressive disciplinary actions for one year from the date of the violation. If multiple violations occur on the same day, they may be treated as one violation, with any applicable discipline based upon the most serious offense.

Responsibility

The Fleet Coordinator (HR) will have the ultimate responsibility for enforcing the EST "Rules of the Road."

The Fleet Coordinator (HR) will monitor and evaluate all violation reports on the EST periodically. Per occurrence, a report will be given to the driver if a corrective action is necessary.

Company Vehicles Requiring an EST Unit

All CWC-owned vehicles assigned to field safety, sales, and operations personnel, as well as any company-owned vehicles regularly used by more than one employee, are required to be equipped with an EST unit.

Required Measures

The following are presumptive remedial measures for EST-related activities:

Vehicles that speed more than 10 MPH over posted speed limit for more than one minute:

1. First offense will be a written warning.
2. Second offense results in a final written warning.
3. Third violation will result in requirement to complete a company driver safety course, at the employee's cost, time on his or her time, and loss of fleet vehicle privileges for 30 days.

Failure to wear seat belt while driving company vehicle:

1. First offense will result in written warning.
2. Second offense will result in final warning.
3. Third violation will result in requirement to complete a company driver safety course, at the employee's cost, time and on his or her time, and loss of fleet vehicle privileges for 30 days.

Unauthorized use of company vehicle after work hours:

1. First offense will result in loss of fleet vehicle and fuel card privileges for 30 days.
2. Second offense will result in permanent loss of fleet vehicle and fuel card privileges or termination.

Employee tampering with the EST equipment:

1. Will result in termination.

NOTE: CWC reserves the right, if the Fleet Coordinator finds the employee's driving to be especially hazardous or reckless based on the road conditions or area in which the violation occurred, to terminate an employee even if the employee has not exhausted all disciplinary measures leading up to termination.

2.5 Motor vehicle record (MVR) Program

Requirements for new employees:

- New employees who drive on company business must read and sign an *MVR consent form* that permits the company to complete a motor vehicle background check.
- Fleet Coordinator will review the MVR to ascertain the employee holds a valid license and the employee's driving record is within the parameters set by CWC.

Annual MVR review

- The Fleet Coordinator/Management will review the driver's MVR annually and score it using the company-developed driver standards for vehicle incidents and violations.

Driving Standards for screening employees driving records:

CWC uses the following standards to screen employees' driving records over the past 36 months for violations and at fault accidents.

- **2 non-serious moving violations/at fault accidents:** Employee will receive a letter of reprimand.
- **3 non-serious moving violations/at fault accidents:** Employee will receive a letter of reprimand and be suspended without pay for one day and must successfully complete a driver improvement course.
- **4 or more non-serious moving violations/at fault accidents:** Employee will either be reassigned to a non-driving position if available, or, if a non-driving position is not available, the driver will be terminated. Before reinstatement to a driving position, the employee will be required to successfully complete a driver improvement course and follow the procedures as outlined in the *Re-qualification section* of this policy.
- **1 or more serious moving violations:** Employee will either be reassigned to a non-driving position if available, or, if a non-driving position is not available, the driver will be terminated. Before reinstatement to a driving position, the employee will be required to successfully complete a driver improvement course and follow the procedures as outlined in the *Re-qualification section* of this policy.

Non-Serious moving violations to include but not limited to:

- Fatigue, falling asleep at the wheel.
- Exceeding posted speed limit less than 10 MPH over posted speed.
- Following too closely (tailgating).
- Failing to signal intentions.
- Failing to Yield Right of Way
- Improperly backing the vehicle.
- Disregarding stop signs or signals.
- Improper lane changes

Serious moving violations to include but not limited to:

- Committing involuntary manslaughter or criminally negligent homicide.
- Attempting to elude a law officer or hit/run.
- Operating a vehicle while operator's license is suspended or revoked.
- Operating vehicles under the influence of alcohol or drugs.
- Reckless or careless driving
- Speed contest or racing
- Any other conviction that shows a significant disregard for traffic safety

Re-qualification for employees who have poor driving records: Employees who have been reassigned to non-driving positions for poor driving records may apply to re-qualify after 6 months under the following conditions:

Employees must send a written request to the Fleet Coordinator stating why they should be re-qualified. Re-qualification requires the Fleet Coordinator's approval. Employees must also complete a driver improvement class which may include remedial and behind-the-wheel training before resuming their driving duties.

2.6 Reporting Incidents Involving Motor Vehicles:

An incident report packet is in the glove box of each company vehicle. The packet contains instructions on what to do in case of an incident. Drivers should become familiar with the instructions before using vehicles.

Employees are responsible for completing and filing all necessary reports within 24 hours of an incident. Failure to file a report (or to do so timely) may cause the loss of the employee's driving privileges or subject the employee to other discipline.

Regardless of fault, employees must immediately notify Fleet Coordinator of any accident, collision, or vandalism involving any vehicle they use on company business.

If the incident results in injuries or fatalities, employees must report them to the Fleet Coordinator immediately after ensuring the injured have or will receive necessary medical treatment. (If the Fleet Coordinator is not available, contact your supervisor immediately.) Employees must forward copies of all vehicle accident forms to the Fleet Coordinator within 24 hours of the accident.

Reporting violations/change in license status:

Drivers must immediately notify the Fleet Coordinator the following:

- All traffic violations for which they are ticketed (during business or personal time);
- All traffic violations for which they are convicted, or plead guilty or no contest to; and
- Any change in driver's license status including suspension, revocation or restriction.

Rules and Responsibilities of Authorized Drivers of CWC Vehicles

Employees who drive Company vehicles are responsible for the proper maintenance and cleanliness of the vehicle, the safety of its contents, and the safety of themselves and all occupants of the vehicle. If you are authorized to use a CWC vehicle, you must adhere to the following:

- Ensure vehicle is inspected annually in correct expiration month.
- Ensure vehicle registration is renewed in expiration month.
- Ensure current registration, insurance and *accident investigation kit* information is stored in glove box.
- Follow all the vehicle preventive maintenance procedures.
- NO SMOKING.

2.7 Fleet Safety Policy and Acknowledgment Agreement

Employee Name: License number:
State issued: _____

- **ONLY AUTHORIZED DRIVERS of CWC** may drive company vehicles. This requires HR to approve your driving record.
- All CWC vehicles are equipped with EST devices that are used to evaluate safe driver performance. On a periodic basis, you will receive feedback on your driving performance. Repetitive bad driver reports will result in forfeiture of your driving privileges.
- Employees and passengers must wear seat belts while the vehicle is in motion.
- Drivers shall not be fatigued or impaired by any substance such as medications, drugs, and alcohol.
- Traffic laws must always be followed. Traffic flow and inclement weather should be taken into consideration and following distances should be extended if conditions deem it necessary.
- The vehicle must be maintained in accord with the company's maintenance requirements. Employees must report all mechanical problems to their supervisor immediately.
- Employees must immediately report to the Fleet Coordinator any motor vehicle incident (work related or personal) that results in damage, injury, or vandalism.
- Employees must have a valid driver's license for the vehicles they will operate, must follow all license restrictions, and must have their license in their possession when they are driving. A driver whose license is suspended, revoked, or terminated must notify the Fleet Coordinator immediately.
- Company vehicles will be operated for business purposes only by assigned drivers or individuals specifically authorized by the company. Personal use of company vehicles is only permitted for purposes of driving to and from work only. Friends, co-workers, and family, including children or a spouse, are not allowed to drive our vehicles at any time without prior written permission from a duly authorized company manager.
- Employees are prohibited from leasing, loaning, or hiring out to others any company-owned vehicle; using it in any livery operations (Ride Share Service, i.e., Uber); or any other enterprise not approved by the company.
- Employees are responsible for all traffic and parking violations they receive when using company vehicles.
- These same rules apply to driving rental vehicles for company purposes.

Using personal vehicles for company business: Authorization to use a personally-owned vehicle for company business is permitted under the following conditions:

- Employees and passengers must wear seat belts while the vehicle is in motion.
- Employees must have the appropriate license to operate their vehicles.
- Employees must provide CWC with proof of insurance upon hire and each time their policy is renewed or updated.
- Employees must provide CWC with a copy of their insurance certificates.
- Employees must notify CWC of all accidents, violations or vandalism involving vehicles driven on company business.
- CWC is authorized to review the driver's MVR annually if the driver is a company employee.
- Normal travel to and from work is not working time.

I have read, understand, acknowledge, and agree to comply with this Vehicle Use Agreement. If I am not on the authorized driver list, I will not drive an CWC company Vehicle.

Employee's signature and date:

_____

Chapter 3 - Pre-Work Safety Planning

3.1 Jobsite Hazard Assessment

Purpose

Civil Works Contracting ensures that all jobsites are as free from hazards as possible with the use of frequent formal and informal hazard assessments by management, Project Managers, Field Supervisors, and employees. A workplace hazard can be any activity, condition or substance that has the potential to harm a worker or the environment.

Hazards are generally divided into two categories: safety and health. Certified Safety Professionals (CSP) or Industrial Hygienists (CIH) contracted by Civil Works Contracting will conduct baseline health hazard exposure assessments for asbestos, lead, silica, and other hazards as required, and perform subsequent comparative monitoring using professionally accepted procedures for all sampling, testing, and analysis. Test results are then used to remediate exposure.

All employees share in the responsibility for hazard control by identifying and mitigating potential hazards, and by reporting unusual hazards to the appropriate personnel where action to minimize the immediate danger will be undertaken. All employees should familiarize themselves with the Job Hazard Analysis to increase their awareness of potential hazards.

Field Supervisors are responsible for completing the Job Hazard Assessment on all jobsites prior to any work being performed. Potential hazards that are identified and reported must be corrected as quickly as safely possible. Civil Works Contracting provides access to certified industrial hygienists (CIH) and certified safety professionals (CSP) as needed, based on risks identified at the jobsite.

<u>Steps for conducting a Jobsite Hazard Assessment:</u>

1. Assemble the involved Field Supervisors and employees, as appropriate
2. Identify and discuss the possible hazards
3. Walk the jobsite and complete the Job Hazard Analysis
4. Take corrective action and make recommendations for the control of hazards, such as safe work practices, hazard communication (Safety Data Sheets and Chemical Inventory List), administrative and engineering controls, PPE, label confined spaces, etc.
5. Understand and implement the “hierarchy of controls” into active work steps is key. All employees should review the hierarchy of controls chart below.
6. Monitor and follow up to ensure corrective action is taken.

MOST EFFECTIVE	**ELIMINATE THE RISK**		
	1	**Eliminate the hazard:** Remove it completely from your workplace	If this is not reasonably practicable, then minimize. This is most effectively done in the early planning stages of the site-specific safety plan.
	MINIMIZE THE RISK		
	2	**Substitute the hazard** Completely or partly with a safer alternative	Minimize the risk, so far as reasonably practicable, by taking one or more of these actions that is the most appropriate. These actions should be planned into the site-specific safety plan. Although the nature of work can change, before any new work tasks begins, the project management team should evaluate these preventative practices before using administrative or personal protective equipment (PPE).
		Isolate the hazard: Use physical barriers, time, or distance	
		Use engineering controls: Incorporate tools or equipment to reduce the risk	
	3	**Use administrative controls:** Follow Civil Works Contracting's safe work practices and procedures	If a risk then remains, you must minimize the remaining risk, so far as reasonably practicable.
LEAST EFFECTIVE	4	**Use personal protective equipment (PPE):** This is the last option after you have considered all the other options for your workplace.	This is the last line of defense to protect our people. We should be using the MOST effective PPE in the field. Do not solely rely on PPE to reduce risk.

3.2 Pre-Work Safety Meetings and Jobsite Set-Up

Safety Meetings

At the beginning of each project, the Field Supervisor is responsible for coordinating, a pre-work safety meeting with each individual subcontractor's field crew managers (including the subcontractor's Field Supervisor and work crew).

This meeting should include all Civil Works Contracting supervisory personnel for the project.

The purpose of these meetings is to bring Civil Works Contracting together with all subcontractors and establish a plan to safely perform all work on the project. These meetings give both Civil

Works Contracting and the subcontractors an opportunity to review any special conditions that may require additional safety measures. Topics should include, but not be limited to, a discussion of the following:

- Project contact information
- Site conditions, including any adjacent tenant conditions
- Safety (emergency plans, Safety Data Sheets, etc.)
- Project scope, including any field related plans and shop drawings
- Schedule, including material delivery and storage

The safety start-up meetings are not designed for Civil Works Contracting to tell subcontractors how to implement their own safety measures on the jobsite, but to review and discuss their safety plans and discuss any possible deficiencies. Subcontractors should have a written safety plan for identifying and correcting any hazards that may occur in their scope of work. This written safety plan also allows Civil Works Contracting Field Supervisors to monitor subcontractors' compliance with their own specified plans.

These pre-work safety meetings also give Civil Works Contracting the opportunity to establish the safety expectations for the project and reaffirms the company's commitment to provide a safe workplace for all employees.

Jobsite Set-Up

The Field Supervisor is responsible for jobsite set-up, which may include but not be limited to:

- Site Specific Safety Plan creation and implementation
- Job board(s)
- First aid kit
- Eyewash kit
- Lockout / tagout kit
- Labor compliance poster / safety communication information
- Emergency blast horn

Chapter 4 - Jobsite Safety Program

4.1 Site Specific Safety Plan

Purpose

Before work begins, a Site Specific Safety Plan must be developed, approved, and implemented for the project. The plan must be tailored to the jobsite and include the information needed to communicate hazards, controls, emergency resources, and required responsibilities. This includes but is not limited to:

- Project identification, including job name, job number, and location
- Required review and sign-off sheet with appropriate signatures
- Project contact list, including emergency contacts and key company personnel
- Scope of work, including subcontractor activities and responsibilities
- High-hazard activities related to the scope of work, with action plans for safely controlling or completing those activities
- Directions and map routes to the nearest medical clinic and emergency room
- Applicable task-specific safety plans based on the project scope and anticipated hazards

4.2 Job Hazard Analysis (JHA)

Purpose

The purpose of this policy is to establish a proactive process for identifying, analyzing, and controlling workplace hazards on a daily basis. By conducting a daily Job Hazard Analysis (JHA), Civil Works Contracting ensures that all field employees understand task-specific risks and implement necessary control measures BEFORE starting work.

Scope

This policy applies to all employees, field supervisors, subcontractors, and multi-tier vendors performing construction, demolition, maintenance, or repair activities at any [Company Name] job site. No physical work may begin on any shift until a daily JHA is completed, communicated, and signed by the field crew.

Roles and Responsibilities

Project Managers

- **Enforce Compliance:** Verify that all active field crews complete a daily JHA before starting work.

- **Resource Allocation:** Ensure necessary safety equipment, engineering controls, and Personal Protective Equipment (PPE) are readily available.
- **Audit Logs:** Conduct weekly random audits of completed daily JHA forms to verify quality and compliance.

Crew Foremen / Supervisors

- **Lead the Analysis:** Conduct the JHA process at the start of every shift with their specific crew.
- **Document and Update:** Complete the daily JHA form, accurately listing task steps, hazards, and controls.
- **Facilitate Briefings:** Deliver the daily JHA information during the morning huddle.
- **Stop Work:** Halt operations if field conditions change, requiring a new or updated JHA.

Field Workers and Craft Personnel

- **Active Participation:** Assist the foreman in identifying task-specific hazards and control mechanisms.
- **Acknowledge Understanding:** Sign the daily JHA roster confirming they understand the risks and controls.
- **Report New Hazards:** Immediately notify the supervisor if new hazards emerge during the shift.

Procedure and Execution

[Step 1: Break Down Task] ⟶ [Step 2: Identify Hazards] ⟶ [Step 3: Implement Controls] ⟶ [Step 4: Crew Sign-off]

Define the Work Steps

- Break the day's assigned tasks down into a sequence of basic steps.

Identify the Hazards

- For each step, analyze potential dangers to personnel, equipment, and the environment.
- Focus on primary hazards: falls, struck-by incidents, caught-in/between, electrical risks, chemical exposures, and extreme weather.

Develop Control Measures

Apply the **Hierarchy of Controls** to address each identified hazard:

1. **Elimination/Substitution:** Completely remove the hazard (e.g., pre-assembling components on the ground instead of at heights).
2. **Engineering Controls:** Isolate people from the hazard (e.g., guardrails, trench boxes,

machine guards).

3. **Administrative Controls:** Change the way people work (e.g., job rotation, safety signs, scheduling work during low-traffic hours).

4. **PPE:** Protect the worker with gear (e.g., respirators, safety harnesses, face shields). *PPE is always the last line of defense.*

Morning Huddle and Sign-Off

- The foreman / supervisor and or crew members must read and explain the completed JHA to the entire crew during the morning huddle.

- Every crew member must sign and date the JHA form before performing any physical labor.

Triggers for Mandatory Revision

A daily JHA is a living document. The foreman / supervisor must immediately stop work, revise the JHA, and re-brief the crew if any of the following occur:

- **Scope Changes:** The scope of work or sequence of tasks changes mid-shift.

- **Environmental Changes:** Weather conditions shift (e.g., sudden high winds, heavy rain, or extreme heat).

- **Personnel Changes:** New workers or different subcontractors join the active work crew mid-day.

- **Unexpected Hazards:** The introduction of new heavy machinery, tools, or nearby hazardous operations by other trades.

- **Safety Incidents:** A near-miss, property damage, or injury occurs on the site.

4.3 Toolbox Talks

“Toolbox Talks” are safety talks that are conducted by Field Supervisors or delegated to appropriate employees or subcontractors weekly or more frequently if needed. Safety topics are selected that are applicable to the specific hazards on the job. Employees and subcontractors are encouraged to participate.

4.4 Inspections and Audits

Inspections

Project, jobsite, or workplace supervisors and employees are responsible for inspecting their work locations and maintaining safety. Frequent and regular inspections are conducted of project jobsites, administrative offices, shop areas, and other locations to ensure compliance with applicable regulatory requirements. Safety inspections look at physical conditions and work practices, and identify hazards so they can be eliminated, guarded, or protected against.

Inspections conducted by supervisors and employees at Civil Works Contracting include, but are not limited to:

- Vehicle Inspection – Daily, pre- and post-trip
- Forklift Inspection – Daily, pre-shift
- MEWP (mobile equipment work platform) Inspection – Daily, pre-shift
- Lockout/Tagout Procedures Inspection – Periodic
- Respiratory Equipment Inspection – Monthly
- Crane Inspection – Annually
- Crane Pre-Lift Inspection – Pre-lift, before each use
- Excavation Inspection – Daily, before start of each shift, following any change

Safety Audits/Inspections/Observations

Safety audits, inspections, and or observations shall be conducted at least weekly on each project by the HSE department and or field supervision.

From these audits/inspections/ and or observations, useful information is obtained that helps bring focus to existing and potential safety hazards associated with Civil Works Contracting jobsites, along with the corresponding hazard prevention and control measures. Prevention and control measures include engineering controls, training, PPE, and an emphasis on good communication between the Field Supervisors and their crews. Existing hazards are corrected as they arise, and audit reports are used to help identify any repetitive issues or overall trends discovered.

Safety audits provide verification that the company's safety programs and practices are working.

Chapter 5 - Subcontractor Management

All subcontractors operating at Civil Works Contracting jobsites are required to maintain effective safety and health programs and management systems, and to comply with all applicable Civil Works Contracting safety and health rules and regulations. The quality of each subcontractor's safety and health program is a primary consideration during the evaluation and selection process.

5.1 Subcontractor Pre-Work Meetings

Field Supervisors have the responsibility to conduct subcontractor pre-work meetings with subcontractors prior to the start of each job. Participants include the appropriate subcontractors' representatives.

Field Supervisors are responsible for:

- Setting the meeting date and inviting participants
- Preparing the agenda
- Documenting the meeting, including date, time, participants, and topics discussed
- Obtaining subcontractor documentation including names and proof of training for required Competent Persons

5.2 Subcontractor Safety Training and Inspections

Subcontractor Required Safety Training

Subcontractors are required to have all safety and equipment-related training as required by OSHA and other applicable requirements. Civil Works Contracting considers a minimum level of training for subcontractors to include the following: ladder safety, personal protective equipment (PPE), hazard communication, electrical, scaffolding, fire prevention, First Aid/CPR/AED, and drug-free workplace.

Subcontractors' field supervisors should have adequate safety training to provide them with a basic knowledge and understanding of safety work practices and requirements related to their scope of work. Depending on the scope of work, the following safety training is required for subcontractor supervisors on Civil Works Contracting projects. Subcontractors must provide proof of training prior to the start of work and training records must be maintained on the jobsite.

- Excavation Competent Person
- Scaffold Competent Person
- Confined Space Entry Supervisor
- Fall Protection Competent Person
- Crane Qualified Signaler
- Qualified Rigger
- NFPA 70E
- Respiratory Protection

Subcontractor Safety Inspections

Subcontractors are required by Civil Works Contracting to conduct frequent and regular jobsite inspections of their work areas and maintain written documentation of each inspection. Subcontractors may use the Subcontractor Safety Inspection Checklist to document their inspections. Deficiencies must be corrected as soon as possible, and copies of inspections should be available upon request by Civil Works Contracting.

5.3 Subcontractor Disciplinary Procedures

These procedures are intended to be used at the project level in the field. In most cases, a progressive disciplinary policy will be used for violation of Civil Works Contracting safety rules, policies, and procedures by subcontractor employees. The goals of a progressive policy are to inform the subcontractor of non-compliance with Civil Works Contracting safety rules, policies, and procedures; to clarify what was violated; to instruct the subcontractor on the corrective action that must be taken; and inform the subcontractor of the action that Civil Works Contracting will take if the company's expectations for safety are not met. One or more of the progressive steps may be bypassed, depending on the seriousness of the infraction.

Chapter 6 - Incident Response, Reporting & Investigation

6.1 First Aid and Medical Treatment

Purpose

The purpose of this section is to ensure prompt and professional medical treatment when an injury or illness occurs on a Civil Works Contracting jobsite.

Responsibility

Field Supervisors hold overall responsibility for establishing and ensuring compliance with this procedure. It is the responsibility of all managers and supervisory personnel to enforce this procedure and of each permanent and temporary employee to follow it. Each subcontractor maintains ultimate responsibility for ensuring compliance with this procedure for its employees and its third-tier subcontractors.

General Requirements

Scope

The following factors will be considered in determining the scope of first aid and medical services provided:

- Duration of the project
- Peak manpower
- Location of the project and availability of existing medical resources
- Accessibility, transportation, and communication resources
- Exposure of the project to specific health and safety hazards such as toxic substances, occupational diseases, and potential for explosions, fires, or other catastrophes

First Aid Kits

Each jobsite must have at least one first aid kit sized and equipped in proportion to the workforce. A third-party first aid supplier may be retained to service and supply first aid kits monthly or as needed. If a third-party supplier is not used, first aid kits meeting minimum OSHA requirements for contents must be procured and made available by Civil Works Contracting.

First aid kits must be inspected weekly to ensure that depleted contents are replaced as required.

First Aid Personnel

Regardless of the jobsite's proximity to medical care providers, Civil Works Contracting should provide on the jobsite at least one employee who is trained in the following:

- Adult Cardio-Pulmonary Resuscitation (CPR)
- Adult First Aid
- Automated External Defibrillator (AED)

Transportation of Injured or Ill Employees

For serious and/or life-threatening emergencies, local first responder services should be activated in all cases by calling 9-1-1.

For first aid (non-emergency) transportation of injured or ill employees from the jobsite or worksite to the doctor's office, clinic or urgent care provider, a suitable vehicle will be provided. This vehicle should be always available during the workday.

6.2 Incident Response

Purpose

An incident is defined as an event that interrupts usual operations, damages property, causes bodily injury, requires first aid, etc. Incidents include but are not limited to: bodily injury or illness, chemical exposure, property damage, near-miss, etc. A near-miss is defined as narrowly missing an incident.

Civil Works Contracting's Field Supervisor will maintain documentation of all near-misses and first aid incidents so that patterns with common causes can be identified and the causes eliminated or controlled.

Following these basic procedures will allow you to perform the tasks necessary to provide for the safety and care of affected employees. Your cooperation is essential to managing workplace incidents.

Essential Response Procedures

When an incident happens:

1. If safety permits, provide first aid for injured personnel (within your scope and ability).
2. Provide for your safety, the safety of co-workers and others.
3. Determine the degree and extent (if any) of bodily injury or property damage.
4. If a serious and/or life-threatening emergency exists, or if unable to safely transport in a company vehicle without causing additional injury, pain or discomfort, activate local emergency services by calling 9-1-1.
5. Isolate any unsafe conditions existing at the scene.
6. Notify your supervisor immediately.
7. If injuries are not immediately life threatening, transport the injured employee(s) to the closest Urgent Care facility.

The injured or sick employee should always be accompanied to the medical provider. For non-life-threatening injuries, make use of designated Urgent Care facilities first whenever possible. Use hospital Emergency Rooms for life-threatening injuries and when Urgent Care facilities are not available.

8. Notify the Field Supervisor and HSE Director immediately so an incident investigation can be initiated.
9. Complete an Incident Report and preserve the scene as accurately as possible.
10. Take pictures if needed.
11. Record all pertinent information and identify witnesses.
12. Conduct an incident investigation at the project level providing corrective and preventative action.

6.3 Incident Reporting and Investigation

Purpose

The purpose of this section is to provide detailed guidance and protocol for:

- Reporting and investigating injuries involving Civil Works Contracting permanent and temporary employees
- Reporting and investigating near-misses occurring on the jobsite
- Ensuring that Civil Works Contracting employees who suffer on-the-job injuries are medically cleared prior to being permitted to return to work

Responsibility

All Civil Works Contracting employees are required to report all work-related incidents and illnesses immediately to their supervisor, Field Supervisor or designated competent person on the jobsite. Civil Works Contracting employees have the right and responsibility to report work-related injuries and illnesses without the fear of being retaliated against, discriminated against, or terminated from employment.

Field Supervisors hold overall responsibility for establishing and ensuring compliance with this procedure. It is the responsibility of all managers and supervisory personnel to enforce this procedure and of each permanent and temporary employee to follow it. Each subcontractor maintains ultimate responsibility for ensuring compliance with this procedure for its employees and its third-tier subcontractors.

It is the responsibility of the injured employee's immediate supervisor in conjunction with the Field Supervisor (if applicable) to conduct an incident investigation and complete all required reports.

General Requirements

The potential severity of the employee's injury must always be considered when determining the depth in which to investigate any incident or near miss. If an injury or illness claim is suspected to be fraudulent, a full investigation must be completed, and this suspicion must be communicated to Civil Works Contracting Human Resources.

All incidents of work-related injury or illness involving a Civil Works Contracting employee must be investigated and the steps outlined within this procedure must be followed. This requirement applies to all events from near misses to fatalities.

Reporting and Investigation Procedures

When a work-related illness or injury occurs, take the steps outlined below, depending on the specified circumstances:

When Medical Attention is Not Required or Desired by the Employee

When treatment of a work-related illness or injury **beyond first aid** is not required or desired by the Civil Works Contracting employee:

1. The employee's supervisor must complete and sign an Incident Report checking the boxes under Incident Type and Injury/Illness Information that indicate "First Aid Only."
2. The employee must review the report, sign, and retain a copy; the original is maintained in the employee's personnel file.

When Medical Attention is Required and/or Desired by the Employee

The full step-by-step protocol in Section 5.2 Essential Response Procedures must be followed.

Following provisions for first aid and safety at the scene, injury assessment and activation of emergency services (if applicable), supervisor notification, transportation to medical provider, and notification of Field Supervisor and HSE Director, the individual responsible for reporting (usually the Field Supervisor) must:

1. Complete an Incident Report and preserve the scene as accurately as possible.
2. Take pictures if needed.
3. Record all pertinent information and identify witnesses.
4. Ensure that all required claim reporting paperwork has been completed by the employee and/or supervisor
5. Conduct an incident investigation at the project level. The incident investigation should answer the questions who, what, when, where and (most importantly) why. The incident investigation should also provide corrective and preventative action.

Return to Work Program

It is Civil Works Contracting's goal to prevent work-related injuries from happening. The company is always concerned when an employee is injured or ill due to a work-related condition. Such absences cost both the company and its employees. We want our injured employees to get the best possible medical treatment immediately to ensure the earliest possible recovery and return to work.

Civil Works Contracting has a Worker's Compensation program available for employees who have suffered work-related injuries. The program's administrator will determine, based upon their guidelines, whether you are eligible for wage loss or medical expenses under this program.

Civil Works Contracting wants to provide meaningful work activity for all employees who become unable to perform all, or portions of their regular work assignment. Thus, the company has implemented a Return-to-Work program which includes transitional or light duty work. The Return-to-Work program is temporary, not to exceed six months.

Procedures

The following procedures pertain to the company's Return to Work program:

- All work-related injuries should always be reported immediately to your supervisor, no later than the end of the shift on which the injury occurs.
- If a post-accident drug screen is not performed the same day as the injury, the employee will only be paid up to one hour while taking time out to have the drug screen sample collected.
- You must complete and sign a Report of Injury or Illness form.
- When medical treatment is sought, the injured employee must advise their supervisor that they are seeking treatment and obtain a Return-to-Work Evaluation form. Regardless of the choice of physicians, the Return-to-Work form must be completed for each practitioner visit. Civil Works Contracting will not accept a general note stating that you are only to be off work.
- Under this program, temporary light duty work is available for up to sixty (60) days (with a review of your progress every 30 days) while you are temporarily unable to work in your regular job capacity. Transitional or light duty work beyond sixty (60) days, up to a maximum of six (6) months will be evaluated on a case-by-case basis.
- If you are unable to return to your regular job but capable of performing transitional duty, you must return to transitional duty. Failure to do so will result in your not being eligible for full disability benefits under the Workers' Compensation program and may result in disqualification for certain employee benefits and, in some cases be a basis for termination.
- Employees who are unable to work and whose absences Civil Works Contracting approves must keep the company informed on a weekly basis of their status. Failure to do so will result in a reduction in benefits available and discipline, up to and including termination from employment.
- If you are unable to return to your regular job or transitional duty, your absence must be approved under the Family Medical Leave Act (FMLA) program. For this purpose, you must complete a Family Medical Leave Request form and submit it to Human Resources. You must also have your medical practitioner complete both the Return-to-Work Evaluation form and the Return-to-Work Request / Physician's Authorization form.
- If you are not eligible for leave under the Family Medical Leave Act (FMLA), you must return to light duty or regular work if possible. If you are unable to return to any available work, your job position may be filled after a reasonable time. When able to do so, you will be entitled to return to a suitable position, if available and consistent with any limitations. However, you must keep the company regularly informed of your status and any change in your condition.
- You must provide a Return-to-Work form indicating you are capable of returning to full duty. Permanent restrictions will be evaluated on a case-by-case basis and relate to the performance of essential job functions. No permanent light duty positions will be created.
- You must cooperate with our third-party administrator and provide accurate and complete information as soon as possible so that you receive all benefits to which you are entitled. If you have problems or concerns, please contact your supervisor and Human Resources.

Near-Miss Reporting

Near-miss incidents should be reported using the Incident Report form as soon as possible after they occur at the jobsite. Important lessons can be learned if near-miss incidents are treated as other incidents/accidents. When near-miss incidents are investigated and root-cause-analysis performed, preventative measures can be implemented, and additional employee training conducted if necessary.

Near-miss reporting should be done for the following types of incidents:

- When property damage occurs, including existing buildings, work under construction, vehicles, and equipment.
- A near-miss incident occurs where a serious injury could have resulted, but fortunately, did not. Examples include dropping a load, a sizable object falls from overhead, a piece of equipment or load almost contacts electrical lines, a gas main or buried electrical lines are struck, etc.
- Other near-miss incidents should be reported whenever a “lessons learned” example can be used to benefit the project or even the entire company

Root-Cause Analysis

The following information should be collected and discussed to assist in determining the root cause of any incident:

- The nature of the work being done immediately prior to the incident and at the time of the incident.
- Whether the work was normally scheduled, unscheduled, emergency work or an extremely urgent job.
- The specific instructions that were issued to the crews and employees directly involved in the incident.
- The PPE required and used.
- The statements of witnesses present at the time of the incident compared with those obtained earlier at the incident scene.

The incident events should be reviewed chronologically using the above information to ensure that everyone agrees with what took place. Include the root and any contributing causes of the incident.

Formulate the corrective steps to be put into effect immediately, based on the complete assemblage of the facts, including any retraining plans that may be indicated. Each cause must have an associated recommendation to prevent recurrence.

6.4 OSHA Recordkeeping

Definitions

First Aid – For the purposes of OSHA recordkeeping, the following is a complete list of all treatments that are considered first aid:

- Using a non-prescription medication at non-prescription strength (using a non-prescription medication at prescription strength is considered medical treatment for recordkeeping purposes)
- Administering tetanus immunizations (other immunizations, such as Hepatitis B vaccine or rabies vaccine, are considered medical treatment)
- Cleaning, flushing or soaking wounds on the surface of the skin
- Using wound coverings such as bandages, Band-Aids, gauze pads, etc. or using butterfly bandages or Steri-Strips (other wound closing devices such as sutures, staples, etc. are considered medical treatment)
- Using hot or cold therapy
- Using any non-rigid means of support, such as elastic bandages, wraps, non-rigid back belts, etc. (devices with rigid stays or other systems designed to immobilize parts of the body are considered medical treatment for recordkeeping purposes)
- Using temporary immobilization devices while transporting an accident victim, for example splints slings, neck collars, back boards, etc.
- Drilling of a fingernail or toenail to relieve pressure, or draining fluid from a blister
- Using eye patches
- Removing foreign bodies from the eye using only irrigation or a cotton swab
- Removing splinters or foreign material from areas other than the eye by irrigation, tweezers, cotton swabs or other simple means
- Using finger guards
- Using massages (physical therapy or chiropractic treatment are considered medical treatment for recordkeeping purposes), or
- Drinking fluids for relief of heat stress

Medical Treatment – Treatment of a work-related injury or illness beyond first aid

OSHA Lost-Time Injury or Illness – Any work-related non-fatal injury which causes the employee to lose at least one day of regularly scheduled work after the date of the injury as deemed required by a licensed medical provider; any work-related non-fatal illness which causes the employee to lose at least one day of regularly scheduled work after the date the illness is first diagnosed

OSHA Non-Recordable Injury or Illness – Minor work-related injuries or illnesses requiring first aid only

OSHA Recordable Injury or Illness – Any work-related injury or illness which results in the following:

- a fatality, regardless of the time between the injury and death or the length of the illness; or
- a work-related injury or illness other than a fatality which results in lost workdays; or
- a work-related non-fatal injury or illness without lost workdays which results in transfer to another job or termination of employment, or which requires medical treatment other than first aid or involves loss of consciousness or restriction of work or motion (this category also includes any diagnosed occupational illness that is reported to the employer but is not classified as a fatality or lost workday case).

Recordable injuries and illnesses must be recorded on the OSHA 300 and 301 logs within seven days of receiving information that the injury or illness has occurred.

OSHA Reportable Injury or Illness – Severe work-related injuries or illnesses that must be reported to OSHA in an expedited time frame. These include the following, which are reportable and recordable:

- Any employee fatality resulting from a work-related incident must be reported within 8 (eight) hours of the fatality.
- Any employee in-patient hospitalization as a result of a work-related incident must be reported within 24 (twenty-four) hours of the hospitalization.
- Any employee amputation or loss of an eye as a result of a work-related incident must be reported to OSHA within 24 (twenty-four) hours of the incident.

Serious Injury – Any life-threatening injury, for example: electric shock, falls resulting in severe trauma, loss of limbs, crush injuries with suspected internal organ damage, etc.

OSHA Reporting Requirements

Reportable Incidents

Certain types of work-related injuries and illnesses must be reported to OSHA within a certain timeframe dependent on incident type and specified by 29 CFR 1904.39(a):

- Any employee fatality resulting from a work-related incident must be reported within 8 (eight) hours of the fatality.
- Any employee in-patient hospitalization as a result of a work-related incident must be reported within 24 (twenty-four) hours of the hospitalization.
- Any employee amputation or loss of an eye as a result of a work-related incident must be reported to OSHA within 24 (twenty-four) hours of the incident.

These events must be reported using one of the following approved methods:

- Using OSHA's public website at www.OSHA.gov
- By phone or in person to the local OSHA Area Office
- By phone to the OSHA 800 number (1-800-321-6742)

When reporting a fatality, in-patient hospitalization, amputation, or loss of an eye to OSHA, the following information must be reported:

- Company name
- Location of incident
- Type of event
- Number of employees who suffered the event
- Names of employees who suffered the event
- Company contact person's name and phone number
- Brief description of the incident

Recordable Incidents

All employers with 11 or more employees are required by OSHA to maintain the following:

- **Form 300, Log of Work-Related Injuries and Illnesses**
  Entries must be made into this form for each recordable injury or illness within seven days of receiving information that the incident has occurred
- **Form 300A, Summary of Work-Related Injuries and Illnesses**
  This annual summary must be submitted electronically to OSHA by March 2 of the following year
- **Form 301, Injury and Illness Incident Report**
  Entries must be made into this form for each recordable injury or illness within seven days of receiving information that the incident has occurred

OSHA Record Retention Requirements

Document:	Retain for:
Notices of Safety Violations	3 years
Reports of Corrected Safety Violations	3 years
Employee Safety Training Documents	Duration of employee's career
OSHA Injury and Illness Logs: 300, 300A, 301	5 years
Employee Medical Records	Duration of employee's career
Safety Audit and Inspection Records	3 years
Incident Investigation Reports	3 years
Job Hazard Analysis Reports	3 years
Safety Committee Meeting Agendas	3 years

6.5 OSHA Inspections

OSHA is committed to strong, fair, and effective enforcement of safety and health requirements in the workplace. OSHA inspectors, called compliance safety and health officers, are experienced, well-trained industrial hygienists and safety professionals whose goal is to assure compliance with OSHA requirements and help employers and workers reduce on-the-job hazards and prevent injuries, illnesses, and deaths in the workplace. Normally, OSHA conducts inspections without advance notice. Employers have the right to require compliance officers to obtain an inspection warrant before entering the worksite.

Inspection Priorities

OSHA has jurisdiction over approximately 7 million worksites. The agency seeks to focus its inspection resources on the most hazardous workplaces in the following order of priority:

1. Imminent danger situations—hazards that could cause death or serious physical harm receive top priority. Compliance officers will ask employers to correct these hazards immediately or remove endangered employees.

2. Severe injuries and illnesses—employers must report: • All work-related fatalities within 8 hours. • All work-related inpatient hospitalizations, amputations, or losses of an eye within 24 hours.

3. Worker Complaints—allegations of hazards or violations also receive a high priority. Employees may request anonymity when they file complaints.

4. Referrals of hazards from other federal, state or local agencies, individuals, organizations or the media receive consideration for inspection.

5. Targeted inspections—inspections aimed at specific high-hazard industries or individual workplaces that have experienced high rates of injuries and illnesses also receive priority.

6. Follow-up inspections—checks for abatement of violations cited during previous inspections are also conducted by the agency in certain circumstances.

On-Site Inspections

Preparation—Before conducting an inspection, OSHA compliance officers research the inspection history of a worksite using various data sources, review the operations and processes in use and the standards most likely to apply. They gather appropriate personal protective equipment and testing instruments to measure potential hazards.

Presentation of credentials—The on-site inspection begins with the presentation of the compliance officer's credentials, which may include both a photograph and a serial number.

Opening Conference—The compliance officer will explain why OSHA selected the workplace for inspection and describe the scope of the inspection, walkaround procedures, employee representation and employee interviews. The employer then selects a representative to accompany the compliance officer during the inspection. An authorized representative of the employees, if any, also has the right to accompany an inspector. The compliance officer will consult privately with a reasonable number of employees during the inspection.

Walkaround—Following the opening conference, the compliance officer and the representatives will walk through the portions of the workplace covered by the inspection, inspecting for hazards that could lead to employee injury or illness. The compliance officer will also review worksite injury and illness records and the posting of the official OSHA poster.

During the walkaround, compliance officers may point out some apparent violations that can be corrected immediately. While the law requires that these hazards must still be cited, prompt correction is a sign of good faith on the part of the employer. Compliance officers try to minimize work interruptions during the inspection and will keep confidential any trade secrets observed.

Closing Conference—After the walkaround, the compliance officer holds a closing conference with the employer and the employee representatives to discuss the findings. The compliance officer discusses possible courses of action an employer may take following an inspection, which could include an informal conference with OSHA or contesting citations and proposed penalties. The compliance officer also discusses consultation services and employee rights.

Results When an inspector finds violations of OSHA standards or serious hazards, OSHA may issue citations and fines. OSHA must issue a citation and proposed penalty within six months of the violation's occurrence. Citations describe OSHA requirements allegedly violated, list any proposed penalties, and give a deadline for correcting the alleged hazards. Violations are categorized as willful, serious, other-than-serious, de minimis, failure to abate, and repeated. In settling a penalty, OSHA has a policy of reducing penalties for small employers and those acting in good faith. For serious violations, OSHA may also reduce the proposed penalty based on the gravity of the alleged violation. No good faith adjustment will be made for alleged willful violations. For information on penalty ranges, see www.osha.gov/penalties.

Appeals When OSHA issues a citation to an employer, it also offers the employer an opportunity for an informal conference with the OSHA Area Director to discuss citations, penalties, abatement dates, or any other information pertinent to the inspection. The agency and the employer may work out a settlement agreement to resolve the matter and to eliminate the hazard. OSHA's primary goal is correcting hazards and maintaining compliance rather than issuing citations or collecting penalties.

Alternatively, employers have 15 working days after receipt of citations and proposed penalties to formally contest the alleged violations and/ or penalties by sending a written notice to the Area Director. OSHA forwards the contest to the Occupational Safety and Health Review Commission for independent review. Alternatively, citations, penalties, and abatement dates that are not challenged by the employer or settled become a final order of the Occupational Safety and Health Review Commission.

Procedures when an OSHA compliance officer is arrives on-site

Project Team Responsibilities

- Verify the OSHA Compliance Officer presents a government issued ID. If this does not occur, any citations can be null & void.
- Ask the Compliance Officer for the nature of the inspection: Local/National Emphasis Program, General Scheduled Inspection, Complaint, Referral, etc. If a Complaint, ask to see the complaint paperwork.

- **Call Civil Works Contracting HSE Director immediately upon the arrival** of an OSHA Compliance Officer. The HSE Director will make every attempt to assist the project with the inspection.
- The HSE Director will inform CEO Chris Scerri, President Jeff Cole, HR Director, & either VP Federal, VP Rail, or GM Civil.
- A Civil Works Contracting representative **MUST** escort the OSHA inspector through the site. It is preferred that The HSE Director and the Project Superintendent accompany the inspector throughout the inspection. If this is not possible, the Project Manager or other designated representative, having knowledge of the project must accompany the inspector. The Civil Works Contracting representative will keep notes, take photographs, and accompany the inspection party for its duration. Do not permit Civil Works Contracting employees to linger near the inspection party unless they are providing assistance.
- **Treat the Compliance Officer with professional courtesy and respect. Do not harass, threaten, or otherwise intimidate the Compliance Officer.**
- Photographs are to be taken of every item or action the Compliance Officer inspects or photographs. A minimum of two (preferably more) photos are to be taken. The first is to be taken from the angle and location of the Compliance Officer. The second, third, etc., are to be an overall picture of the area surrounding the violation.
- When the Compliance Officer takes photographs, ask them the reason for the photo and record the response.
- Photos should be kept in a log with the following information: project name and number, City and State, location/area, brief description of picture, name of person taking picture.
- If the Compliance Officer takes video, be cautious of the audio recording. You may verbally request that you not be audio recorded. If you take your own video, you must make certain the audience agrees to the video/audio recording to prevent audio recording without permission.
- If OSHA writes down something, you write down the same. Just like in an incident investigation, the information gathered during an OSHA inspection must be clear and detailed such that it can be read and understood by uninvolved persons months or even years after the inspection.
- OSHA can look at paper items on the jobsite; however, they cannot take anything away from the jobsite unless Civil Works Contracting President Jeff Cole & HSE Director Adam Ottaviano have been notified in writing (an email works) and have accepted the request.

Conduct of the Inspection

The Compliance Officer may request an opening conference with representatives from all contractors on site, as well as the General Contractor or Construction Manager before conducting the inspection. The Compliance Officer may also choose to begin the inspection immediately after producing their credentials. In this instance, they may hold several opening conferences in the field with separate contractors.

CIVIL WORKS CONTRACTING AND SUBCONTRACTOR SCOPE OF WORK LOCATIONS ONLY: Keep a chronological record of where the Compliance Officer goes for and how long they talk to employees. If an obvious hazard is observed during the inspection, take the necessary actions to get it resolved. **Do not admit responsibility for any alleged violation.**

The Compliance Officer may interview employees in a group or in private. Employees have the right to decline to be interviewed, request a 3rd party witness to be present, refuse to give a statement or sign a document. Information provided shall be honest and only be the information requested. Refrain from additional commentary, debating alleged violations, providing blame, hearsay, or opinions, etc.

At the completion of the inspection, the Compliance Officer will either hold a general closing conference or meet with each contractor individually. The Civil Works Contracting representative shall take detailed notes during the closing conference.

If a citation is received via certified mail, open it and share the documents immediately with HSE Director, President, either VP Federal, VP Rail, or GM Civil to take prompt action and schedule an informal conference. An alleged violation does not become an affirmed violation unless the employer accepts the citation or when contested, the judge affirms the citation.

OSHA Inspection "Do's and Don'ts"

Do

- Be respectful and polite
- Inform Civil Works Contracting HSE Director and subcontractors of OSHA presence
- Be prepared to provide OSHA 300 and 300A logs
- Request a written list of requested documents on OSHA letterhead if
- Take detailed and accurate notes
- Take photographs of everything OSHA photographs
- Immediately abate/correct all violations pointed out by OSHA

Don't

- Be confrontational or argumentative
- Admit responsibility for any alleged violation
- Halt all work on the project site
- Volunteer information (Unless OSHA will misunderstand a fact to the employer's detriment without additional information)
- Argue, debate, or discuss alleged violation, exceptions, or regulations
- Interfere with the employee interview process or retaliate against employees

Chapter 7 - Safety Training

7.1 New Employee Orientation

New employees receive Hazard Communication training and a job-specific orientation to workplace hazards and personal protection equipment. Also covered are topics including the company's Drug-Free Workplace policy, emergency procedures, injury and illness response procedures, OSHA and training requirements, ladder use, and electrical hazards. Re-orientation is provided when an employee's job assignment is modified.

7.2 Basic and Specialty Safety Training Requirements

All Civil Works Contracting employees receive the appropriate job-specific training. All employees receive their New Employee Orientation covering minimum training requirements within 90 days of being assigned tasks and responsibilities that may expose them to potential work-related safety and health hazards at the jobsite. All required training is documented, and records are maintained in the employee's personnel file.

Employees are required to participate in prepared safety and health training sessions that, depending upon the topic, may include the distribution of printed information, formal or informal classroom or online presentations, videos, hands-on demonstrations, practical exercises, and quizzes.

Civil Works Contracting field personnel must complete required training according to the following schedule:

Training Topic	Training Required	Certification / Evaluation	Frequency Required
New Hire Orientation (includes Drug-Free Workplace Policy)	All employees	Evaluation	Upon Hire, includes a 90 Day Review
OSHA 10	All employees	Certification	Mandatory within 90 days after hire, **3-year refresher *recommended***
Fall Protection	All employees	Evaluation	Mandatory within 90 days after hire, ***annual refresher*** **required**
Fire Prevention & Protection	All employees	Evaluation	Mandatory within 90 days after hire, ***annual refresher*** **required**
Hazard Communication	All employees	Evaluation	Mandatory within 90 days after hire, ***annual refresher*** **required**

Hazard Recognition & Control	All employees	Evaluation	Mandatory within 90 days after hire, ***annual refresher*** *recommended*
Personal Protective Equipment	All employees	Evaluation	Mandatory within 90 days after hire, ***annual refresher*** **required**
Basic Electrical / LOTO	All employees	Evaluation	Mandatory within 90 days after hire, ***annual refresher*** *recommended*
Scaffolds / Ladders	All employees	Evaluation	Mandatory within 90 days after hire, ***annual refresher*** *recommended*
Heavy Equipment Designated Operator	As Needed	Evaluation	Mandatory for employees BEFORE using Heavy Equipment, ***3-year refresher*** **required**
Confined Space	As Needed	Evaluation	Mandatory for employees BEFORE entering a confined space, ***annual refresher*** **required**
Hot Work (welding, grinding)	As Needed	Evaluation	Mandatory for employees BEFORE performing hot work activities, ***annual refresher*** **required**
Forklift / All Terrain Forklift	As Needed	Certification	Mandatory for employees BEFORE using Forklifts, **3-year recertification required.**
Cranes / Rigging	As Needed	Evaluation	Mandatory for employees BEFORE performing hot work activities, ***annual refresher*** **required**
MEWP (mobile equipment work platforms)	As Needed	Certification	Mandatory for employees BEFORE using MEWPs (lifts), **3-year recertification required.**
OSHA 30	Supervisors & Safety Team	Certification	Mandatory within 90 days after hire or promotion to Field Supervisor, **3-year refresher *recommended***
First Aid / CPR / AED	Supervisors & Safety Team	Certification	Mandatory within 90 days after hire or promotion to Field Supervisor. **2-year recertification required.**
Incident Management	Supervisors & Safety Team	Evaluation	Mandatory within 90 days after hire or promotion to Field Supervisor, **3-year refresher *recommended***
Vehicle Safety / Defensive Driver	Vehicle Drivers	Evaluation	Mandatory within 90 days after hire or promotion, ***annual refresher*** **required**

7.3 Refresher Training

Annual refresher training is required for any employees who have received specialty fire extinguisher training. Periodic refresher training is required for all employees on the topic of Hazard Communication. Annual refresher training is required for all employees on the company's Emergency Action Plan, including a practice drill.

It is recommended that Field-level personnel be re-certified in the OSHA 10-Hour course every 36 months. It is recommended that Field Supervisors and above be re-certified in the OSHA 30-Hour course every 36 months.

7.4 Supervisory Training

As soon as possible after their employment or promotion, OSHA 30-Hour training is provided for Field Supervisors. Field Supervisors are also required to attend training on Scaffolds and Incident Management.

Chapter 8 - Hazard Communication Program

8.1 Purpose

There are materials used on jobsites and company-wide that could be hazardous to our employees' personal safety and health if not used properly. This Hazard Communication Program will help all Civil Works Contracting employees recognize those materials that are considered hazardous under certain conditions and learn to handle them safely.

OSHA's Hazard Communication Standard, 29 CFR 1910.1200, covers chemicals and substances that have warnings on their labels or containers. Field Supervisors are required to have each hazardous chemical labeled according to GHS standards and must have Safety Data Sheets (SDSs) available for review by all employees on the jobsite and any OSHA compliance officer or authorized person who may wish to see them. This written Hazard Communication Program must be kept at the jobsite where it is available to all employees.

8.2 Safety Data Sheets (SDSs)

Copies of SDSs for the chemicals and other hazardous materials in use at any jobsite must be kept updated and accessible to all employees, either in a notebook or in electronic form. A Hazardous Chemical Inventory List provides information on the manufacturer of each chemical listed. A Safety Data Sheet (SDS) is required for each item on the Hazardous Chemical Inventory List. The purchaser of the hazardous chemical or material is responsible for contacting the manufacturer or supplier to obtain the SDS. The Chemical Inventory List must be updated with new chemicals added within 30 days. SDSs or Chemical Inventory Lists must be retained for 30 years.

8.3 Employee Training

Before starting work, new employees must be trained and provided information pertaining to the Hazard Communication Program. Employees must also be trained when a new hazardous chemical is introduced into the workplace.

Hazard Communication training must include the identification of specific hazardous chemicals typically found in the new employee's work area, as well as the following:

- Location and availability of the written Hazard Communication Program, including work area-specific guidelines
- Inventory of hazardous chemicals
- Location of the SDSs
- Methods used to detect the presence or release of hazardous chemicals
- Physical and health hazards of the chemicals in the work area
- Methods personnel can use to protect themselves from exposure to hazardous chemicals, including work area- specific guidelines for work practices and personal protective equipment

- Emergency procedures
- An explanation of the labeling system
- How to obtain and use the hazard information

8.4 Training Records

Upon completion of the required Hazard Communication training, each employee must sign an acknowledgement form that the training was received, and this form kept onsite in the employee's personnel file. Records of employee training are retained on file for five years after an employee has left Civil Works Contracting.

8.5 Non-Routine Tasks

Periodically, Civil Works Contracting employees may be required to perform hazardous non-routine tasks. Before beginning any non-routine task involving possible chemical hazards, you should first contact your supervisor. Supervisors must ensure that employees are informed of the following:

- The specific hazards associated with the performance of the task
- Protective measures that must be used
- Measures that have been taken to lessen these hazards, such as ventilation, personal protective equipment, or the presence of another employee
- Specific emergency procedures in the event of an accident or injury

All work in laboratories where there are potential hazards from chemicals used and stored should be considered non-routine. This work should be coordinated with the laboratory staff to identify and minimize potential hazards in the work area. No work should be conducted that requires entering a fume hood body or moving laboratory equipment or stored chemicals without the proper authorization, training, and equipment.

8.6 Subcontractor HazCom Requirements

Civil Works Contracting requires that all subcontractors maintain a job-specific Hazard Communication Program that is made available to all their employees.

The subcontractors' HazCom information must be job specific for the jobsite and contain the following elements:

- Written Hazard Communication Program
- Hazardous Chemical Inventory List of all hazardous materials used by their employees on the jobsite
- Safety Data Sheets to correspond with all items on their Chemical Inventory List

8.7 Site-Specific HazCom Programs

As part of the pre-work Jobsite Hazard Assessment, the Field Supervisor at each jobsite will

ensure that Civil Works Contracting's Hazard Communication Program is implemented, update the Chemical Inventory List whenever a new chemical is acquired, review and update the Hazard Communication Program as necessary, provide training, and ensure Safety Data Sheets are accessible to all affected workers during their normal work hours.

The site-specific Hazard Communication Program will contain the following information:

- Date
- Location of the written program
- Revision dates
- Responsible employee
- Location of SDSs
- Location of training records
- Location of past records
- Emergency procedures for hazardous chemical spills
- Location of nearest health care provider
- Location of eyewash station
- Location of emergency shower

Chapter 9 - Emergency Procedures

9.1 Corporate Crisis Management Plan

A crisis is any event that has created and/or may still pose an immediate threat to life, property, or business as usual at Civil Works Contracting. This includes any major incident that could focus negative attention on our owners, management, subcontractors, vendors, or any entity associated with the company, and may occur at the corporate offices, project jobsites, or other locations related to the company.

The Civil Works Contracting Corporate Crisis Management Plan provides organized, systematic guidelines to be used in the event of any crisis or unexpected negative events associated with the company. The Crisis Management Plan should always be available at the corporate offices and at all jobsites. This predetermined plan can help our management team and supervisors react quickly and decisively when there is not much time to think through a problem situation.

Such situations may include, but are not limited to:

- Incidents involving serious bodily harm and/or fatality(s), or physical damages
- Suspected terrorist attacks, bomb threats, etc.
- Building collapse
- Tornado, hurricane, earthquake
- Fire/explosion
- Major equipment failure
- Workplace violence, active shooter
- Environmental exposures

The extent of actions required will be determined by the severity of the event. Timely and sound judgment is required to ensure the success of this Crisis Management Plan. All employees must notify Civil Works Contracting management immediately when there is a crisis event. It is critical that information be quickly communicated up the chain of management to initiate all parties' involvement in further actions and to maintain Civil Works Contracting's valued relationships with our customers, the community, and all involved parties.

Corporate Crisis Management Team

All members of senior management comprise the Corporate Crisis Management Team. A corporate Crisis Team Members phone list will be maintained and made available as appropriate throughout the company.

Notification of Corporate Emergency Response Coordinator (HSE Director)

Civil Works Contracting employees are instructed in all emergency response procedures to notify any manager or supervisor. That person should contact the designated Emergency Response Coordinator (HSE Director), who will do the following:

1. Determine what happened, when/where it happened and who is involved

2. Verify the status of the worksite; determine if it should be shut down
3. Notify the company's President and other senior management, as appropriate
4. Notify the designated company spokesperson
5. Advise the company receptionist where to route calls
6. Identify potential spin-off crises
7. Notify insurance company
8. If there is an injured party/fatality who is an employee, determine who will notify the spouse/family; a fatality requires a personal visit
9. If there is an injured party/fatality who is a subcontractor employee, it is the subcontractor's responsibility to notify the spouse/family
10. Determine earliest opportunity for Crisis Management Team to hold preliminary accident review meeting at the site
11. Prepare a media statement on behalf of the company
12. Notify all employees and departments of the incident and tell them who/where they should direct media questions
13. Notify Civil Works Contracting's legal counsel, if appropriate

Media Management and Media Statement

If contacted by the news media concerning an incident involving any entity or location associated with Civil Works Contracting, members of the Corporate Crisis Management Team, or other employees will be supportive and accommodating. However, communications with the media must be coordinated effectively by:

- Designating a single company spokesperson and referring media calls immediately to the company spokesperson. A media escort should also be designated to escort the media to a safe place to wait for information and comment from the company spokesperson. Everyone at the incident location, including owners, senior management, project management, Field Supervisors, employees, and subcontractors should know who the company spokesperson is and understand that no one except that designated person should talk to the media.
- Determining a central gathering point for the media representatives to maintain incident scene safety and coordination. Depending on the nature of the incident, the media gathering point should be away from the immediate incident, preferably off-site but close by, such as a meeting room at a local hotel or restaurant. A suitable onsite location may be possible away from the incident in a conference room or office; however, the media should not meet at the Civil Works Contracting corporate offices at all if possible. Research possibilities beforehand so you have options to consider if an incident occurs.
- As soon as possible, developing a statement of known information that can be provided. If pressed by the media, the following statement should be read:

  "My name is (_____) and I am (title) with Civil Works Contracting The incident has just occurred, and I am not prepared to answer any questions at this time. Please stay in this area so we can do our job and address this event. I need to return to the jobsite, but either (company spokesperson) or I will be back at (time) with an update. Thank you."
- Providing regular updated information as it becomes available. Media representatives should be promised and receive regular updates, even if it is confirmation of what they already know.

- Creating a log of media representatives including their names, organizations, phone numbers and email addresses for effective continued communication.

9.2 Emergency Response

These procedures are intended to prepare Civil Works Contracting employees for dealing with emergency situations and to comply with OSHA's Emergency Action Plan Standard, 29 CFR 1910.38. These procedures are designed to minimize injury and loss of human life and company resources by assigning responsibilities, training employees, and procuring and maintaining necessary equipment.

9.3 Emergency Action Plan

Responsibilities

Management has overall responsibility for establishing and ensuring compliance with this Emergency Action Plan for Civil Works Contracting. It is the responsibility of all supervisory personnel to enforce these policies and procedures and of each employee to follow them.

All Civil Works Contracting employees must be familiar with the specifics of this plan and the responsibilities of each worker to minimize or avoid loss exposures. The key to success in loss avoidance during and after an unanticipated event rest with the team's knowledge and preparedness for such an event.

Subcontractors

Each subcontractor has a contractual obligation to Civil Works Contracting to comply with OSHA regulations pertaining to emergency response. Each subcontractor maintains ultimate responsibility for ensuring compliance with this procedure for its employees, and all its subcontractors working on the project.

We will make every attempt to ensure that all exposed employees are evacuated in the event of an emergency; however, no actions taken by Civil Works Contracting to monitor subcontractor's compliance with this procedure will be construed to suggest or imply that Civil Works Contracting has assumed any obligation or duty to take such actions.

Emergency Response

The Emergency Action Plan (EAP) is designed to address the following areas:

- Program Implementation and Responsibilities
- Emergency Posting Notices / Evacuation Maps
- First Aid / Emergency Medical Services
- Employee Notification / Alarm System
- Employee Training
- Emergency Evacuation Procedures
- Emergency Response Procedures

Program Implementation and Responsibilities

Job supervision such as foreman, superintendents, and project managers are responsible for overseeing the implementation and maintenance of the EAP at Civil Works Contracting project locations, with full authority to manage and enforce all provisions of this policy and delegate appropriate individuals to assist with emergencies. The HSE Director is responsible for assisting with the implementation of policies and procedures and maintenance of the EAP. HSE Director responsibilities include:

- Identifying, evaluating, and establishing procedures for potential emergencies
- Ensuring that a sufficient inventory of emergency equipment and first aid supplies is maintained at all jobsite locations
- Coordinating implementation and maintenance of the EAP and maintaining documentation
- Coordinating first aid training, and other related training, for all designated field employees
- Providing safety material to assist with employee training requirements
- Enforcing compliance with requirements of the EAP

Field Supervisors must establish procedures that are site-specific and complete a written Emergency Action Plan for each project before work begins. This plan must be revised if conditions change. Field Supervisors are responsible for:

- Identifying and documenting appropriate evacuation routes and a designated safe location for employees to assemble in the event of an evacuation
- Designating employees to assist with Crisis Response and Emergency Response procedures
- Providing notification and training to field employees
- Coordinating continued enforcement of the EAP with Safety Committee members
- Monitoring the inventory of first aid kit contents at jobsites

Emergency Posting Notices

Postings are displayed in all jobsite locations and identify the following:

- Emergency evacuation maps
- Location of designated assembly area in the event of an evacuation
- Emergency contact information, including site manager and after-hours contact information

First Aid / Emergency Medical Services

First responder services are the primary source of emergency medical treatment (EMS, Fire Department, Ambulance). First aid kits are maintained and accessible at all jobsites. Contents of first aid kits will adhere to requirements consistent with the number of employees working at the jobsite and will be kept in a weatherproof container. Field Supervisors will be responsible for performing weekly inventory checks to ensure that used contents are replaced. Only certified employees are allowed to perform first aid / emergency medical services. Action taken will only be to the extent necessary to preserve life. Field Supervisors will ensure that a suitable number

of employees are certified to provide first aid / emergency medical services. This training will be coordinated with the Safety Committee.

Employee Notification / Alarm System

In the event of an emergency requiring the evacuation of all employees, different warning systems may be used, depending on the jobsite conditions or emergency involved. Methods may include verbal communication, vehicle horn, or air horn. Managers, supervisors, or designated employees will be responsible for sounding emergency evacuation alarms and ensuring that any employees needing assistance are safely evacuated.

Employee Training

Designated employees will be provided with the proper training to assist with the following functions:

- First aid / medical services
- Fire suppression
- Crisis response procedures
- Evacuation procedures

No employee will be permitted to perform any action that might endanger his/her life or the life of others.

All employees will be provided necessary training on all elements of the EAP.

Training will occur when:

- Work begins at a new jobsite (group training)
- A new hire is assigned to a specific jobsite (individual training)
- An employee is transferred to a new jobsite (individual training)
- Annual emergency evacuation drill (group training)

Employee notification and training relevant to the EAP includes:

- Employees' right to review the EAP policy
- Location of emergency posting notices / evacuation maps
- Description of alarm system used to trigger an evacuation
- Location of exit routes and designated assembly location
- First aid and emergency medical services available to employees
- Procedures implemented for crisis response and emergency response

Emergency Evacuation Procedures

When an evacuation occurs:

- Employees must proceed directly to the designated assembly area (usually the Civil Works Contracting truck onsite, or otherwise as instructed by the General Contractor/Owner)
- Employees should not stop to pick up personal belongings when exiting the jobsite/structure
- Employees should not block areas that would be considered access for emergency vehicles
- Employees will not be allowed to re-enter the jobsite/structure without clear indication that it is safe
- Employees will not be allowed to leave the jobsite/assembly area unless advised to do so by a manager or supervisor
- Employees will be instructed to refer questions from the news media to designated supervisors or management

The most important focus of our response to an emergency is the protection of human life.

Field Supervisors are responsible for evaluating new jobsites in order to identify emergency evacuation routes and a safe location for employees to assemble. This information will be documented and posted at the jobsite. Identified exit routes will be checked periodically to ensure they remain unobstructed. The following tasks will be carried out in the event of an emergency requiring evacuation:

After calling 9-1-1, the Field Supervisor will sound the evacuation alarm

- The Field Supervisor will instruct a designated employee to proceed to the designated assembly area to perform the necessary head count
- The Field Supervisor and designated employee(s) will be responsible for making sure the jobsite/structure is clear of all employees that have not been assigned with specific duties to assist with the evacuation

Multi-Employer Jobsite Exposures

Other contractors/employers have a contractual obligation to Civil Works Contracting to be in compliance with OSHA regulations pertaining to emergency response. We will make every attempt to ensure that all exposed employees are evacuated in the event of an emergency.

Emergency Response Procedures

Fire and Explosion: Designated employees will be trained on the use of fire suppression equipment. All employees will be trained on the following:

- Call 9-1-1
- Notify a manager or supervisor immediately
- Quickly and carefully remove any person who is injured or in immediate danger, unless doing so will create the possibility of personal injury
- Notify employees in the immediate vicinity of the fire and surrounding areas
- Fight the fire ONLY if the fire department has been notified, AND the fire is small and not spreading to other areas, AND escaping the area is possible by backing up to the nearest exit, AND the fire extinguisher is in working condition and personnel are trained to use it

- When a fire cannot be extinguished using a portable fire extinguisher, evacuation procedures will be initiated by the Field Supervisor or foreman; When instructed to do so, leave the jobsite/structure using the designated escape routes, assemble in the designated area, remain outside until an authorized person announces that it is safe to re-enter

Severe Weather, Flood, Hurricane: Most severe weather is usually forecast sufficiently in advance for emergency action to be initiated before the exposure becomes serious. In most cases, advising employees of the approaching danger and ensuring that everyone is in a safe location is sufficient, should the incident occur during normal working hours.

Tornado: When a tornado warning is issued by sirens or other means, seek inside shelter - preferably in small interior rooms on the lowest floor and without windows, hallways on the lowest floor away from doors and windows, and rooms constructed with reinforced concrete, brick or block with no windows. Stay away from outside walls and windows. Use arms to protect head and neck. Remain sheltered until the tornado threat is announced to be over.

Earthquake: All employees are instructed to:

- Move away from windows, temporary walls, partitions, freestanding and heavy objects
- Duck or drop down to the ground
- Attempt to take cover under fixed objects or interior framing that may provide safety from falling objects
- Avoid being near any electrical units, flammable or combustible materials
- STAY PUT until the ground/structure stops shaking and it is safe to move
- Evacuate the structure

Chemical Leak, Spill or Threatened Release: In the event of a hazardous substance leak, spill or threatened release, all employees will be instructed to notify management immediately and leave the immediate area. Depending on the nature and source of the spill/release, if warranted the fire department and appropriate environmental agency will be notified. Clean-up procedures will be performed in accordance with the SDS by qualified, trained personnel using the proper PPE.

Extended Power Loss: In the event of extended power loss to a facility or jobsite, certain precautionary measures should be taken depending on the location and environment of the facility:

- Unnecessary electrical equipment and appliances should be turned off in the event that power restoration would surge, causing damage to electronics and damaging sensitive equipment
- Facilities and jobsites with freezing temperatures should turn off and drain the following lines in the event of a long-term power loss: fire sprinkler system, standpipes, potable water lines, toilets
- Propylene-glycol should be added to drains to prevent traps from freezing
- Equipment that contains fluids that may freeze due to long-term exposure to freezing temperatures should be moved to heated areas, drained of liquids, or provided with auxiliary heat sources

Upon restoration of heat and power:

- Electronic equipment should be brought up to ambient temperatures before energizing to prevent condensate from forming on circuitry
- Fire and potable water piping should be checked for leaks from freeze damage after the heat has been restored to the facility and water turned back on

Bomb Threat: If a bomb threat is received, employees are instructed to notify management immediately. Management will notify the authorities and initiate evacuation procedures. The individual receiving the threat is instructed to document every word of the conversation immediately. A search of the jobsite/structure may be performed by law enforcement personnel. Access to the jobsite/structure will not be permitted until clearance is given by the appropriate authorities.

Active Shooter: The best course of action in any active shooter scenario, if there is an accessible escape path, is to evacuate the premises. Employees should:

- Always have an escape route and plan in mind
- Evacuate regardless of whether others agree to follow
- Leave belongings behind
- Help others escape, if possible
- Prevent others from entering area where the shooter may be
- Keep hands visible
- Follow the instructions of police officers
- Do not attempt to move wounded people
- Call 9-1-1 when safe

If evacuation is not possible, employee should find a place to hide. Ideally the hiding place should be out of the shooter's view, provide protection, and not restrict options for movement. To prevent the active shooter from entering the hiding place, employees should lock the door and/or block the door with heavy objects. If the active shooter is nearby, any sources of noise should be silences.

If evacuation and hiding are not possible, employees should remain calm and dial 9-1-1 (if possible) to alert police to the active shooter's location and leave the line open to allow the dispatcher to listen. As a last resort, and only when an employee's life is in imminent danger, he or she should attempt to disrupt and/or incapacitate the active shooter by acting as aggressively as possible toward the shooter using improvised weapons.

Chapter 10 - Safe Work Procedures

10.1 Abrasive Blasting

Purpose

The purpose of this program is to provide safe guidelines for the operation and maintenance of abrasive blasting equipment and their related components for *Civil Works*.

Scope

This program covers all employees involved in abrasive blasting jobs. Whenever hazardous substances such as dusts, fumes, mists, vapors, or gases exist or are produced during construction work, their concentrations shall not exceed the limits specified in the "Threshold Limit Values of Airborne Contaminants – 1970" of the American Conference of Governmental Industrial Hygienists. When ventilation is used as an engineering control method, the system shall be installed and operated according to the requirements of 1926.57 (Ventilation).

KEY RESPONSIBILITIES

Supervisors

Be aware of potentially hazardous conditions that may arise during the blasting process prior to starting any blasting job and must take measures to protect employees. Ensure that all employees are trained on related safety topics.

Understand the importance of regularly scheduled maintenance for continued safe operation of blast equipment. Ensure that all employees comply with this policy and all other related policies.

Blast Employees

Be familiar with the safe operating functions of blasting equipment to be used on a job. Comply with all company policies.

Have knowledge of hazards associated with respirable silica.

Understand they are prohibited from using compressed air for cleaning unless the pressure is reduced to less than 30 pounds per square inch and be equipped with effective chip guarding and proper PPE.

PROCEDURE

General

Abrasives and the surface coatings on the materials blasted are shattered and pulverized during blasting operations and the dust formed will contain particles of respirable size. The composition and toxicity of the dust from these sources shall be considered in

making an evaluation of the potential hazards.

Dust shall not be permitted to accumulate on the floor or on ledges outside of an abrasive blasting enclosure. Dust spills shall be cleaned up promptly. Aisles and walkways shall be kept clear of steel shot or similar abrasives which may create a slipping hazard.

Equipment Handling

Follow these guidelines when moving blasting equipment to prevent back strains and crushing injuries:

- Use a forklift, crane or other type of lifting device for transporting a blast machine; always use a lifting device when the machine contains abrasive.
- Never manually move a blast machine where abrasive has been spilled on hard surfaces or on a wet or slippery surface.
- Never attempt to manually move a blast machine containing abrasive.
- Always disconnect hoses from machines to avoid interference during moving.

Air Compressors

Air compressors must be located in a well-ventilated area. It must be able to contain large volumes of clean, toxicant-free air. This means the compressor must be placed up wind from the blasting operation and out of the range of dust and flying abrasives.

Due to the high pressure that air compressors create, precautions must be taken to prevent unleashing of strong forces that can cause serious bodily injury.

Air for abrasive blasting respirators must be free of harmful quantities of dust, mists, or noxious gases and must be inspected daily, prior to use and comply with CFR 1910.134(I) (Respiratory Protection).

Never adjust the pressure setting on a compressor above the blast equipment maximum working pressure rating. The maximum working pressure rating is indicated on the manufacturer's metal identification plate.

Blast Pot

Position blast pots and/or compressors on level ground. Machines operate best when they sit on level surfaces.

For communication purposes place blast pot between the compressor and the surface to be blasted. This will enable the pot tender and operator to make visual contact.

All couplings and pipefitting on the blast pot, compressor and hoses must be airtight.

Blast pots must be inspected daily prior to use.

Hoses and Connectors

Couplings must have safety wires in place and be secure as required by federal safety regulations. The operator shall be responsible to ensure that each coupling has safety wires in place.

Whip checks must be installed at bull hose connections.

Operator should hold onto the blast hose until the air pressure from the nozzle drops off to zero.

Do not use hoses with soft spots.

Never use tape to repair a blown-out hose.

Immediately replace a hose if a blowout or leak occurs.

Hose ends must come into contact with coupling gaskets to prevent leaks and to maintain static electricity conductivity.

Nozzles and Remote Controls

Blast nozzles shall be bonded and grounded to prevent the buildup of static charges. Where flammable or explosive dust mixtures may be present, the abrasive blasting enclosure, the ducts, and the dust collector shall be constructed with loose panels or explosion venting areas, located on sides away from any occupied area, to provide pressure relief in case of explosion following the principles set forth in the National Fire Protection Association Explosion Venting Guide. NFPA 68-1954.

Organic abrasives which are combustible shall be used only in automatic systems.

Blast cleaning nozzles shall be equipped with an operating valve which must be held open manually. A support shall be provided on which the nozzle may be mounted when it is not in use.

All blast machines must be equipped with remote control systems to start and stop the blasting process.

Never tape, strap, or tie down an air actuated remote-control lever or choke electric remote control switch.

If there is the slightest delay in reaction time of the handle lever or lever lock to open, check for dust and dirt build-up around pivot pins before resuming blasting. Also, test the tension on the lever springs, and replace them immediately if they do not respond rapidly.

Substituting component pieces with other manufacturer's parts is not allowed.

Inspect blast nozzles for wear and cracks on the inner liner. When a nozzle orifice is worn 1/16" larger than its original size, it should be replaced.

Check nozzles and nozzle holders for deterioration of thread form. Threads on nozzles and their companion holders must not be cross-threaded, worn or distorted.

Hoses that are being tied and lifted to blasting operations being conducted above grade, i.e., scaffolds, shall be depressurized to prevent accidental start-up.

Operator Signals

On the job site, voice communication is often impossible. Even shouts cannot be heard over the noise of compressors and blasting. In addition, the operator's head will be enclosed in the helmet, which blocks out sound and limits vision. For these reasons, an industry wide standard set of hand and sound signals has been developed.

Signals may be visual hand movements, flashing light, pulls on a rope or sounds made by banging a hammer or using a horn or electric buzzer.

Every operator must become familiar with the signals to be used on the jobsite.

Respirator Use

A specific work-site procedure shall be developed where respirators or CE blasting hoods/helmets are required to protect the health of the operator. A respiratory protection program shall be established wherever it is necessary to use respiratory protective equipment including worksite specific procedures and elements for required respirator use. Abrasive blasting respirators shall be worn by all abrasive blasting operators under certain conditions.

Equipment for the protection of eyes, face and body shall be supplied to the operator when the respirator design does not provide such protection and to any other personnel working in the vicinity of abrasive blasting operations. This equipment shall conform to the requirements of 1926.102 (Eye and Face Protection).

Equipment for protection of the eyes and face shall be supplied to any other personnel working in the vicinity of abrasive blasting operations.

Environmental Controls

Organic abrasives which are combustible shall be used only in automatic systems. Where flammable or explosive dust mixtures may be present, the construction of the equipment, including the exhaust system and all electrical wiring, shall conform to the requirements of American National Standard Installation of Blower and Exhaust Systems for Dust, Stock, and Vapor Removal or Conveying, Z33.1-1961 (NFPA 91-1961), and Subpart S of 1926.57 (Ventilation).

The work area must be inspected for exterior electrical power lines that may endanger operators.

Operators should use care to avoid directly blasting power lines and insulators.

Do not blast in atmospheres that contain flammable fumes.

Take precautions at the work site to eliminate hazardous surface obstacles that may cause tripping hazards or interfere with worker mobility.

Adequate ventilation must be provided for employees working within enclosures.

Never operate compressor if hoses are frozen. When winter temperatures drop below freezing, check for ice prior to pressurizing hoses.

Provide adequate drinking water for operators, especially during summer.

Personal Protective Equipment

Secure hoses by tying them to scaffolding or personnel platforms, when working from elevations, to prevent injury from hoses falling on other personnel working below or near blasting area.

Before using any blasting abrasive, check the SDS to find out the chemical composition of the abrasive material.

Equipment for the protection of eyes, face and body shall be supplied to the operator when the respirator design does not provide such protection and to any other personnel working in the vicinity of abrasive blasting operations. This equipment shall conform to the requirements of 1926.102 (Eye and Face Protection).

Ventilation systems and dust collectors may be necessary in enclosed conditions.

Noise from abrasive blast nozzles can be loud enough to damage the hearing of blasters and others on the work site. Workers must not be exposed to noise levels exceeding 80 decibels as an eight-hour time weighted average (80 dBA TWA), therefore all blasters shall wear earplugs.

Blaster must wear heavy-duty gloves and steel toe boots.

Helmet lenses should be changed as soon as pitting or frosting takes place

10.2 Blood-Borne Pathogens Exposure Control

Purpose

The purpose of this exposure control plan is to:

- Eliminate or minimize Civil Works Contracting employees' occupational exposure to blood or other infectious body fluids.
- Make employees aware of hazardous conditions associated with blood and other potentially infectious body fluids.

Responsibility

Supervisors and Field Supervisors will be responsible for ensuring their employees comply with the provisions of this plan. Civil Works Contracting is responsible for providing all necessary supplies such as personal protective equipment, soap, bleach, and Hepatitis B vaccinations administered by a designated local clinic if required.

Engineering and Work Practice Controls

- Universal precautions will be observed by all employees to prevent contact with blood or other potentially infectious materials. All blood or other potentially infectious materials will be considered infectious regardless of the perceived status of the source individual.
- Engineering and work practice controls will be utilized to eliminate or minimize exposure to employees.

Housekeeping

- All contaminated work surfaces, tools, objects, etc. will be decontaminated immediately or as soon as feasible after any spill of blood or other potentially infectious materials. The bleach solution or disinfectant must be left in contact with contaminated work surfaces, tools, objects, or potentially infectious materials for at least 10 minutes before cleaning.
- Equipment that may become contaminated with blood or other potentially infectious materials will be examined and decontaminated before servicing or use.
- Broken glass and contaminated material will not be picked up directly with the hands. Sweep or brush material into a dustpan and discard immediately in closeable, puncture-resistant, leak-proof container with appropriate biohazard label.

Post-Exposure Evaluation and Follow-Up

All exposure incidents will be reported, investigated, and documented. When a Civil Works Contracting employee incurs an exposure incident, it will be reported immediately to the supervisor. Following a report of an exposure incident, the exposed employee will go to a medical clinic for a confidential medical evaluation and follow-up.

10.3 Confined Space Entry

General Requirements

OSHA's construction standard for confined spaces, 29 CFR 1926 Subpart AA, applies to any space that:

- Is large enough for a worker to entry it
- Has limited or restricted means of entry or exit, and
- Is not designed for continuous occupancy

Permit-Required Confined Space

A confined space that contains certain hazardous conditions may be considered a permit-required confined space under the standard. Permit-required confined spaces can be immediately dangerous to workers' lives if not properly identified, evaluated, tested, and controlled. A permit-required confined space means a confined space that has one or more of the following:

- Contains or has the potential to contain a hazardous atmosphere
- Contains a material that has the potential for engulfing an entrant
- Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section
- Contains any other recognized serious safety or health hazard.

Identification and Assessment

Before beginning work on a project, Civil Works Contracting designates a Competent Person to identify all confined spaces in which one or more employees it directs may work and identify any

space that is a permit-required confined space.

When identifying and assessing confined spaces, the Competent Person pays careful attention to acute health hazards that may be present, such as toxic (carbon monoxide), flammable, or explosive atmospheres. Safety Data Sheets (SDSs) must be maintained and reviewed to fully assess potential hazards to determine if a confined space is permit-required prior to worker entry.

Completing a Permit

If Civil Works Contracting's designated Competent Person determines that a project site contains or has the potential to contain a hazardous atmosphere, contains a material that could engulf an entrant, could trap or asphyxiate an entrant, or contains any other recognized serious safety or health hazard, the Competent Person and Field Supervisor must evaluate the area and complete a Confined Space Entry Permit.

To complete the permit, determine the following information:

- Identity and location of the confined space
- Purpose for entering the area
- Known and potential hazards
- Required isolation methods (e.g., lockout/tagout)
- Environmental conditions of the confined space
- Atmospheric readings to verify that environmental conditions are acceptable and maintained
- Rescue services, procedures, and equipment that may be necessary in case of an emergency
- Communication procedures to be used
- Personal protective equipment to be used
- Any additional information relating to the specific circumstances of the confined space

Obtaining Entry Permission

Post names of the following:

- Person authorizing entry
- Supervisor
- Authorized entrants
- Authorized attendants

Employees must notify the person who authorizes entry before working in confined spaces.

The person who authorizes entry refers to any records on file and identifies the actual or potential hazards of the area in question. If no file exists for the specific space, a new one is developed.

The person who authorizes entry then reviews and approves the Confined Space Entry Permit as appropriate. A copy of the form is filed for future reference.

IMPORTANT: If you intend to perform hot work within the permit-required confined space, you

must note this on the form.

Preparing the Entry Team

Before entering a permit-required confined space, all employees involved with the entry must attend a preparation meeting. The agenda for this meeting includes the following:

- Discussion of actual and potential hazards
- Review of emergency procedures including rescue and evacuation
- Completion of the entry form by all team members to acknowledge their understanding of the hazards involved with the confined space
- Issuance of personal protective equipment
- Discussion of site location and other essential information

Monitoring the Atmosphere

Due to poor ventilation and physical structure, the atmosphere in confined spaces may be actually or potentially hazardous. Atmospheric hazards include the following:

- Oxygen deficient or oxygen enriched atmospheres
- Combustible atmospheres
- Toxic atmospheres
- Any other atmosphere that is immediately dangerous to life or health

Employees trained in atmospheric monitoring will test several points in a confined space for the following:

- Oxygen content
- Combustible atmosphere
- Potential toxic contaminants

Oxygen-Enriched and Oxygen-Deficient Atmospheres: Oxygen enriched atmospheres are more than 23.5% oxygen; oxygen deficient atmospheres are less than 19.5% oxygen. Certain chemical or biological reactions may reduce oxygen over time, but employee operations such as cutting, or welding may reduce oxygen content very quickly. Oxygen levels must be tested regularly whenever hot work is performed within a confined space.

Combustible Atmospheres: Combustible atmospheres have enough oxygen and flammable vapor, gas, or dust to ignite and support a fire or explosion if exposed to flames, sparks, or heat. Oxygen-enriched atmospheres and hazardous atmospheres in excess of their lower flammable limits are extremely combustible and dangerous.

Toxic Atmospheres: Toxic atmospheres can cause injury, illness, or death. Safety concerns include inhalation and skin exposure. If the identity of the toxic atmosphere is known, check all appropriate Safety Data Sheets (SDSs) for threshold limit values and recommended personal protective equipment. If the identity of the toxic atmosphere is not known, use maximum PPE (i.e.,

SCBA).

Ventilation: Ventilation controls the atmospheric hazards of a confined space by replacing unsafe air with clean, breathable air. There are several methods for ventilating a confined space. The method and equipment used depend on the following factors:

- Size of the confined space
- Atmosphere
- Source of the ventilation air

For most confined spaces, fans or other air-moving equipment can provide adequate ventilation. Two common types of mechanical ventilation include local exhaust ventilation and general ventilation.

Local exhaust ventilation captures contaminants at their point of origin and removes them. This type of ventilation method is ideal for flammable and toxic materials produced at a single point (e.g., hot-work and work involving cleaning solvents). When using this type of ventilation system, keep the exhaust intake close to your work. Do not use this type of ventilation system for contaminants that are widely dispersed or for confined spaces that make ventilation difficult. Instead, use general ventilation.

General ventilation flushes the atmosphere by supplying and exhausting large volumes of air. Because this system does not reduce the number of contaminants released, it is not recommended for highly toxic atmospheres. General ventilation is ideal for providing oxygen and controlling low concentrations of materials that are not highly toxic. When using this type of ventilation system during hot work, monitor the atmosphere continuously and wear a SCBA, as necessary.

IMPORTANT:

Ventilation alone cannot reduce some atmospheric hazards to safe levels. Use atmospheric testing to confirm whether the ventilation system has been successful.

Follow these guidelines for ventilating confined spaces:

- Begin ventilation in time to assure that the space is safe before entry.
- Test the atmosphere before entry to confirm that the ventilation system is working properly and that the space is safe.
- Continue ventilation as long as the space is occupied, or at least until the oxygen levels and hazardous concentrations are within safe limits.
- If work inside the space can make the air unsafe (e.g., hot work, painting, using solvents, sandblasting, etc.) continue ventilation as long as the work is in progress.

Preparing the Site for Entry

- Employees must complete the following steps to prepare confined spaces for entry:
- Isolate the confined space entry site from the surrounding area using guards and barriers (including signs, rope, or tape).

- Drain, clean, ventilate, and/or purge the confined space, as necessary, to prevent flammable, toxic, and corrosive hazards. Isolate all electrical, mechanical, and pneumatic energy sources as outlined in Civil Works Contracting's Lockout/Tagout procedures.
- Ensure that all workers are wearing appropriate personal protective equipment, and that all persons wearing respirators have been properly trained in their usage.
- Provide continuous ventilation, as necessary.
- Ensure that non-sparking tools and explosion proof equipment are used when working in a potentially combustible atmosphere.
- Position gas cylinders for cutting or burning outside the confined space. Ensure that a standby SCBA is available.
- Obtain personal protective equipment, including lifelines, winches, and harnesses, as required. Ensure that the equipment has been inspected as scheduled.
- Take precautions to ensure against engulfment hazards, such as water, dirt, grain, etc.

Safeguarding Confined Space Operations

Life support safety is critical during confined space operations. The following items are requirements for safeguarding confined spaces:

- Employees must wear appropriate personal protective equipment at all times.
- Employees must use harnesses, lifelines, and/or winches, as appropriate.
- The Authorized Safety Attendant is specifically responsible for the following:
- Keeping a log of all authorized entrants working within the confined space.
- Maintaining constant verbal contact with the authorized entrants within a confined space.
- Taking necessary precautions and measures to prevent unauthorized persons from entering a confined space
- Initiating evacuation procedures whenever conditions within or outside the confined space pose a new hazard. All employees must evacuate a confined space when one or more of the following conditions occur:
  - Authorized Safety Attendant orders evacuation
  - Automatic atmospheric alarm sounds
  - Authorized entrants believe they are in danger

Emergency Procedures

If a worker is unable to evacuate the confined space during an emergency, the Authorized Safety Attendant will contact rescue personnel by radio or other means.

The Authorized Safety Attendant and other workers outside the confined space should attempt to hoist the worker out of the confined space using a lifeline.

IMPORTANT:

Under no circumstances will unauthorized employees enter a confined space during an emergency.

Individual and Subcontractor Responsibilities

All employees and subcontractors must follow Civil Works Contracting's Confined Space Entry procedures and other required procedures to ensure safe entry into confined spaces.

Subcontractors who perform rescues in confined spaces must practice entries at least once annually.

Field Supervisors are responsible for the following:

- Selecting a person to authorize entry
- Authorizing entrants and attendants, as appropriate
- Providing atmospheric monitoring equipment, personal protective equipment, and other necessary equipment

All Field Supervisors and Competent Persons are responsible for monitoring program compliance and the following:

- Assisting with identifying and labeling confined spaces, as necessary
- Training the people who authorize entry and the people who enter and attend confined spaces

10.4 Cranes and Equipment

Purpose

Crane accidents can be prevented if considerations are given to safe use and operation of the crane. Civil Works Contracting is committed to protecting our employees, contractors and the public from unsafe conditions and practices. The Crane Safety Program is a critical element in the success of the Civil Works Contracting's commitment to that goal.

Moving large, heavy loads is a crucial component of Civil Works Contracting's operation. Procedures have been developed for these operations, including careful training and extensive workplace precautions. There are significant safety issues to be considered, both for the operators of the diverse "lifting" devices, and for employees in proximity to them.

Because the possibility of serious accidents resulting in personnel injury or death or significant property damage exists whenever hoisting and rigging take place, the requirements for crane hoisting and rigging operations must be clearly defined and precautions ensured, including proper preplanning, extreme care, attention to detail, teamwork on the part of trained operators/riggers/signalpersons, and the use of equipment that is reliable, properly designed, inspected, and maintained. The full implementation of the requirements and recommendations of this standard will dramatically strengthen hoisting and rigging programs and will significantly decrease the probability of serious accidents resulting in personnel injury or death or property damage.

General Crane Safety

<u>The primary components of crane safety are:</u>

- Competent and qualified employees who operate and work with and around cranes
- Hazard prevention requirements being in place

Hazard prevention requirements include:

- Pre-work planning
- Job hazard analysis
- Communication
- Lifting capabilities
- Rigging practices
- Controlling and holding the load
- Ballast or counterweights
- Footing
- Rope inspection and wire rope requirements
- Inspection schedule
- Transporting cranes
- Preventive maintenance

Hazard Prevention Requirements

Pre-Work Planning

Most crane accidents could have been easily prevented if the safe use of cranes had been incorporated at the pre-work planning meeting. The planning stage meeting is the best time to address hazard avoidance. Planning before actual crane operations begin can eliminate major craning hazards from the jobsite and make operations more efficient.

Job Hazard Analysis (Lift Plan by a Qualified Person)

Before crane operations begin at the jobsite, a specific job hazard analysis should be conducted to ensure that pre-work planning is adequate. When pre-job planning has been neglected, this onsite job hazard analysis is necessary to ensure that craning operations can be done safely.

Communication

- Standard signals to the operator must be in accordance with the ANSI standard, unless voice communication equipment (telephone, radio, or equivalent) is used.
- Signals must be discernible or audible at all times. No response will be made unless signals are clearly understood.
- Hand signals will be posted conspicuously on a chart or poster.
- Special signals will be agreed on in advance by the operator and the signal person and should not conflict with standard signals.
- These special signals are for operations not covered by the hand signals or for special conditions that occur from time to time.
- If it is necessary to give instructions to the operator other than provided by the established signal system, the crane motions will be stopped.

- Modes of communication must be agreed upon in pre-work planning and in the job hazard analysis.

Lifting Capabilities and Load Ratings

During pre-work planning, lifting requirements should be analyzed by an engineer competent to establish whether the crane to be used has adequate lifting capability. The job hazard analysis should verify that the crane to be used has sufficient boom length for the lift.

All cranes will be marked with the load ratings and loads will not exceed this amount. A load rating chart will be affixed inside the cab of each crane in sight of the operator. Percentage of loads causing tipping are indicated by crane type and design, and maximum limits will not be exceeded.

Rigging Practices

The requirements for slings to support loads are well defined in OSHA Standards 29 CFR 1910.184 and the requirements for rigging equipment are defined in 29 CFR 1926.251. Loads will be moved using slings or other approved devices, not by wrapping the rope around the load.

Controlling and Holding the Load

The use of tag lines to control movement of the load is very important. Normally, when a load is being hoisted, the lay or twist in wire rope causes rotation when the load becomes suspended. OSHA Standard 29 CFR 1910.180(h)(3)(xvi) states: "A tag or restraint line will be used when rotation of the load is hazardous."

At no time will the operator be allowed to leave the controls while a load is suspended. Employees will be instructed to stay clear and not to pass under suspended loads.

Ballast or Counterweights

Cranes will not be operated without the full amount of ballast or counterweight in place as specified by the manufacturer, unless the load is significantly lighter than the recommended maximum weight.

Footing

Firm footing, uniformly level to within one percent (1%) should be provided. Where such footing is not otherwise supplied, it should be provided by substantial timbers, cribbing, or other structural members sufficient to distribute the load so as not to exceed the safe bearing capacity of the underlying material.

Rope Inspection and Wire Rope Requirements

All ropes will be inspected for damage each month. Any rope found to be damaged or altered due to stress will be closely monitored for the following warning signs:

- Reduction in rope diameter (stretching) or corrosion
- A number of broken exterior wires
- Worn outside wires

- Corroded or broken wires at the end of connections
- Corroded, cracked, bent, worn, or improperly applied end connections
- Severe kinking, crushing, cutting, or un-stranding

It is very important to comply with the crane manufacturer's recommendations for the type of wire rope to be used for various hoist lines or pendants.

Inspection Records

A notice of the current annual inspection will be posted in the crane.

Transporting Cranes

The following procedures will be observed when transporting cranes from location to location:

- The boom of the vehicle will be carried in line with the direction of travel
- The superstructure will be secured against rotation
- The empty hook will be lashed or otherwise prevented from swinging

Preventive Maintenance

Cranes require on-going service and preventive maintenance. Preventive maintenance programs should be documented according to the crane manufacturer's recommendations.

Inspections

Crane Lift Plan Checklist

A Crane Lift Plan Checklist must be submitted prior to a critical lift. This checklist contains information on operator qualifications, crane permits, rigger and signalperson qualifications, adjacent structures, lifting capabilities, and load ratings.

Crane Pre-Lift Inspection

A Crane Pre-Lift Inspection by a qualified inspector is required immediately prior to a critical lift. This inspection includes a review of operator qualifications, rigger qualifications, crane information, site conditions, and critical lift criteria.

Annual Crane Inspection

A notice of the current annual inspection will be posted in the crane.

Hazards Common to Cranes

Power Line Contact

Power line contact is the inadvertent contact of any metal part of a crane with a high-voltage power line.

Most power line contacts occur when a crane is moving materials adjacent to or under energized

power lines and the hoist line or boom touches a power line. Contact also frequently occurs during pick-and-carry operations when loads are being transported under energized power lines.

Sometimes the person who is electrocuted is touching the crane or getting on or off of it when the hoist line or boom inadvertently comes into contact with an energized power line.

The best hazard prevention method to avoid such an occurrence is to position the crane to keep a 20-foot clearance so the boom or hoist line cannot reach the power lines.

Power line contact usually occurs because no one considered the need for specific hazard prevention measures to avoid using cranes near power lines. The key to avoiding power line contact is pre-job safety planning. Planning is one of the greatest accident deterrents available in the workplace.

A single individual should have overall supervision and coordination of the project and must initiate a positive direction to assure that pre-job safety planning is done before any cranes arrive at the worksite.

It is extremely difficult for a crane operator to:

- Judge accurately clearances between a crane and power lines simply through the use of vision
- See more than one visual target at a time
- Overcome the camouflaging characteristics that trees, buildings, and other objects have upon power lines

Sometimes a crane operator cannot judge the clearance of the boom from the power line because the boom blocks the operator's view to the right. Sole reliance upon the performance of crane operators, riggers, and signalers, without any planning to separate cranes from power lines, has resulted in many deaths.

Overloading

Overloading occurs when the rated capacity of a crane is exceeded while a load is being lifted and maneuvered, resulting in upset or structural failure. Overloading also occurs when poorly trained personnel operate cranes. The operator must always know the weight of the load.

Cranes easily upset from overloading. On some models, the weight of a boom without a load can create an imbalance and cause some high-reach hydraulic cranes to upset when the boom is positioned at a low angle. This has occurred even with outriggers extended.

The variables that affect lifting capacity include:

- The ability to lower a boom increases the radius and reduces its capacity
- The ability to extend a hydraulic boom increases the radius and reduces lifting capacity
- The ability to lower a boom while extending a boom quickly reduces lifting capacity
- The crane's tipping capacity can vary when the boom is positioned at the various points of the compass or clock in relation to its specific carrier frame
- The operator may neglect to extend the outriggers and affect the crane's stability

- The operator may mistakenly rely upon his perception, instinct, or experience to determine whether the load is too heavy and may not respond fast enough when the crane begins to feel light.

All these variables create conditions that lead to operators inadvertently exceeding the rated capacity, tipping the load, and upsetting the crane. The variables may also lead to structural failure of the crane.

With the advent of solid-state micro-processing electronics, load-measuring systems evolved. Such systems can sense the actual load boom angle and length, warn the operator as rated capacity is approached, and stop further movement. Load-measuring systems automatically prevent exceeding the rated capacity at any boom angle, length, or radius. Today, most U.S. crane manufacturers are promoting the sale of load- measuring systems as standard equipment on new cranes. There are after-market suppliers of these devices for older model cranes.

For years, the only control to avoid upset from overload has been reliance upon an operator's performance and the use of load charts. Optimally, formal training should be provided for all crane operators to ensure a working knowledge of crane load charts. However, on-the-job training can be adequate if the trainer is qualified.

Failure to Use Outriggers, Soft Ground and Structure Failure

Crane upset can occur when an operator does not extend the outrigger or when a crane is positioned on soft ground.

Many cranes upset because the use of outriggers is left to the discretion of the operator. For example, sometimes an operator cannot extend the outriggers because of insufficient space or outrigger pads may be too small to support the crane even on hard ground. However, the use of outriggers is not voluntary. Load capacity charts are based either on the use of fully extended outriggers or on "rubber" for rubber-tired cranes. If outriggers cannot be fully extended, then capacities in the on-rubber chart must be used. Outriggers have collapsed because they were overloaded, defective, or located on inadequate foundation.

Determining the load weights is generally viewed as the responsibility of the site supervisor who must inform the operator before the lift is made. The operator must still be able to determine or estimate load weights, to evaluate and verify the weight provided. Based on the load weight, the operator knows if it is necessary to use outriggers.

The surest way to avoid an accident is to make the machine inoperable until the operator activates necessary safeguards. This could include limit switches to prevent boom movement until outriggers are extended and in place to avert upset.

Soil failure occurs because the ground is too soft or the outrigger pads are not big enough. When poor soil is encountered, or the outriggers have inadequate floats or pads, well-designed blocking or cribbing is needed under the outriggers.

Two-Blocking

Two-blocking occurs when the hoist block or hook assembly contacts the boom tip, causing the hoist line to break and the hook and load to fall, endangering workers below. Two-blocking also occurs because the crane operator is often visually overtaxed. He or she is unable to watch the

load and headache ball or hook simultaneously.

Both latticework and hydraulic boom cranes are prone to two-blocking. When two-blocking occurs on latticework booms, the hoist line picks up the weight of the boom and lets the pendant guys go slack. When a hoist line two-blocks, it assumes the weight of the boom and relieves the pin-up guys of the load. The weight of the load plus the weight of the boom on a latticework boom (when combined with a little extra stress when lifting a load) can cause the hoist line to break if two-blocking occurs.

The power of the hydraulic rams that extend hydraulic booms is often adequate to break the hoist line if the line two-blocks.

In many circumstances, both latticework and hydraulic boom cranes will two-block when the hook is near the tip and the boom is lowered.

OSHA now requires an anti-two-blocking device or a two-block damage prevention feature where cranes are used to hoist personnel.

There are several ways to prevent two-blocking:

- An anti-two-blocking device can be used. The device is a weighted ring around the hoist line that is suspended on a chain from a limit switch attached to the boom tip. When the hoist block or headache ball touches the suspended, weighted ring, the limit switch opens and an alarm warns the operator.
- On hydraulic cranes, the hydraulic valve system can be sequenced to pay out the hoist line when the boom is being extended, thus avoiding two-blocking.
- Adequate boom length can be ensured to accommodate both the boom angle and sufficient space for rigging, such as slings, spreader bars, and straps. To avoid bringing the hook and headache ball into contact with the boom tip, a boom length of 150 percent of the intended lift is required for a boom angle of 45 degrees or more.

Anti-two-blocking devices should be standard equipment on all cranes. Currently, most new mobile hydraulic cranes are being equipped with these systems.

<u>Pinch Points</u>

There are two types of crane pinch points:

1. Within the swinging radius of the rotating superstructure of a crane, in areas in which people may be working, is a pinch point where people can be crushed or squeezed between the carrier frame and the crane cab, or the crane cab and an adjacent wall or other structure. Many unguarded gears, belts, rotating shafts, etc., within the crane are pinch points to which employees may be exposed.

A pinch point is created by the narrow clearance between the rotating superstructure (cab) of a crane and the stationery carrier frame. This narrow clearance is referred to as the danger zone.

The swing area of the crane cab and counterweight must be barricaded against entry into the danger zone.

The removal of water jugs, toolboxes, and rigging materials from crane cabs would reduce the incentive to enter the danger zone.

The installation of rear view mirrors for the crane operator provides an added safeguard so the operator can see into the turning area of the cab and counterweight.

Obstruction of Vision

Safe use of a crane is compromised when the vision of an operator, rigger, or signaler is blocked and employees cannot see what the others are doing.

There are two general categories for obstructions to operators' vision:

1. Obstruction by the crane's own bulk
2. Obstruction by the work environment

The crane size alone limits the operator's range of vision and creates many blind spots, preventing the rigger, signaler, oiler, and others affected by the crane's movement from having direct eye contact with the crane operator.

To overcome the hazard of blind spots while loads are being lifted, the use of radios and telephones is much more effective than relying upon several signalers to relay messages by line of sight.

The use of automatic travel alarms is an effective way to warn those in the immediate vicinity of crane travel movement in pick-and-carry functions.

Travel Upset in Mobile Hydraulic Cranes (Rough Terrain and Wheel-Mounted Telescoping Boom)

Because of a high center of gravity, a mobile hydraulic crane can easily upset and crush the operator between the boom and the ground.

This type of crane is easily overturned on road shoulders or other embankments during travel from one location to another.

The best preventive measure for operator safety is the installation of a crush-resistant cab and seatbelt. In the event of a travel upset, the operator would be protected.

Boom Disassembly on Latticework Boom Cranes

If a boom is not blocked, improper disassembly can cause it to collapse upon those who are removing pins under the boom while the boom is suspended.

Latticework booms are disassembled for shortening, lengthening, or transporting. Boom collapse occurs on truck- or crawler-mounted cranes when the boom is lowered to a horizontal position and suspended from the boom tip with pendant guys, but the boom is not blocked. If the lower pins connecting boom sections are knocked out, the boom can collapse upon workers who are under the boom, resulting in death or serious injuries.

Preventive measures during latticework boom disassembly include:

- Planning boom disassembly location and procedures which are consistent with the manufacturer's instructions
- Using blocking or cribbing on each boom section

- Using one of several types of pins that substantially reduce the risk of crushing
- Posting warnings at pin connections

Specific Operating Practices and Responsibility

Lift Supervisors shall:

- Make sure operators are properly trained and qualified (See Section XI).
- Ensure that crane contractors have satisfactory procedures for inspection of equipment (see Section 8).
- Ensure that riggers are familiar with equipment manufacturer's procedures.
- Coordinate communications between the crane operator and others working near the crane.
- Thoroughly evaluate ground conditions, wind speed, overhead power lines, and develop a procedure or cancel crane lift operations in the event of severe weather warnings
- Develop and follow a general lift plan or a written Critical Lift Plan.
- Ensure that certifications for all cranes and operators on site are current.
- Keep workers clear of hoisted loads.
- Notify workers before a lift begins.

Crane Operators shall:

- Crane Operators shall be required to pass a written or oral examination and a practical operating examination offered by Civil Works Contracting unless they are able to furnish satisfactory evidence of qualifications and experience. Qualification shall be limited to the specific type of equipment for which the operator is examined. Crane training must be current at the time of use for the type of crane used.
- Crane Operators and operator trainees should have normal depth perception, field of vision, reaction time, manual dexterity, coordination, no tendencies towards dizziness, and shall meet the following physical qualifications:
    - Vision at least 20/30 Snellen in one eye and 20/50 in the other, with or without corrective lenses.
    - Ability to distinguish colors regardless of position of colors, if color differentiation is required for the operations.
    - Adequate hearing, with or without a hearing aid, for a specific operation.
    - Sufficient strength, endurance, agility, coordination, and speed of reaction to meet the demands of equipment operation.
- Read the operator manual for each crane operated.
- Conduct a pre-use inspection.
- Use the crane manufacturer's load chart for each crane.
- Know the weight of each load.
- Follow the manufacturer's procedures for proper outrigger deployment.
- Check the condition of the ground and blocking materials regularly.
- Check for overhead power lines and other obstructions.
- Take into consideration, wind and temperatures when making any lift.
- Respond to signals from the person who is directing the lift, or an appointed signal person. When a signal person or a crane follower is not required as part of the crane operation, the operator is then responsible for the lifts.
- The operator shall obey a stop signal at all times, no matter who gives it.

- Do not operate equipment if wire rope is not seated in drum or sheave grooves.
- Do not use a crane for the purpose of pushing or pulling.
- Avoid hoisting, moving or swinging suspended loads over or near workers.
- Do not engage in any activity that diverts attention while operating the crane.
- Stop and refuse to handle loads, if there is a safety concern.

Spotters, Riggers, and Ground Workers shall:

- Use standard hand signals (see Appendix A).
- Be observant of hoisting operations in your work area.
- Be observant and watch for signs of problems during each lift.
- Check for overhead power lines and other obstructions.
- Use rigging in accordance with manufacturers recommendations.
- Never work or position yourself directly under a suspended load.
- Use only slings or chains that are rated for the load being lifted.
- Only use appropriate rigging devices for lifts.

Crane Mechanics shall:

- Be qualified to make adjustments and repairs.
- Ensure all maintenance, inspections and testing conducted is based on manufacturer's recommendations, and specific site conditions.
- Seek approval in writing of crane manufacturer for any modifications of the crane that will change the structural or lift characteristics of the equipment.
- Ensure all maintenance related inspections occur at frequency specified by the manufacturer, or Cal/OSHA (see Section 8).

Safety & Health Supervisor shall:

- Review and approve critical lift plans and hold-harmless agreements for Civil Works Contracting property or projects.
- Coordinate quarterly inspections for Civil Works Contracting rigging.

<u>Operations</u>

- The operator will not engage in any practice that will divert his attention while actually engaged in operating the crane.
- When he or she is physically or mentally unfit, then the operator will not engage in the operation of this equipment.
- The operator will respond to signals only from the appointed signaler, but will obey a stop signal at any time, no matter who gives it.
- The operator will be responsible for those operations under his direct control. Whenever safety is in question, the operator will have the authority to stop and refuse to handle loads until safety has been assured.
- No load is to be moved until the swing path and the landing site have been assured to be safe.

- If a warning signal is furnished, it will be sounded each time before traveling and intermittently during travel, particularly when approaching workmen.
- Before leaving his crane unattended, the operator will:
  - Land any attached load, bucket, or other device
  - Disengage clutch
  - Set travel, swing, boom brakes, and other locking devices
  - Put controls in the OFF position
  - Stop the engine
  - Secure crane against accidental travel
- When wind alarm is given or on leaving crane overnight, set ground chocks on truck and crawler cranes
- Lower crane booms to ground level or otherwise fasten securely against displacement by wind loads or other outside forces.
- If there is a lockout/tagout sign on the switch or engine starting controls, the operator will not close the switch or start the engine until the warning or lock has been removed by the person placing it there.
- Before closing the switch or starting the engine, the operator will see that all controls are in the OFF position and all personnel are in the clear.
- If power fails during operation, the operator will:
  - Set all brakes and locking devices
  - Move all clutch or other power controls to the OFF position
- If practical, the suspended load should be landed under brake control
- The operator will familiarize him or herself with the equipment and its proper care. If adjustments or repairs are necessary, or any defects are known, he or she will report the same promptly to the appointed person and upon changing shifts will also notify the next operator of the defects.
- All controls will be tested by the operator at the start of a new shift. If any controls do not operate properly, they will be adjusted or repaired before operations are begun.
- Booms which are being assembled or disassembled on the ground with or without support of the boom harness should be securely blocked to prevent dropping of the boom and boom sections.

<u>Moving Loads</u>

The following procedures will be observed when moving loads:

- The crane will be level and blocked if necessary
- The load will be properly secured and balanced
- The rope will be straight, not kinked
- Multiple part lines will be straight, not kinked
- The hook will be brought over the load to prevent swinging
- The lifting action will be a smooth acceleration
- The load will clear all obstructions
- Side loading will be limited to freely suspended loads

- Cranes will not be used for dragging loads sideways
- No load will be moved while employees are on the load or hook
- Employees will not work under loads
- The brakes will be tested prior to each lift when the weight approaches the maximum for the crane
- Outriggers will be used when necessary
- Loads will not be lowered below the point where less than two wraps of rope remain on their drums

Operating Near Electric Power Lines

Cranes that operate near, under, over, or by power lines will be in accordance with the following:

- For lines rated 50 kV or below, minimum clearance between the lines and any part of the crane or load will be 10 feet
- For lines rated over 50 kV minimum, clearance between the lines and any part of the crane or load will be 10 feet plus 0.4 inch for each 1 kV over 50 kV, or use twice the length of the line insulator but never less than 10 feet
- In transit with no load and boom lowered, the clearance will be a minimum of 4 feet
- It is recommended that a person be designated to observe the clearance and give timely warning for all operations where it is difficult for the operator to maintain the desired clearance by visual means.
- Before the commencement of operations near electrical lines, the person responsible for the job will notify the owners of the power lines or their representative providing them with all information about the specific job and requesting their cooperation.
- Any overhead wire is considered energized unless the owner or the electrical utility representative gives positive indication that the line is not energized.

Heavy Equipment Procedures

- Construction vehicles and heavy equipment brought onsite must be inspected and certified to be in safe operating condition.
- Certification of an equipment operator's ability to safely operate designated equipment is required. Certification is required for crane operations, power industrial trucks, and others as required by OSHA. Training documentation must be current and be provided upon request.
- Only qualified personnel are permitted to operate equipment.
- Shut off the engine during fueling and maintenance, or when leaving a motor vehicle unattended.
- Use wheel chocks if the vehicle could possibly roll.
- Do not use equipment having an obstructed view to the rear, unless the vehicle has a backup alarm audible above the surrounding noise level.
- Heavy machinery, equipment, or their parts which are suspended or held aloft by slings, hoists, or jacks must be substantially blocked or cribbed to prevent falling or shifting. Do not work under or between suspended loads. Bulldozer and scraper blades, end-loader buckets, dump bodies, hydraulic lifts, and similar equipment must be either fully lowered

or blocked when being repaired or when not in use. Controls must be in neutral position, with motors stopped and brakes set, unless the work being performed requires otherwise.

- Hauling vehicles for which the payload is loaded by cranes, power shovels, loaders, or similar equipment must have a cab shield and/or canopy adequate to protect the operator from shifting or falling materials.
- Arrange and label control handles for tailgates, dump trucks, and heavy equipment for ease of identification when dumping.
- Check equipment at the beginning of each shift to ensure that equipment and accessories are in safe operating condition, and free of damage that could cause failure while in use.
- Do not ride with arms or legs outside of the truck body, in a standing position, on running boards, seated on side fenders, tailgates, cabs, cab shields, rear of truck, or on the load.
- Do not drive above the posted speed. Weather, traffic, width and characteristics of the road, type of motor vehicle, and existing conditions may reduce the speed limit.
- Conspicuously post rated load capacities, operating speeds, and special hazard warnings on equipment. Instructions or warnings must be visible to the operator while at the control station.
- A Competent Person must inspect machinery and equipment prior to each use. Deficiencies must be corrected, and defective parts replaced before continued use.
- Belts, gears, shafts, pulleys, sprockets, spindles, drums, flywheels, chains, or other reciprocating, rotating, or moving parts of equipment must be guarded if parts are exposed or create a hazard.
- An accessible fire extinguisher of 5BC rating or higher must be available at the operator stations or cabs of construction vehicles.
- Rollover protection specified by OSHA is required for applicable equipment operated in the work area.
- Operators of vehicles or equipment are to use seat belts or other restraint devices, if provided, at all times during operation of vehicles or equipment.

10.5 Demolition Safety

General Requirements

A pre-survey shall be performed by a competent person, prior to initiating demolition operations, to assess the structural integrity of the framing, flooring, and walls. The survey shall also include adjacent structures and operations.

Access and egress shall be always maintained. Only those stairways, passageways, and ladders designated as means of access shall be used. Other access shall be always closed off during demolition operations.

Multi-story buildings, when utilizing stairwells, shall be properly illuminated, and completely covered over at a point not less than two floors below the floor on which work is being performed.

All damage sustained to a structure to be demolished shall be shored or braced.

A survey shall be conducted to establish the utilities located within floors, walls, and ceilings. All utility lines shall be marked and disconnected/blanked-off or relocated. The “One-Call” utility

program shall be utilized to locate gas, electric, water, and steam lines in advance of operations beginning.

The competent person shall determine whether a hazardous atmosphere is apparent or suspected from demolition activities. Such hazards shall be either tested or purged before operations continue.

Hazards encountered from fragmentation of glass, tile, brick, etc. shall be removed or protected.

Wall and floor openings shall be protected. Wall openings utilized for trash removal shall be protected by the use of a standard guardrail system. Floor openings, not used as material drops, shall be protected by covering that may withstand the maximum load imposed, and properly secured from movement.

Material shall not be dropped to any point lying outside the exterior walls unless the materials chute is utilized and/or the area is effectively protected.

Chutes designed at an angle of greater than 45 degrees shall be entirely enclosed, except for openings equipped with closures or at the floor level for material insertion.

Protective measures shall be provided when dumping materials and when operations are not in progress, i.e. fall protection, protective gates, equipment bumpers, etc.

Signage shall be placed to demarcate areas where debris and materials are being dropped.

Storage of waste material and debris shall not exceed the allowable floor structural loads. Storage space into which material is dumped shall be blocked off, except for openings necessary for the removal of material. When material is not being removed, these areas shall be kept closed.

Removal of walls, masonry sections, chimneys, floors, and steel shall be inspected prior to demolition to ensure that structural support loads are not exceeded and that structural or load-supported members are not removed.

Floors weakened or otherwise made unsafe by demolition operations shall be shore/braced to safely carry the maximum intended imposed loads. Before demolishing any floor arch, debris shall be removed from the arch and adjacent floor areas.

Planking consisting of 2x10 construction grade lumber shall be provided as a safe support for operations between beams. Openings between beams shall not exceed 16 inches. Stringers shall be installed to support the floor planking, and the ends of the stringers shall be supported by floor beams/girders.

Wall sections greater than one story shall not be allowed to stand-alone unless lateral support bracing is provided, or the wall is specifically designed to stand-alone.

Mechanical equipment shall not be allowed on floors or working surfaces unless the floor has enough strength to support the imposed loads. Floor openings and exposed sides shall have curbs installed to prevent equipment from running over the sides.

When utilizing mechanical equipment for demolition operations, i.e. clamming or balling, only authorized personnel shall be allowed in the area.

10.6 Designated Operator Program (Heavy Equipment)

Purpose

This program is a proactive approach to train CIVIL WORKS CONTRACTING operators (full-time, part-time, or temporary) to reduce the risk of work-related injury or fatality by maximizing personal safety during heavy equipment operation. CIVIL WORKS CONTRACTING recognizes that hazards associated with the operation of heavy equipment and has developed this program to establish safety procedures and training requirements for all CIVIL WORKS CONTRACTING heavy equipment operators. The safety procedures developed in this program are considered supplemental to the manufacturer's operator and safety manuals.

This program applies to all heavy equipment that may be propelled by gasoline, propane, diesel, or electricity power. Heavy Equipment used on our jobsites, and covered by this program, include:

- Off-Road Dump Trucks
- Backhoe / Loader / Excavator
- Skid Steers
- Rollers / Tractors

This program establishes requirements to work in and around heavy equipment. Only competent personnel may operate heavy equipment. An individual's competency must be demonstrated by successful completion of the training and evaluation process specified in this program.

Principles of Safe Operation

It is the expectation that anyone who operates heavy equipment will do so in a manner that does not increase the possibility of an incident. The commitment to safe operation takes place long before heavy equipment gets used. The following are considered leading indicators of CIVIL WORKS CONTRACTING safe operation:

- Appropriate training that leads to certification.
- Using pre-use checklists, setting minimal operational standards, and operators' commitment using fully functional equipment.
- Knowing, understanding, and following all applicable standards as well as manufacturer's recommendations on every piece of equipment in operation.
- Recognition of site-specific conditions through use of Job Safety Analysis (JSA).
- Supervision's ability to enforce safe work practices.

By adhering to these safe work practices every time heavy equipment is used the risk of loss and injury is significantly reduced. Any operation inconsistent with these references is considered unsafe and may be subject to disciplinary action. The following are examples of safe operation:

1. All operations must obey any posted speed limit signs, postings, audible, and visual warning devices under all travel conditions.

2. Wear appropriate PPE for equipment and task being performed.
3. Operators are responsible to keep equipment under control at all times and shall slow down for conditions of wet or slippery ground, limited work access, high traffic areas, pedestrians and weather factors.
4. Equipment operators shall keep both hands free to operate the equipment. Eating, drinking, reading, texting, and talking on the phone are prohibited while operating any mobile equipment.
5. Operator shall not walk under or allow anyone to work under an elevated or suspended load.
6. All equipment rated capacities shall not be exceeded; the capacity shall be readily visible to the equipment operator.
7. Operators should stay at least 10 feet away from energized or live overhead power lines and maintain safe distances from any other energy sources.
8. Equipment operators shall maintain a safe distance form edges, such as excavations, elevated ramps, platforms, and people.
9. When leaving free moving equipment unattended (greater than 25 feet), the equipment operator shall place the bucket/basket/attachment on the ground; put the equipment in neutral; set the brakes; shut-off the equipment, remove the key; and block the wheels if on a ramp or slope.
10. A spotter for heavy equipment is required during transportation of oversized loads, traveling outside of work zone or during congested areas.

Responsibilities:

HSE Department:

- Facilitate heavy equipment training (classroom and/or hands-on).
- Assist with the development of incident prevention methods, procedures, and/or programs.
- Assign an employee to a site superintendent and/or mentor for advanced equipment inspections and training.
- Schedule and track all training records, which includes re-training or re-fresher training.

Superintendents (designated Heavy Equipment Trainer/s):

Due to their constant contact with employees, supervisors take a primary role in the prevention of incidents and the safety of employees under their supervision. The Superintendent's responsibilities include:

- Observing and evaluating the use of Heavy Equipment by employees and correcting any unsafe conditions or practices.
- Remove form service, any heavy equipment that is not safe.
- Monitor employees for awareness and performance proficiency.
- Complete the task training checklist to sign-off on the hours of supervised training.

Employees (Heavy Equipment Operators)

- Reading, understanding, and complying with the owner's manuals and manufacture-provided safety information before using heavy equipment.
- Completing the heavy equipment pre-use checklist before use.
- Using all appropriate safety equipment and devices, including but not limited to seatbelts.
- Obey traffic signs and signals and audible or visual warning devices.
- Attending appropriate training as recommended by their supervisor.

Designated Operator Program:

Safe Operation

Any CIVIL WORKS CONTRACTING employee who operators serviced-owned, leased, rented, or borrowed heavy equipment must take 8 hours of safety training for each type of equipment before they operator without any supervision. This training includes 2-4 hours of classroom instruction and 6 to 8 hours of supervised, hands-on training with the specific equipment they will operate.

Prior to permitting an employee to operate heavy equipment (except for training purposes), CIVIL WORKS CONTRACTING must ensure that each operator has successfully completed the training required by this section.

Training Program Implementation

Employees who are being trained may operate heavy equipment only:

- Under the direct supervision of persons who have the knowledge, training, and experience to train operators and evaluated their competence.
- Where such operation does not endanger the trainee or other employees.

Training Program Content

Heavy Equipment Operator must receive initial training in the following topics, except those topics that the employer can demonstrate are not applicable to safe operation of the equipment in the employer's workplace. Training will be documented on the Heavy Equipment Operator Training Certification Form. After completing the training, the operator must demonstrate through written exams and a pass/fail instructor evaluation of the following knowledge and skills:

- The operator's manual
- Proper methods of fueling, maintenance, and lubrication as required by the manufacture
- Pre-start procedures, which include proper safety checks
- Starting and warming up the machine
- Proper operational procedures, which include use of all the controls
- Demonstration of travel maneuvers necessary for the types of terrain they will encounter
- Proper hook-up of equipment and attachments that may be used with the machine
- Operation of the equipment with various attachments
- Proper shut-down procedures

- Proper transportation and load securement procedures
- Proper PPE (personal protective equipment)
- Surface conditions where the equipment will be operated.
- Load maneuvering, loading, and unloading.
- Pedestrian traffic in areas where the equipment will be operated.
- Ramps and other sloped surfaces that could affect the vehicles stability.
- Closed environments and other areas where insufficient ventilation or poor vehicle maintenance could cause buildup of carbon monoxide or diesel exhaust.

Refresher Training and Evaluation

Refresher training, including an evaluation of the effectiveness of that training, must be conducted as required below to ensure that the operator has the knowledge and skills needed to operate the heavy equipment. Refresher training in relevant topics will be provided to the operator when:

- The operator has been observed to operate the equipment in an unsafe manner.
- The operator has been involved in an incident, accident or near-miss event.
- The condition of the jobsite changes in a manner that could affect safe operation of the equipment.

An evaluation of each heavy equipment operator's performance will be conducted ***at least once every three years***. Certification will be documented on the form provided as Appendix B.

Safety Requirements for Heavy Equipment Operation

1) Personal Protection Equipment is mandatory and may include the following:
    - Hard toe boots
    - Long Pants
    - Hearing Protection
    - Eye/Face Protection
    - Hard Hat
    - Gloves
    - Hi visibility Safety Vest / Shirt
2) Pre-Start/Walk around Inspection: All vehicles in use must be checked at the beginning of each shift to assure that the following parts, equipment, and accessories are in safe operating condition and free of apparent damage that could cause failure while in use:
    - Horn
    - Parking System (hand brake)
    - Brakes
    - Operation Controls
    - Service Brakes (including any trailer brake connections)
    - Steering Mechanism
    - Seat Belts
    - Safety Devices
    - Tires

All known defects will be corrected before the equipment is placed in service. These requirements also apply to equipment such as lights, reflectors, windshield wipers, defrosters, fire extinguishers, etc., where such equipment is necessary.

- Check for loose or worn parts and repair or replace immediately.
- Check all/fluid/coolant levels. *caution* open the radiator cap only when the engine is cooled.
- Inspect hydraulic line connectors and hoses for leaks before applying pressure to the system. Use paper or cardboard, not your hands, to search for leaks. *caution* hydraulic fluid escaping under pressure can penetrate skin and cause serious bodily harm.
- Check tires for cuts, bulges, irregularities, abnormal wear, and proper inflation.
- A fire extinguisher, spill kits and first aid kit must be always onsite.

3) Maintenance: When servicing equipment, fasten a “Do Not Operate” tag on the steering wheel / controls. Review the Lock Out/Tag Out procedures prior to servicing any equipment.
   - Ensure the cab area is clean and free of debris and tools.
   - Clean windshield, mirrors, and lights.
   - Remove all oil, grease, or mud from grab irons, handrails, steps, pedals, and floor to prevent slips and falls.
   - Remove or secure any loose items such as tools, chains, or lunch boxes from the cab.

4) Work Site Location: before any operation begins, check and mark the area for underground utilities. Know the work area clearances, watch for overhead and underground objects, holes, drop-offs, and partially hidden obstacles and wires.

5) Mounting Equipment: **DO NOT GET ON OR OFF EQUIPMENT THAT IS IN MOTION**. Maintain 3-points of contact with the steps and handrails while getting on/into the machine. Do not use the controls or steering wheel as a handhold.

6) Starting and Testing Equipment: **EXHAUST FUMES ARE DANGEROUS – ALWAYS HAVE A RUNNING MACHINE IN A WELL-VENTILATED AREA.**

   - Fasten your seat belt and adjust the seat prior to starting.
   - Controls should be in neutral, and the parking brake set before starting the engine.
   - Start the engine only from the operator’s seat.
   - Warn personal in the area that you are starting the engine.
   - Check all gauges, light, instruments, and warning devices that assure that they are functioning properly, and the readings are within normal range.
   - Test brakes against ground speed to be certain there is no malfunction.

7) Machine Operation: **SMOKING IS PROHIBITED AT ALL TIMES**
   - Secure all tools and materials to prevent movement when transported in the same compartment with the operator.
   - Always use the seat belt. Most heavy equipment is required to have a seat belt and rollover protection (ROPS). *OSHA takes the position that seat belts are personal protective equipment, and failure to use them is grounds for a citation.*
   - Familiarize yourself with the controls before operating the machine.
   - Only the operator is permitted to ride on the machine.
   - While backing up, use extra care and sound the horn to clear the area.
   - Do NOT coast downhill. Select a gear that will prevent excessive speed. Do not park on a steep incline.
   - DO NOT permit anyone to stand or pass under the bucket or lift arms.
   - Follow the manufacture’s load capacity limits. Identification plats are attached to all machines.

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8) Refueling: **DO NOT SMOKE WHILE REFUELING**.
    - Shut off and cool the engine and any electrical equipment before refueling.
    - Ensure the fueling area is well ventilated.
    - Keep open flames and sparks away from the area.
    - DO NOT use gasoline or diesel for cleaning parts.
    - Know where the fire extinguishers are located.
    -
9) Workers and People on foot: **MANY INJURIES INVOLVING HEAVY EQUIPMENT DO NOT OCCUR TO THE OPERATOR BUT ARE INFLICTED ON GROUND PERDONNEL WORKING IN OR AROUND THE VICINITY OF MOVING MACHINES.**
    - Always be aware of the location of personnel working near your machine. Heavy equipment operators frequently require the aid of ground personnel who should be thoroughly familiar with the procedures of your operation and the capabilities of the machine.
    - Never assume the assigned ground workers will watch out for themselves. If they are not visible, DO NOT MOVE THE MACHINE OR ANY ATTACHMENTS.
    - When working in conjunction with ground personnel, never operate equipment at high speeds.

10.7 Electrical Safety

Purpose and Scope

The danger of injury through electrical shock is possible whenever electrical power is present. When a person's body completes a circuit and thus connects a power source with the ground, an electrical burn or injury is imminent. Most fatal injuries result from high-voltage exposure; however, people can sustain severe injuries from low voltage power if it has a high current flow.

Electrical safety is important in every work environment. The following sections cover circuit breaker loads, electrical grounding, electrical safety guidelines, and electrical emergency response.

Definitions

The following definitions help clarify general electrical safety:

Amps - The standard unit for measuring electrical current.

Watt - A unit of electrical power, equal to the power developed in a circuit by a current of amp flowing through a potential difference of one volt.

Voltage - Electromotive force expressed in volts.

Circuit Breaker - A device that automatically interrupts the flow of an electrical current.

Breaker Box - An insulated box on which interconnected circuits are mounted.

Electrical Panel - An insulated panel on which electrical wires are mounted.

Current Flow - The rate of flow of an electrical charge, generally expressed in amps.

Electrical Load - The amount of power delivered by a generator or carried by a circuit. A device to which the power is delivered.

Ground-Fault Circuit Interrupter (GFCI) - A GFCI is a protective device and detects grounding problems and shuts electricity off to prevent a potential injury/electrocution incident.

High Voltage - The term high voltage applies to electrical equipment that operates at more than 600 Volts (for terminal to terminal operation) or more than 300 Volts (for terminal to ground operation). Low voltage, high current AC or DC power supplies are also considered to be high voltage.

Hazardous Energy Sources - This term applies to stored or residual energy such as that in capacitors, springs, elevated machine members, rotating flywheels, hydraulic systems, and air, gas, steam, or water pressure.

Lockout - The placement of a lock on an energy-isolating device. This act prevents workers from operating a piece of equipment until the lock is removed.

Tagout - The placement of a tag on an energy-isolating device. A tagout device is a prominent warning device of a lockout.

Test – Verification the circuit is not capable of being energized after isolation and prior to initiating any work.

Energy-Isolating Device - A mechanical device that prevents the transmission or release of energy. Energy-isolating devices should be lockable by means of a hasp or other type of attachment. It should not be necessary to dismantle or reassemble a device to lock it.

Examples include the following:

- Manually operated circuit breakers
- Disconnect switches
- Line or block valves

***IMPORTANT:* Pushbuttons, selector switches, and other control circuit devices do not isolate energy.**

Authorized Employee - A person who locks out or tags out equipment for service or maintenance. Authorized employees have been formally trained in proper lockout/tagout procedures.

Circuit Breaker Loads - Most locations have 20-amp circuit breakers that serve two or more outlets. These breakers can handle most 110-volt tools and equipment; however, the widespread use of personal computers and associated hardware can create an electrical overload. To determine your current electrical load, follow these steps:

1. Check office/laboratory equipment for a manufacturer's rating label that indicates total watts or amps. Take special care to check appliances that use electricity to generate heat.
2 . Convert the watts rating to amps: Amps = Watts / 120 Volts
3. Total the amps for each circuit.
4. If the total equals more than 15 amps per 20-amp circuit, you may be overloading the circuit. Move enough equipment to a different circuit to reduce the circuit load.

Electrical Grounding - Proper electrical grounding can help prevent electrical injury. Most electrical equipment is grounded with either a three-prong plug or a two-prong plug and insulation. Because a grounding system may be defective without your knowledge, use a GFCI to ensure electrical safety. GFCI's are required on all construction sites where moist or potentially damp environments exist.

Electrical Panel - Electrical panels or breaker boxes require special safety considerations, including the following:

- Know where your panel box and/or disconnect is located.

- Do not tape circuit breakers to keep a breaker from tripping.
- Ensure that breaker circuits are accurately labeled within panel boxes.
- Ensure that panel box doors are securely attached.
- Do not block panel boxes. There should be at least 30 inches of clear space in front of a panel box.
- Report tripped breakers and refer any electrical questions to your supervisor or qualified electrician.

Electrical Safety Guidelines

Follow these guidelines for general electrical safety:

- Be familiar with the electrical hazards associated with your workplace.
- Unplug electrical equipment before repairing or servicing it.
- If a prong breaks off inside an outlet, do not attempt to remove it yourself. Contact your supervisor or qualified electrician for assistance.
- Immediately report defective equipment to your supervisor.
- Report all electrical problems, including tripped breakers, broken switches, and flickering lights, to your supervisor.
- All appliances used on company property and projects must be UL or FM (Factory Mutual) labeled.
- Do not use an appliance, tool or equipment that sparks, smokes, or becomes excessively hot, unless the appliance is specifically designed to exhibit these characteristics.
- Portable electrical heaters must be placed to avoid causing a trip hazard and must be kept away from combustible material. Never leave a heater unattended. Unplug the heater at the end of the day/shift or when not in use.
- Keep electrical equipment away from water, unless the appliance is specifically designed for use around water, such as a wet-dry shop vacuum.
- Use GFCI's or implement the Assured Equipment Grounding Conductor Program (AEGCP).
- Be aware of overhead power lines when working with tall equipment (e.g., cranes, backhoes, loaders, excavators, etc.).
- Follow lockout/tagout procedures.

Follow these guidelines for electrical plug and cord safety:

- Do not remove the prongs of an electrical plug. If plug prongs are missing, loose, or bent, replace the entire plug.
- Do not use an adapter or extension cord to defeat a standard grounding device. (e.g., Only place three-prong plugs in three-prong outlets; do not alter them to fit in a two-prong outlet.)
- Use extension cords only when necessary and only on a temporary basis. Do not use extension cords in place of permanent wiring. Request new outlets if your work requires equipment in an area without an outlet.
- Use extension cords that are minimum of 12 gauge, three-conductor.
- Do not run electrical cords above ceiling tiles or through walls.
- Keep electrical cords away from areas where they may be pinched and areas where they may pose a tripping or fire hazard (e.g., doorways, walkways, under carpet, etc.)
- Avoid plugging more than one appliance in each outlet. If multiple appliances are necessary, use an approved power strip with surge protector and circuit breaker. Do not overload the circuit breaker.
- Discard damaged cords, cords that become hot, or cords with exposed wiring.

- Never unplug an appliance by pulling on the cord; pull on the plug.

Procedures and Guidelines to Eliminate Injuries

The following procedures and guidelines are designed to eliminate all injuries resulting from possible malfunctions, improper ground and/or defective tools.

Assured Grounding Site Program Requirement

An assured grounding conductor program must be implemented on all Civil Works sites covering all cord sets, receptacles which are not part of the building or structure & equipment connected by cord and plug which are available for use or used by employees.

Ground Fault Circuit Interrupters

All 120-volt, single-phase 15 and 20 ampere receptacle outlets on construction or maintenance sites, which are not part of the permanent wiring of the building or structure and which are in use by employees, shall have approved ground fault circuit interrupters for personnel protection.

- All hand portable electric tools and extension cords shall use a GFCI.
- Additionally, approved GFCI's shall be used for 240-Volt circuits in the same service as described above.
- GFCI's must be used on all 120 volt, single-phase 15 amp and 20 amp receptacles within 6 feet of a sink, damp areas or on installed outdoor equipment.
- The GFCI must be the first device plugged into a permanent receptacle.
- The GFCI must be tested before each use.

Assured Equipment Grounding Conductor Program

The Assured Equipment Grounding Conductor Program (AEGCP) shall cover all cord sets, receptacles not a part of the permanent wiring of a structure and equipment connected by cord and plug on all construction and maintenance sites.

This written description of the program shall be kept at the jobsite for inspection and copying by OSHA and any affected employee.

Removing Equipment

Restrictions for the use of equipment that does not meet requirements or if is found to be defective shall be applied and enforced. Any equipment which has not met the requirements of this program shall not be available or permitted to be used by Civil Works. Damaged items shall not be used until repaired.

How Often Inspection of Cords and Equipment are to be Made

Daily Visual inspections – The following shall be visually inspected before each day's use for external defects (such as deformed or missing pins or insulation damage) and for indication of possible internal damage:

- Cord sets
- Attachment caps
- Plug and receptacle of cord sets
- Any equipment connected by cord and plug (with the exception of cord sets and receptacles which are fixed and not exposed to damage) such as deformed or missing plug
- Insulation damage
- Damaged items shall not be used until repaired or shall be discarded.

How and When Tests are Performed and What Records are Maintained

All equipment grounding conductors shall be tested for continuity and shall be electrically continuous.

Each receptacle and attachment cap or plug shall be tested for correct attachment of the equipment grounding conductors. The equipment grounding conductor shall be connected to its proper terminal.

When tests are performed:

- Before each use.
- Before equipment is returned to service following any repairs.
- Before equipment is used such as when a cord has been run over.
- At intervals not to exceed 3 months, except that cord sets and receptacles which are fixed and not exposed to damage shall be tested at intervals not exceeding 6 months.

Tests performed as required by this program shall be recorded as to the identity of each receptacle, cord set and cord and plug connected equipment that passed the test and shall indicate the last date tested or interval for which is was tested. This record shall be kept by means of logs, color coding or other effective means and shall be maintained until replaced by a more current record. These records shall be made available at the job site for inspection by the Assistant Secretary and any affected employees.

All tested cord sets, and cord and plug-connected equipment shall be marked, one or both ends, with colored tape to denote the month that the tests were performed.

The below color code chart “Seasonal Color” must be followed for marking.

Month #	Month Tested	Color of Tape(s)	
1	January	White	
2	February	White	Yellow
3	March	White	Blue
4	April	Green	
5	May	Green	Yellow
6	June	Green	Blue
7	July	Red	
8	August	Red	Yellow
9	September	Red	Blue
10	October	Orange	
11	November	Orange	Yellow
12	December	Orange	Blue

Electrical Emergency Response

The following instructions provide guidelines for handling three types of electrical emergencies:

Electric Shock

When someone suffers serious electrical shock, he or she may be knocked unconscious. If the victim is still in contact with the electrical current, immediately turn off the electrical power source. If you cannot disconnect the power source, try to separate the victim from the power source with a nonconductive object, such as a wood-handled broom.

IMPORTANT: Do not touch a victim that is still in contact with a power source; you could electrocute yourself. Have someone call for emergency medical assistance immediately and administer first aid as appropriate.

Electrical Fire

If an electrical fire occurs, try to disconnect the electrical power source, if possible. If the fire is small, you are not in immediate danger, and you have been trained in fighting fires, use any type of fire extinguisher except water to extinguish the fire.

IMPORTANT: Do not use water on an electrical fire.

Power Lines

- Stay away from energized power lines and downed power lines.
- Be particularly careful if a live power line is touching a body of water.
- The water could conduct electricity.
- If a power line falls on your vehicle or equipment while you are inside, remain within the vehicle until help arrives.

High Voltage Procedures

In addition to the guidelines associated with general electrical safety and lockout/tagout procedures, there are more stringent safety requirements for high voltage procedures.

The following list provides high-voltage safety tips. For more information, please refer to Title 29 Section 1910.269 of the Code of Federal Regulations or NFPA 70 (National Electric Code).

- Ensure that only authorized employees work around high voltage equipment.
- Label entrances with a High Voltage Sign.
- Ensure that terminal voltage ratings can withstand surges caused by electrical faults or switching transients.
- Be careful around output circuits even when the input power is off. Parallel power sources and energy storage devices can still be dangerous.
- Be careful when working with power supplies that serve more than one area.
- Before working in a high voltage area, inspect the power supply and check all protective devices.
- Do not work alone near high voltage.
- Label equipment to identify power sources. Label input power sources to identify connected power supply loads.
- Attach emergency shutdown instructions and phone numbers to equipment that is remotely controlled or unattended while energized.

Before entering a power supply or associated equipment enclosure to work on hazardous energy sources, complete the following:

1. De-energize the equipment.
2. Open and lockout the main input power circuit breaker.

3. Check for auxiliary power circuits that could still be energized.
4. Inspect automatic shorting devices for proper operation.
5. Short the power supply with grounding hooks.

High voltage power supplies can be a source of x-rays and may need to be evaluated for radiation hazard potential.

Minimum Clear Working Space

The following tables from the National Electric Code provides minimum depth of clear working space in front of electrical equipment:

Outdoor Conductor Clearances

For outside wiring all conductors will comply with clearances specified below:

LOW VOLTAGE (0 - 750 Volts) MINIMUM CLEARANCE	
Above and along thoroughfares	20 feet
Above areas where it is possible to drive vehicles	16 feet
Above areas accessible to pedestrians only	12 feet
Above structures	8 feet
Distance away from windows doors, scaffolds or similar locations will be maintained not less than:	3 feet

WORKING CLEARANCES VOLTAGE TO GROUND MINIMUM CLEAR DISTANCE (FEET)			
*CONDITIONS	(i)	(ii)	(iii)
0 -150	2 - 1/2	2 - 1/2	3
151 - 600	2 - 1/2	3 - 1/2	4

Where *conditions (i), (ii), and (iii) are as follows:

i. Exposed live parts on one side and no live or grounded parts on the other side of the working space, or exposed live parts on both sides effectively guarded by suitable wood or other insulating materials. Insulated wire or insulated bus bars operating at not over 300 volts will not be considered live parts.
ii. Exposed live parts on one side and grounded parts on the other side. Concrete, brick, or tile walls will be considered as grounded surfaces.
iii. Exposed live parts on both sides of the workspace [not guarded as provided in condition (I)] with the operator between.

10.8 Environmental Awareness – Asbestos, Mold, Lead and Heat

Purpose

Civil Works Contracting does not perform contaminated or hazardous remediation abatement work. The owner must take responsibility for the abatement of any hazardous or contaminated materials

found before any project is bid and awarded or during construction. All employees working onsite are responsible for bringing any environmental hazards identified during an ongoing project to the attention of the Field Supervisor. The purpose of this policy is to make employees aware of hazardous conditions associated with asbestos, mold, lead, and heat on the jobsite.

Asbestos

In the past, asbestos was a common building component because it was cheap, plentiful, heat resistant, and chemical resistant. Although new buildings generally contain no asbestos, many asbestos-containing products remain in older buildings.

Health Risks

Intact asbestos materials do not pose a health threat. But if the material becomes damaged or deteriorated, asbestos fibers can be released into the air and inhaled.

Asbestos fibers are inhaled through the bronchial tubes to the bronchioles and are embedded in the alveoli. Exposure to elevated levels of these microscopic fibers has been linked to lung cancer and other serious health problems, such as asbestosis (excessive scar tissue on the lungs that restricts breathing) and mesothelioma (cancer of the lining of the chest cavity). The odds of getting asbestos-related illness increase with the level and duration of exposure.

Recognizing Asbestos Products

Common asbestos products include floor tile, linoleum, pipe insulation, tank insulation, ceiling tiles, popcorn ceilings, textured walls, fireproofing, lab counters, fume hoods, roofing shingles and tar, gaskets on pipes, ovens, furnaces and other equipment.

Asbestos Inspection and Training

Civil Works Contracting supervisors, in conjunction with our clients, systematically survey our worksites to determine where asbestos products are or may be located. Where necessary, specialty contractors monitor asbestos removal and repair to ensure that building occupants are not exposed to asbestos fibers. Periodic asbestos awareness training is conducted as needed to help prevent accidental exposures.

Asbestos Abatement

Specialty contractors are employed as needed to ensure that asbestos materials are handled in a safe manner. All suspect materials are sampled prior to renovation and demolition projects. If asbestos is identified, certified asbestos workers remove asbestos on projects before routine construction and maintenance to ensure that it is not accidentally damaged. To meet the goal of maintaining asbestos in good condition, trained asbestos workers repair damaged asbestos. An asbestos warning sign is posted at entrances to the work area. If you see this sign, do not enter the area for any reason. Only trained, authorized personnel may enter.

Avoiding Exposure

Possible asbestos-containing materials should not be disturbed so the fibers do not become airborne. If you suspect materials contain asbestos, leave them alone!

Getting Assistance

If you have questions about possible asbestos materials in your work area, please contact your supervisor.

Ionizing Radiation

This program is to ensure essential information regarding the hazard of ionizing radiation is communicated to our staff to minimize any potential exposure to ionizing radiation. When work is performed on a non-owned or operated site, the operator's or their radiation services contractor's program shall be followed.

Exposure/Effects

As a rule, the dangers of radioactive exposure are less visible than those of other hazardous materials, and the presence of dangerous levels of radioactivity is hard to detect; it can only be detected with special monitors. Its effect on the human body may not be evident for days, weeks, or even years after exposure occurs. As ionizing radiation is applied to humans, the effects may include dermatitis, redness of the skin, skin cancer, hair loss, and eye inflammation.

The human body is able to tolerate a certain level of ionizing radiation; after all, we are continuously exposed to ionizing radiation from natural sources, such as cosmic radiation from outer space, and from radioactive materials in the earth. The degree of injury that is inflicted on a person by radiation exposure depends on several factors, such as the amount of the radiation dose, the duration of the dose, the rate at which the dose was received, the type of radiation received, and the body parts receiving the dose.

Procedure

Civil Works shall not possess, use, or transfer sources of ionizing radiation in such a manner as to cause any individual in a restricted area to receive in any period of one calendar quarter from sources in the employer's possession or control a dose in excess of the limits specified below:

TABLE G-18	Rems per calendar
Whole body: Head and trunk; active blood-forming organs; lens of eyes; or gonads	1 1/4
Hands and forearms; feet and ankles	18 3/4
Skin of whole body	7 1/2

Precautionary procedures and personal monitoring

Survey

Civil Works shall ensure that survey of the area has been taken and appropriate restricted areas established at the client worksite prior to beginning work. Survey means an evaluation of the radiation hazards incident to the production, use, release, disposal, or presence of radioactive materials or other sources of radiation under a specific set of conditions. When appropriate, such evaluation includes a physical survey of the location of materials and equipment, and measurements of levels of radiation or concentrations of radioactive material present.

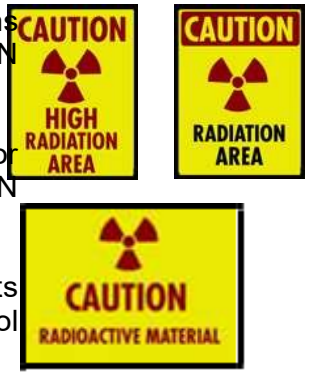
Monitoring

Civil Works shall ensure the supply of appropriate personnel monitoring equipment, such as film badges, pocket chambers, pocket dosimeters, or film rings, and shall require the use of such equipment by each employee who enters a restricted area. All shall be calibrated as required.

Signs and Emergency Signals

Signs

Symbols shall use the conventional radiation caution colors of magenta or purple on yellow background. The symbol prescribed by this paragraph is the conventional three-bladed design.



Each radiation area shall be conspicuously posted with a sign or signs bearing the radiation caution symbol and the words: CAUTION RADIATION AREA.

Each high radiation area shall be conspicuously posted with a sign or signs bearing the radiation caution symbol and the words: CAUTION HIGH RADIATION AREA.

Each area or room in which radioactive materials in regulated amounts are stored shall post a sign or sings bearing the radiation caution symbol and the words: CAUTION RADIOACTIVE MATERIAL.

Emergency Signal

Each high radiation area shall be equipped with a control device which shall either cause the level of radiation to be reduced below that at which an individual might receive a dose of 100 millirems in 1 hour upon entry into the area or shall energize a conspicuous visible or audible alarm signal in such a manner that the individual entering and the employer or a supervisor of the activity are made aware of the entry.

The signal generator shall not be less than 75 decibels at every location where an individual may be present whose immediate, rapid, and complete evacuation is essential.

A sufficient number of signal units shall be installed at every location where an individual may be present whose immediate, rapid, and complete evacuation is essential.

The signal shall be unique in the plant or facility in which it is installed.

The minimum duration of the signal shall be sufficient to ensure that all affected persons hear the signal.

The signal-generating system shall respond automatically to an initiating event without requiring any human action to sound the signal.

Once the system has been placed in service, periodic tests, inspections, and checks shall be made to minimize the possibility of malfunction.

In addition to the initial startup and operating tests, periodic scheduled performance tests and status checks must be made to ensure that the system is at all times operating within design limits and capable of the required response. Specific periodic tests or checks or both shall include:

All employees whose work may necessitate their presence in an area covered by the signal shall be made familiar with the actual sound of the signal-preferably as it sounds at their work location. Before placing the system into operation, all employees normally working in the area shall be made acquainted with the signal by actual demonstration at their work locations.

Training

All individuals working in or frequenting any portion of a radiation area shall be informed on:

The occurrence of radioactive materials or of radiation in such portions of the radiation area,

The safety problems associated with exposure to such materials or radiation and in precautions or devices to minimize exposure, including but not limited to time, distance, shielding and methods of keeping exposure limits as low as reasonably achievable (ALARA).

The applicable provisions of 1910.1096 for the protection of employees from exposure to radiation or radioactive materials, and

Shall be advised of reports of radiation exposure which employees may request a copy of.

Recordkeeping

Civil Works shall post a current copy of the applicable regulations and a copy of the operating procedures applicable to the work conspicuously in such locations as to insure that employees working in or frequenting radiation areas will observe these documents on the way to and from their place of employment or shall keep such documents available for examination of employees upon request.

Civil Works shall maintain records of the radiation exposure of all employees for whom personnel monitoring is required and advise each of his employees in writing of his individual exposure on at least an annual basis.

Mold

Subcontractors are instructed to report any water events, including water infiltration and saturated materials to the Civil Works Contracting Field Supervisor immediately so that corrective actions can be taken to prevent the growth of mold.

Lead

Lead poisoning has been a serious health concern for centuries. Even though much is known about lead and how it can affect your health, lead poisoning is still very common today.

Lead is a serious potential health hazard for construction workers. It can get into your body through inhalation and ingestion, which is the most frequent source of entry. There are strict federal and state regulations governing lead removal.

The owner's responsibility is to complete any known lead removal before work is started on Civil Works Contracting projects. If the abatement of lead materials takes place after work has begun, this activity must be performed by a qualified subcontractor and the Field Supervisor must be consulted prior to the start of abatement activities.

Many paints manufactured before 1979 may contain lead. Sometimes the topcoat is lead-free, but the primer contains lead. Lead is commonly found on window and door frames, steel that's been exposed to the outdoors or corrosive elements, and hospital environments. Lead is not a hazard if left alone; it becomes a hazard when it is disturbed by sanding, chipping, grinding, etc. Painted surfaces must be pre-assessed before disturbing to determine if they contain lead-based paint.

Testing

If the owner has documentation of the lead content of any surfaces, the Field Supervisor should obtain a copy of these results and keep them in the job file.

Heat Illness Prevention

Outdoor construction work conducted in hot weather can cause exposed employees to have heat-related illnesses. Individual susceptibility varies, making it difficult to know who will be affected and when. This Heat Illness Prevention Plan applies to employees of Civil Works, who work in outdoor areas of employment or on job tasks where the environmental risk factors for heat illness are present and are at risk for developing heat illnesses if they do not protect themselves appropriately.

The Civil Works HIPP includes steps for ensuring drinking water is provided in sufficient amounts, temperatures and humidity conditions are monitored, shade is available, high heat procedures are followed, employee training is in place, emergency response procedures are documented, acclimatization of employees is accounted for, and auditing processes are incorporated to strengthen the plan's success.

Site Superintendent: Use professional opinion along with given data charts to decide among the best possible way to prevent heat related illnesses, provide first aid for minor heat and cold related illnesses, and seek medical services is signs or symptoms worsen. Ensure compliance with the policy is adhered to by all employees.

Water

Civil Work Contracting will provide fresh, pure, and suitable cool water, free of charge, as close as practicable to areas where employees are located. Supervisors will visually examine the water to ensure purity and check that it is adequately cool by pouring some on their skin. When employees are working in large areas water will be placed in several locations. Civil Works Contracting will also place water in designated shade areas and near restrooms.

Civil Works Contracting Site Supervision will ensure that 1 quart of water per person per hour is available at the start of the shift and will have a water replenishment system in place.

Procedures for Monitoring the Weather

Supervisors will be trained and instructed to check in advance the extended weather forecast. Weather forecasts can be checked with the aid of the internet (http://www.nws.noaa.gov/) or by checking the Weather Channel TV Network. The work schedule will be planned in advance, taking into consideration whether high temperatures or a heat wave is expected. Routine advance weather monitoring will take place between the months of May and September; with additional advance monitoring conducted as needed during the remainder of the year.

In addition to advance weather monitoring, supervisors shall utilize one of the aforementioned weather services to review the day's forecasted temperature and humidity level prior to the start of work. Temperature and humidity levels will also be monitored on the work site throughout the day and compared to the National Weather Service Heat Index to evaluate the risk level for heat illness and determine when precautionary heat illness prevention measures should be taken. Temperature will be monitored by means of dry bulb thermometer in degrees Fahrenheit. Temperature measurements will be taken in work areas where shade is not present.

Shade

Civil Works Contracting will provide shade when the temperature exceeds 80 degrees Fahrenheit. Shade areas will be open to the air or provided with ventilation or cooling. Enough shade will be provided to accommodate the number of employees on break or recovery period at any given time.

Civil Works Contracting will ensure that employees in shaded areas can sit in a normal posture fully in the shade without having contact with one another. The shade shall be located as close as practicable

to the work area. During meal periods, the amount of shade available shall be enough to accommodate the number of employees on meal break and those seeking cool-down rest periods.

Civil Works Contracting will encourage employees to take a preventive cool-down rest in the shade when they feel the need to protect themselves from overheating.

Employees taking cool-down breaks will be monitored and asked if they are experiencing symptoms of heat illness and will be encouraged to remain in the shade until any signs or symptoms have abated. Employees will be given no less than 5 minutes to rest in the shade, in addition to time needed to access the shade.

Civil Works Contracting policy will be that any employee who exhibits signs or reports symptoms of heat illness while taking a preventive cool-down rest shall be provided with appropriate first aid or emergency response.

High Heat Procedures

Civil Works Contracting will implement the following high heat procedures when the temperature equals or exceeds 95 degrees Fahrenheit.

A supervisor, or a qualified designee, shall directly observe employees, for signs and symptoms of heat illness. Each supervisor, or qualified designee, shall be responsible for observing no more than 20 employees.

- If impractical to directly observe employees, a mandatory buddy system shall be implemented or;
- Regular communication with employees working solo shall be implemented by either radio or cellular phone or;
- Other effective observation such as periodic checks.

Employees shall be observed for symptoms of heat illness and will be reminded throughout the work shift to drink plenty of water.

Civil Works Contracting will designate 1 or more employees to call for emergency medical procedures and will allow any employees to call for emergency services when a designated person is not available.

Civil Works Contracting will closely supervise new employees for the first 14 days of employment, unless the new employee indicates at the time of hire that they have been doing similar work for at least 10 of the past 30 days, and for more than 4 hours per day.

Civil Works Contracting will provide a pre-shift meeting during periods of high heat to remind employees:

- Of the company's high heat procedures.
- To drink plenty of water.
- Of their right to take cool-down rest periods when necessary.

Training

All Civil Works Contracting Field Supervisors and Field Supervisors should be familiar with the signs of heat stress. Training and Toolbox Talks should discuss the types of heat-related illnesses and how to prevent them.

Heat Cramps

Heat cramps can be caused by hard physical work in a hot environment. Heat cramps can be caused

by either too much or too little salt in the diet, and the lack of water replenishment. Thirst cannot be relied on as a guide to the need for water. Workers must drink water every 15 to 20 minutes in hot environments.

Heat Exhaustion

The signs and symptoms of heat exhaustion include fainting, headache, nausea, dizziness, weakness, and thirst. The fainting associated with heat exhaustion can be dangerous because the employee may be operating machinery or controlling an operation that should not be left unattended. The employee could also be injured when fainting. The signs and symptoms of heat exhaustion are similar to those of heat stroke, which is a medical emergency.

Heat Stroke

When the body's temperature regulation system fails and body temperature rises to critical levels, heat stroke occurs. Heat stroke is caused by highly variable factors and is difficult to predict. Heat stroke is considered a medical emergency.

The primary signs and symptoms of heat stroke are confusion; irrational behavior; loss of consciousness; convulsions; a lack of sweating (usually); hot, dry skin; and an abnormally high body temperature. If body temperature is too high, it can cause death.

If an employee shows signs of possible heat stroke, emergency medical treatment is required. The employee should be placed in a shady area, outer clothing removed, skin wetted, and air movement around the employee increased. Fluids should be replaced as soon as possible.

An employee suspected of being ill from heatstroke should never be sent home or left unattended without the approval of a physician.

Preventing Heat Stress

The steps to avoid heat stress are:

- Consider potential for heat stress during pre-planning.
- Through engineering, reduce the temperature or potential for heat stress.
- Turn off or reduce the ambient temperatures of equipment surrounding the work area or jobsite.
- Provide increased ventilation by using fans, opening windows or doors, and/or moving the work to an area where ventilation exists.
- Provide chilled air direct or via a duct to the work location.
- Provide a cooling station, such as a tent, with fans for employee breaks.
- Through administrative controls, decrease heat exposure.
- Establish a work-rest protocol. Typically, 45 minutes of work followed by 15 minutes of rest in an air conditioned, or significantly cooler area, will serve to avoid heat stress.
- In extreme temperature conditions, rotate workers out of the heated area or the strenuous task. One hour on and one hour off the job in a cooler area will help avoid heat stress.
- Perform work at a time of day when ambient temperatures arelowest.
- Provide training on heat stress avoidance and symptoms to employees and supervisors.
- Cool water must be made available to workers and they must be encouraged to drink small amounts frequently, e.g., one cup every 20 minutes. Ample supplies of liquids must be placed close to the work area.

10.9 Fall Prevention and Protection

Purpose

Civil Works Contracting is dedicated to the protection of its employees from on-the-job injuries. All employees of Civil Works Contracting and its subcontractors have the responsibility to work safely on the job. The purpose of this plan is to:

- Provide safety standards specifically designed to cover fall protection on the job.
- Ensure that each employee is trained and made aware of the fall protection provisions that must be implemented prior to the start of construction.

To prevent falls, Civil Works Contracting has a duty to anticipate the need to work at heights and to plan our work activities accordingly. Careful planning and preparation lay the necessary groundwork for an accident-free jobsite.

Worksite Assessment and Fall Protection System Selection

All fall protection systems selected for each application will be installed before an employee may go to work in an area that necessitates the protection. Civil Works Contracting management is responsible for their installation. Designated employees are authorized to inspect, investigate, or assess workplace conditions before construction work begins or after all construction work has been completed. These employees are exempt from the fall protection rule during the performance of these duties.

These authorized employees determine if all walking/working surfaces on which our employees work have the strength and structural integrity to support the employees. Our employees will not be allowed to work on these surfaces until they have the requisite strength and structural integrity.

This fall protection policy is intended to anticipate the specific fall hazards to which our employees may be exposed. Specifically, we:

- Inspect the area to determine what hazards exist or may arise during the work.
- Identify the hazards and select the appropriate measures and equipment.
- Give specific and appropriate instructions to workers to prevent exposure to unsafe conditions.
- Ensure that our employees follow the procedures given and understand the training provided.
- Apprise ourselves of the steps our specialty subcontractors have taken to meet their fall protection requirements.

Providing fall protection requires an assessment of each fall situation at a given jobsite. Our criteria for selecting a given fall protection system follow those established by 29 CFR 1926.502, fall protection systems criteria and practices. Each employee exposed to these situations must be trained.

<u>Unprotected Sides and Edges</u>

Our employees must be protected when they are exposed to falls from unprotected sides and edges of walking/working surfaces (horizontal and vertical surfaces) that are 6 feet or more above lower levels. We know that OSHA has determined that there is no "safe" distance from an unprotected side or edge that would render fall protection unnecessary. We maintain the system(s) chosen until all work has been completed or until the permanent elements of the structure that will eliminate the exposure to falling hazards are in place.

<u>Leading Edge Work</u>

Leading edges are defined as the edge of a floor, roof, or formwork that changes location as additional floor, roof, or formwork sections are placed, formed, or constructed. If work stops on a leading edge it will be considered an "unprotected side or edge" and will be covered by the section of this plan on

unprotected sides and edges.

Hoist Areas

In all situations where equipment and material hoisting operations take place, we protect our employees from fall hazards.

When operations require the materials to be lifted by crane to a landing zone (and do not require an employee to lean through the access opening or out over the edge to receive or guide materials), we can select either personal fall arrest equipment or a guardrail system.

When guardrails (or chains or gates) are removed to facilitate hoisting operations, and our employees must lean through the access opening or out over the edge to receive or guide materials they will be protected by a personal fall arrest system.

Holes

Civil Works Contracting protects employees from:

- Tripping in or stepping into or through holes (including skylights).
- Objects falling through holes (including skylights).

Employees can trip or step into or through a hole (including skylights). In these instances, we use covers to prevent accidents.

We understand that OSHA does not intend that a guardrail be erected around holes while employees are working at the hole, passing materials, and so on. Therefore, if the cover is removed while work is in progress, guardrails are not required because they would interfere with the performance of work. When the work has been completed, we will be required to either replace the cover or erect guardrails around the hole.

However, while work is in progress, employees working in and around holes must either barricade or restrict access to the work areas below any hole or opening.

Ramps, Runways, and Other Walkways

We equip all ramps, runways, and other walkways with guardrails when employees are subject to falling 6 feet or more to lower levels.

Wall Openings

Employees who are exposed to the hazard of falling out or through wall openings (including those with chutes attached) where the outside bottom edge of the wall opening is 6 feet or more above lower levels and the inside bottom edge of the wall opening is less than 39 inches above the walking/working surface must be protected from falling.

Walking/Working Surfaces Not Otherwise Addressed

We realize there will be situations that are not covered by our written safety policies and procedures, for which we have the duty to provide fall protection. All employees exposed to falls of 6 feet or more to lower levels must be protected by a guardrail system, safety net system, or personal fall arrest system except where specified otherwise in CFR 1926.

Protection from Falling Objects

When employees are exposed to falling objects, we ensure they wear hard hats and also implement one of the following measures:

- Erect toe-boards, screens, or guardrail systems to prevent objects from falling from higher levels.

- Erect a canopy structure and keep potential fall objects far enough from the edge of the higher level so that those objects would not go over the edge if they were accidentally moved.
- Barricade the area to which objects could fall, prohibit employees from entering the barricaded area, and keep objects that may fall far enough away from the edge of a higher level so that those objects would not go over the edge if they were accidentally moved.
- Cover or guard holes 6 feet or more above a lower level.

General Requirements

- If any one of the conditions described in the Worksite Assessment is not met for the area or piece of equipment posing a potential fall hazard, then do not perform that work until the condition is met. If you cannot remedy the condition immediately, notify a supervisor of the problem and utilize a different piece of equipment or work in a different area, according to the situation.
- If the situation calls for use of fall protection devices such as harnesses or lanyards because the fall hazard cannot be reduced to a safe level, then you must don such protective equipment before beginning the work and use it as intended throughout the duration of the work.
- Only employees trained in such work are expected to perform it.
- All jobsites and work locations will be kept clean and orderly and in a sanitary condition.
- All walking/working surfaces must be kept in a clean and, so far as possible, dry condition. Where wet processes are used, drainage will be maintained, and false floors, platforms, mats, or other dry standing places should be provided where practicable.

Types of Fall Protection Equipment

Catch Platforms

A substantial catch platform will be installed below the working area of roofs more than 20 feet from ground to eaves without a parapet, or 16 feet from ground to eaves with a slope greater than 4 inches in 12 without a parapet. The platform will extend 2 feet in width beyond the projection of the eaves and will be provided with a safety rail, mid-rail, and toe-board. This provision will not apply to employees engaged in work on such roofs are protected by a body harness attached to a lifeline.

Personal Fall Arrest Systems (PFAS)

- Where catch platforms are not in place, employees performing duties on a roof more than 20 feet from ground to eaves without a parapet, or 16 feet from ground to eaves with a slope greater than 4 inches in 12 inches without a parapet, will be secured by an approved body harness attached to a lifeline.
- The lanyard will be of the shock-absorbing type, a minimum of 1/2- inch nylon, or equivalent, with a maximum length to provide for a fall of no greater than 6 feet. The rope will have a nominal breaking strength of 5,000 pounds.
- Lifelines will be secured above the point of operation to an anchorage or structural member capable of supporting a minimum dead weight of 5,000 pounds. One employee acting as anchor for another does not fulfill this requirement.
- Lifelines used in areas where they may be subjected to cuts or abrasions, will be a minimum of 7/8-inch wire core manila rope. For all other lifeline applications, a minimum of 3/4- inch manila or equivalent, with a minimum breaking strength of 5,000 pounds, will be used.
- Lifelines, body harnesses, and lanyards will be used only for employee safeguarding. Ropes used for hoisting lines and other purposes will not be used as lifelines. Any lifeline, safety harness, or lanyard subjected to in- service loading, as distinguished from static testing, will be immediately removed from employee safeguarding.

Safety Nets

Where the use of ladders, scaffolds, catch platforms, temporary floors, safety lines, or harnesses is impractical, safety nets will be provided when workplaces are more than 20 feet above the ground, water, or other surface.

Roofing Brackets

Roofing brackets will be constructed to fit the pitch of the roof.

In addition to the pointed metal projections, brackets will be secured by nailing in place. The nails will be driven full length into the roof. When rope supports are used, they will consist of first-grade manila of at least 3/4-inch diameter, or equivalent.

Hoisting Lines

When hoisting lines are used to raise tools or materials to a roof greater than 16 feet from ground to eaves without a parapet (or with a parapet less than 30 inches in height), the employee on the roof will be secured by an approved personal fall arrest system.

The fall protection lanyard will be of the shock-absorbing type, a minimum of 1/2- inch nylon, or equivalent, with a maximum length to provide for a fall of no greater than 6 feet. The anchor point will have a nominal breaking strength of at least 5,000 pounds

Inspection, Maintenance and Storage of Fall Protection Equipment

Before use each day, a designated Competent Person as well as the individual employee will inspect the harness, lanyard, rope grab and rope. The Competent Person will also inspect anchor points twice each day, typically in the morning and afternoon. In the event of a fall, the PFAS will be inspected, and the deployed lanyard will be taken out of service immediately. Any defective or damaged equipment will be immediately removed from service and the jobsite. PFAS will be removed from the working area each day and stored in the individual employee’s bucket/bag in their vehicle to provide protection from the elements.

Worksite Isolation

Prior to the start of roof work, the Field Supervisor or person in charge of the project will ensure that the area below the work site is isolated against entry by the use of barrier tape or other means.

If means of egress are to be blocked by ladders, scaffolds, or other equipment, or to isolate below a work site, prior approval must be obtained from the Field Supervisor.

Personal Protective Equipment

Employees involved in construction, repair, or maintenance operations will use appropriate personal protective equipment in addition to PFAS including, but not limited to, hard hats, eye protection, leather gloves and environmental elements (sun, wind, rain, etc.).

Weather

Employees will not be involved in any outdoor construction, repair, or maintenance operations during lightning storms, snowstorms, or other potentially hazardous weather conditions.

Training

Under no circumstances will employees work in areas where they might be exposed to fall hazards, do work requiring fall protection devices, or use fall protection devices until they have successfully completed Civil Works Contracting's fall protection training program.

The training program includes classroom instruction and operational training on recognition and

avoidance of unsafe conditions and the regulations applicable to each specific fall hazard the employee may encounter. The training program is given by a Competent Person qualified in each aspect of the program, and must cover the following areas:

- The nature of fall hazards in the work area.
- Selection and use of personal fall arrest systems, including application limits, proper anchoring and tie-off techniques, estimation of free fall distance (including determination of deceleration distance and total fall distance to prevent striking a lower level), methods of use, and inspection and storage of the system.
- The correct procedures for erecting, maintaining, disassembling, and inspecting the fall protection systems to be used.
- The use and operation of guardrail systems, personal fall arrest systems, safety net systems, warning line systems, safety monitoring systems, controlled access zones, and other protection to be used.
- The role of each employee in the safety monitoring system when this is used.
- The limitations on the use of mechanical equipment during the performance of roofing work on low-sloped roofs.
- The correct procedures for the handling and storage of equipment and materials and the erection of overhead protection.
- The role of employees in fall protection plans.
- The standards contained in CFR 1926, Subpart M.

Civil Works Contracting supervisors will identify all current and new employees who require training and schedule the classroom instruction for those employees. Training on the above components will occur both in the classroom and on the jobsite, as appropriate. Classroom training will cover written policies and procedures on fall protection and may include a training video on the subject. Jobsite instruction will include demonstration of and practice in wearing fall protection equipment and any instruction necessary for a specific job.

Civil Works Contracting supervisors have overall responsibility for the safety of employees and will verify compliance with CFR 1926.503(a), training requirements, for each employee required to be trained.

Supervisors have the responsibility of determining when an employee who has already been trained does not have the understanding and skill required by the training program described in CFR 1926.503(a).

A written certificate of training is required which must include:

- The name of the employee trained.
- The date(s) of training.
- The signature of the Competent Person who conducted the training or the signature of the employer. Retraining is required when an employee cannot demonstrate the ability to recognize the hazards of falling and the procedures to be followed to minimize fall hazards.

Enforcement

Constant awareness of and respect for fall hazards, and compliance with all safety rules are considered conditions of employment. The Field Supervisor, as well as individuals in management and Human Resources, reserve the right to issue disciplinary warnings to employees, up to and including termination, for failure to follow Civil Works Contracting's policies and procedures pertaining to fall protection.

Rescue Plan and Procedures

Each Civil Works Contracting employee using fall protection equipment works with a buddy or within sight and earshot of another worker. If a fall occurs, prompt rescue will take place in less than 15 minutes to lessen the likelihood of suspension trauma. The goal is to remove the victim quickly to a safe working level so they can be transported to emergency medical care.

If a fall occurs, the following steps will be followed:

1. The buddy will call/yell to alert other employee(s), who will notify the Field Supervisor, the Project Manager, and the HSE Director.
2. Employees will evaluate the scene to determine the safest, most effective method of rescue.
3. If possible, the employee will be rescued using an onsite personnel crane or aerial lift. The employee performing the rescue will be in full PFAS and securely anchored in the crane or aerial lift.
4. If rescue using onsite equipment is not possible, 911 will be called for local first responder assistance.
5. Employees will communicate with the victim to evaluate injuries and consciousness.
6. The priority is to bring the victim to a safe level before attempting any first aid.
7. After arriving at a safe level, the victim will be kept upright or in a seated posture to reduce the sudden backflow of de-oxygenated blood into the heart.
8. After rescue, the victim may experience delayed suspension trauma which may occur up to an hour after being rescued. For this reason, all fall victims will be transported to receive medical evaluation following rescue.

Incident Investigation

All accidents that result in injury to workers, regardless of their nature, are investigated and reported. It is an integral part of any safety program that documentation take place as soon as possible so that the cause and means of prevention can be identified to prevent a reoccurrence.

In the event that an employee falls or there is some other related, serious incident (e.g., a near miss) that occurs, this plan will be reviewed to determine if additional practices, procedures, or training needs to be implemented to prevent similar types of falls or incidents from occurring.

The Field Supervisor in charge of the project, or HSE Director will investigate all personal injury accidents or illnesses, incidents of property damage, and vehicle accidents. Investigations will be documented and reviewed by the HSE Director. Personal injuries and illnesses will be recorded on the OSHA 300 Log as required.

Changes to Plan

This plan is reviewed by a qualified person as the job progresses to determine if additional practices, procedures or training needs to be implemented by the Competent Person to improve or provide additional fall protection. Employees are notified and trained, if necessary, in the new procedures. A copy of this plan and all approved changes will be maintained at the jobsite.

10.10 Fire Prevention and Protection

General Guidelines

The greatest protection against property loss and injuries from fire is prevention. Civil Works Contracting employees are expected to follow these guidelines to promote fire prevention and protection:

- Minimize combustible storage.
- Store waste materials in suitable containers.
- Use flammable materials in well-ventilated areas. Use and store flammables away from ignition sources, such as cigarettes.
- Keep equipment in good working order. Have electrical wiring and appliances inspected regularly.
- Ensure that heating units are properly safeguarded.
- Do not hunt for gas leaks using an open flame. Use approved gas indicators.
- Report and repair all gas leaks immediately.
- Conduct hot work in well-ventilated areas.
- Test enclosed or confined spaces for flammable atmospheres.
- Use open flames carefully. Do not use open flames where flammable atmospheres may be present.
- No candles or open flames are permitted in office areas.

Fire Extinguishers

- Locations of fire extinguishers should be reviewed daily to ensure effective coverage of the roof area.
- Employees must be trained to operate fire extinguishers that are used on the jobsite.
- A minimum of two ABC-rated fire extinguishers must be available within 10 feet of torch operations.
- Extinguishers will be inspected monthly to:
  - Confirm the extinguisher is visible, unobstructed, and in its designated location.
  - Verify the locking pin is intact and the tamper seal is unbroken. Examine the extinguisher for obvious physical damage, corrosion, leakage, or clogged nozzle.
  - Confirm the pressure gauge or indicator is in the operable range or position and lift the extinguisher to ensure it is still full.
  - Make sure the operating instructions on the nameplate are legible and facing outward.
  - Check the last professional service date on the tag. (A licensed fire extinguisher maintenance contractor must have inspected the extinguisher within the past 12 months.)
- Initial and date the back of the tag.
- Each extinguisher must have a durable tag attached to record the inspection date and the initials/signature of the person conducting the inspection.
- Defective extinguishers must be immediately removed from service.
- Fire extinguishers must be serviced per the manufacturer's recommendations.

10.11 Powered Industrial Trucks (Forklifts)

Requirements

Powered industrial trucks (forklifts) used by Civil Works Contracting and its subcontractors will meet the design and construction requirements for powered industrial trucks established in the American National Standard for Powered Industrial Trucks, Part II, ANSI B56.1-1969.

Operator Certification

- Civil Works Contracting will ensure that each potential operator of a powered industrial truck (forklift) is capable of performing the duties that are required of the job.

- In determining operator qualifications, Civil Works Contracting will ensure that each potential operator has received the required training and demonstrated competency while being evaluated by a qualified person. Training received must be specific to the truck(s) the employee will be operating.
- Operator certification must include the name of the trainee, the date of training, and the signature of the person performing the training and evaluation. Civil Works Contracting will retain the current training materials and lesson plan and the name and contact information of the person who conducted the training.
- An evaluation of each powered industrial truck (forklift) operator's performance will be conducted at least once every three years.
- These requirements apply to all powered industrial truck (forklift) operators on the jobsite, including subcontractors. Subcontractors must provide documentation of training and certification.

Training

Civil Works Contracting will ensure that only trained drivers operate powered industrial trucks (forklifts). Training will consist of a combination of classroom instruction (lecture, discussion, video tapes, and/or conference) and practical training (demonstrations and practical exercises by the trainee).

All training and evaluation will be conducted by a designated person who has the requisite knowledge, training and experience to train powered industrial truck (forklift) operators and judge their competency.

Training Program Content

Powered industrial truck (forklift) operator trainees will be trained in the following topics unless the employer can demonstrate that some of the topics are not needed for safe operation.

Truck-Related Topics:

- All operating instructions, warnings and precautions for the types of trucks the employee will be authorized to operate
- Similarities to and differences from the automobile
- Controls and instrumentation - location, what they do and how they work
- Power plant operation and maintenance
- Steering and maneuvering
- Visibility (including restrictions due to loading)
- Fork and attachment adaptation, operation, and limitations of their utilization
- Vehicle capacity
- Vehicle inspection and maintenance
- Refueling or charging, recharging batteries
- Operating limitations
- Reading load charts and determining weight of loads
- Any other operating instruction, warning, or precaution listed in the operator’s manual for the type vehicle that the employee is being trained to operate

Workplace-Related Topics:

- Surface conditions where the vehicle will be operated
- Composition of probable load and load stability
- Load manipulation, stacking and unstacking

- Pedestrian traffic
- Narrow aisles and other restricted places of operation
- Operating in hazardous classified locations
- Operating the truck on ramps and other sloped surfaces that could affect the stability of the vehicle
- Other unique or potentially hazardous environmental conditions that exist or may exist in the workplace
- Operating the vehicle in closed environments and other areas where insufficient ventilation could cause a buildup of carbon monoxide or diesel exhaust.

Evaluation and Refresher or Remedial Training

Sufficient evaluation and remedial training will be conducted so that powered industrial truck (forklift) operators retain and use the knowledge, skills and abilities needed to operate the forklift safely.

An evaluation of the performance of each operator will be conducted at least every three years by a designated person.

Refresher training in relevant topics will be provided to the operator when:

- The operator has been observed to operate the vehicle in an unsafe manner
- The operator has been involved in an accident or near-miss incident
- The operator has received an evaluation that reveals that the operator is not operating the truck safely
- The operator is assigned to drive a different type of truck
- A condition in the workplace changes in a manner that could affect safe operation of the truck.

Equipment Inspection Pre-Operational Checks

- Industrial trucks will be examined before being placed in service and will not be placed in service if the examination shows any condition adversely affecting the safety of the vehicle. This examination will be made at least daily using the Forklift Inspection Checklist.
- Where industrial trucks are used on a round-the-clock basis, they will be examined before and after each shift.
- Defects when found will be immediately reported and corrected.
- If at any time a powered industrial truck is found to be in need of repair, defective, or in any way unsafe, the truck will be taken out of service until it has been restored to safe operating condition.

Maintenance

Industrial trucks will be kept in a clean condition, free of lint, excess oil, and grease. Precautions regarding toxicity, ventilation, and fire hazard will be consistent with the agent or solvent used.

10.12 Hearing Conservation

Purpose

The purpose of this policy is to provide a safe and healthful work environment for Civil Works Contracting employees who may be exposed to substantial workplace noise, and to comply with 29 CFR 1926.52. This standard requires that a hearing conservation plan be implemented on construction projects when the noise level reaches 90 decibels (dBA).

Approved hearing protection should be worn by all Civil Works Contracting employees while working in the area of high-noise level producing machines, tools, or equipment.

Policy

Whenever possible, Civil Works Contracting will prevent the exposure of employees to noise levels exceeding 90 decibels, based on an eight-hour time-weighted average (TWA). When noise levels on a Civil Works Contracting jobsite exceed 90 decibels (TWA), the following engineering controls will be put into place.

Guidelines

Employees exposed to less than 90 dBA (TWA) over an 8-hour time-weighted average are not required to be protected from noise levels under the Federal OSHA Hearing Conservation Standard. However, employees may still be required to wear hearing protection if required by the client/owner.

All employees must wear approved hearing protection at all times in areas with noise levels that exceed 90 dBA (TWA). It will be the responsibility of the Field Supervisor to notify all Field Supervisors of any areas where hearing protection is required, and it will be the responsibility of the Field Supervisors to ensure that all employees working under them are aware of the need for hearing protection and comply with hearing protection requirements.

Examples of equipment that may produce noise levels sufficient to trigger hearing protection requirements include, but are not limited to:

- welding machines
- jack hammers
- compactors
- compressors
- backhoes
- Hilti tools
- other similar equipment

See the following table for examples of allowable noise levels and durations:

Examples of Allowable Noise Levels and Durations			
Duration	Sound Level dBA	Sample Activity	Noise Level
8 Hours	90	Chipping Hammer	110-113
6 Hours	92	Jack Hammer	102-111
4 Hours	95	Concrete Joint Cutter	99-102
3 Hours	97	Bulldozer	93-96
2 Hours	100	Crane	90-96
1.5 Hours	102	Grade All	87-94
1 Hour	105	Front End Loader	86-94
½ Hour	110	Backhoe	94-93
¼ Hour or Less	115	-	-

When noise levels to which employees are exposed exceed these levels, Civil Works Contracting management will first attempt to reduce noise levels by implementing engineering controls or changing

work practices and/or administrative controls. Examples of engineering controls used to reduce noise levels include the following:

- Replacing noisy materials
- Using large, low speed fans
- Considering the noise level of new equipment or processes before purchasing or implementing
- Placing heavy machines on rubber mountings
- Using sound-absorbing acoustical tiles or baffles
- Placing noisy machinery or operations in a separate area or room
- Enclosing noisy conveyors

If no controls are practical or such controls fail to reduce sound levels below the levels in the above table, personal protective equipment will be required at all times during exposure to sound levels in excess of the levels listed in the table.

Approved hearing protection equipment consists of noise attenuating earplugs and muffs. Earplugs must be fitted individually for affected employees according to the manufacturer's instructions. The rated Noise Reduction Rating factor of the hearing protection used must reduce the noise levels to an acceptable level. Employees must not be exposed to sudden or impact noises exceeding a 140 dBA (TWA) peak sound pressure level.

Identification of High Noise Areas

Prior to commencement of onsite work, project management and the Field Supervisor will ask the client to identify known or likely high-noise areas, and to provide Civil Works Contracting with the results of any surveys, monitoring, tests and other information indicating noise levels in such areas. Any information provided by clients will be used to help identify potential noise problems.

Noise Surveys

Project management and the Field Supervisor will be responsible for determining if a noise survey is needed due to potential noise levels. Civil Works Contracting provides access to certified industrial hygienists to assist with these assessments, if needed.

10.13 HazWoper and Hazwoper RCRA

Purpose

This requirement covers emergency and post-emergency response operations standards, to include training for personnel responding to releases or substantial threats of releases chemical or petroleum products without regard to the location of the hazard. Even though there is a specific section devoted to hazardous materials and emergency response (29 CFR 1910.120), this section does not encompass all work procedures around emergency response and 29 CFR 1910 and 29 CFR 1926 continue to apply in every respect during emergency response operations. If there is an apparent conflict or overlap, the provision that is more protective of employee health and safety shall apply. Emergency response efforts on land or water to releases of chemicals or petroleum products originating from Civil Works facilities or in the course of transportation will comply with the requirements of 29 CFR 1910.120(q). The primary concern in emergency response is the safety and security of responding personnel.

Scope

This section applies to all employees and independent contractors employed by and/or contracted to Civil Works when responding to chemical releases.

Definitions

Emergency response - A response effort by employees from outside the immediate release area or by other designated responders (e.g., mutual-aid groups, local fire departments, etc.) to an occurrence which results, or is likely to result, in an uncontrolled release of crude oil or petroleum products.

Post emergency response - That portion of an emergency response performed after the immediate threat of a release has been stabilized or eliminated and clean-up of the site has begun.

Health hazard - Chemicals which are carcinogens, toxic agents, reproductive toxins, irritants, corrosives, sensitizers, heptaotoxins, nephrotoxins, neurotoxins, agents which act on the hematopoietic system, and agents which damage the lungs, skin, eyes, or mucous membranes. It also includes stress due to temperature extremes

REQUIREMENTS

Written Safety and Health Program and Emergency Response Plan

Civil Works and any contractors or subcontractors shall develop and implement a written pre-incident safety and health program to handle anticipated emergencies prior to the commencement of emergency response operations for their employees who are expected to be involved in any product spill emergency and post emergency response operations. The program shall be designed to identify, evaluate and control safety and health hazards and to provide for safe response efforts to product spill emergency and post emergency response operations. These programs shall be described in controlled manuals identified as contingency plans or hazardous materials handling procedures. The plan shall be in writing and available for inspection by employees, their representatives and OSHA representatives.

The following elements must be included in either a specific site safety plan or a combination of plans addressing the response activity:

- Pre-emergency planning and coordination with outside parties
- Personnel roles, lines of authority, training and communication
- Emergency recognition and prevention
- Safe distances and places of refuge
- Site security and control
- Evacuation routes and procedures
- A decontamination procedure shall be developed by the Civil Works safety office, communicated to employees through training and implemented through drills before any employees or equipment may enter areas on site where potential for exposure to hazardous substances exists.
- Emergency alerting and response procedures
- Critique method to evaluate the response and assure follow-up
- Personal protective equipment and spill control, containment, and recovery equipment
- Site and worker monitoring to ensure protective actions are commensurate with the conditions at the site.

Engineering controls, work practices and PPE shall be used to reduce and maintain exposure limits. Feasible engineering controls include the use of pressurized cabs or control booths on equipment and/or the use of remotely operated material handling equipment.

Procedure

Use of the following safety and control procedures will be used by those in charge at the scene to ensure the safety and health of personnel at spill locations.

Person Discovering the Spill

Survey and Secure the Area. Evaluate the seriousness of the situation in regard to protecting personnel and the public. Do not approach the spill if you can smell hydrocarbons or potential chemical sources.

Notify your supervisor as soon as possible. Remember, any device you use to call in spill notice may not be intrinsically safe. Place your call from a safe distance.

If the situation requires, stay at the scene and control access at a safe distance from the spill until the initial response team arrives. The spill area will become subject to regulatory controls with restricted access

Initial Spill Control Actions

Initial spill control actions designed to halt the spread of a spill, direct its movements, or minimize the area affected by the spill shall not be initiated in the immediate spill area until all of the following occur:

- A complete site safety analysis
- Air monitoring shall be used to identify and qualify airborne levels of hazardous substances. The monitoring will address initial entry, periodic monitoring, possible IDLH conditions and wherever exposure may be a possibility.
- Gas detector readings are 10% or less of the lower explosive limit (LEL). If the readings are above 10% of the LEL, spill control actions shall be terminated in the immediate area and moved to an area where LEL conditions are less than 10%.

Initial Approach and Gas Testing

- Gas testing personnel shall be trained to competently operate their equipment and other site-specific requirements.
- Combustible gas detectors (LEL meters) must have current calibrations and be function tested prior to an approach to a spill site.
- At a minimum, the oxygen, LEL and permissible exposure level (PEL) must be evaluated throughout the regulated area at as many points around the spill perimeter as possible. These levels shall be monitored periodically throughout the work shift to detect changes in airborne hazards that may result from work activities, changing weather conditions, etc.
- Approach to the incident site.
- Perform a function test and check the zero reading on the gas detector.
- Don the respirator.
- Observe the readings on the gas detectors as you approach the spill site.
- Continue until one of the following conditions occurs.
    - You can see all that you need to observe, or
    - The gas detector reads 10% or more of the LEL, or
    - Liquid oil or gas condensates are encountered.
- CAUTION Care must be taken to keep the gas detectors warm and prevent rough handling.
- NOTE If any of these conditions are exceeded, do not proceed any closer to the spill perimeter.
- NOTE Decontamination units, first aid kits, and eye flushing supplies shall be functional

and on-site prior to attempting contact with liquid oil or gas condensates.

- After the initial observations are performed, the site conditions shall be reported to the Incident Commander.
- Mark or flag an exclusion area (hot zone) around the spill site to further control access.

Safety Procedures for Exclusion Areas

- Personnel shall be given a safety briefing on the specific hazards and hazard control procedures prior to entering the spill site.
- Decontamination units, first aid kits, and eye flushing supplies shall be functional and on-site prior to attempting contact with spill materials.
- To minimize personnel exposure and reduce potential ignition sources, where possible, all initial approaches to the suspected spill site will be from the upwind direction.
- Personnel shall not approach the site or attempt gas testing without wearing appropriate respiratory protection.

Personal Protective Equipment (PPE) and Chemical Protective Clothing

- Respiratory Protection - During spill response operations when gas detectors read 10% or more of the LEL, trained gas testing personnel shall measure PEL levels to determine appropriate respiratory protection levels.
- Skin Protection - The following PPE is recommended to minimize dermal exposure to chemicals:
- Hands: neoprene, nitrile or butyl rubber gloves
- Feet: neoprene, nitrile or butyl rubber boots
- Body: coated Tyvek or PVC rain suits (as necessary)
- Eye Protection - At a minimum, safety glasses must be worn. If a splash hazard to the eyes is present, chemical goggles or a face shield with chemical goggles shall be used. Eye protection is not required if a full-face respirator is worn.
- NOTE: Either one-piece or two-piece chemical (magnum 445) suits can be used. Gloves and boots can be taped to the arms and legs of the suits as needed. The flaps of a two-piece suit can be taped as well. Heavy duty duct tape is recommended

Other Considerations

- The purpose of personal protective clothing and equipment is to shield or isolate individuals from the chemical, physical, and biological hazards associated with handling crude oil. No single combination of protective equipment and clothing is capable of protecting against all hazards.
- Consider the following:
    - The use of PPE can itself create significant worker hazards, such as heat stress, physical and psychological stress, and impaired vision, mobility, and communication.
    - Equipment and clothing that provide an adequate level of protection shall be used.
    - Overprotection, as well as under protection, should be avoided where possible.

Post-Emergency Response Cleanup or Decontamination Procedures

All employees leaving a contaminated area shall be appropriately decontaminated and all contaminated clothing and equipment leaving a contaminated area shall be appropriately disposed of or decontaminated. Engineering controls, work practices and PPE shall be used to reduce and maintain exposure limits.

Civil Works does not provide removal of contaminated substances such as soil or other elements of the natural environment.

Decontamination procedures shall be monitored by the Civil Works safety department to determine their effectiveness. When such procedures are found to be ineffective, appropriate steps shall be taken to correct any deficiencies

Where the decontamination procedure indicates a need for regular showers and change rooms outside of a contaminated area, they shall be provided and meet the requirements of 29 CFR 1910.141. Decontamination shall be performed in geographical areas that will minimize the exposure of uncontaminated employees or equipment to contaminated employees or equipment. Take into consideration ground water, wind direction, construction material, barriers and fencing, signage and training.

PPE and equipment shall be decontaminated, cleaned, laundered, maintained or replaced as needed to maintain their effectiveness. Employees whose non-impermeable clothing becomes wetted with hazardous substances shall immediately remove the clothing.

Unauthorized employees shall not remove protective clothing or equipment from change rooms.

General Safety/Physical Hazards

During training drills, spill responses, and remediation operations, the physical working environment of personnel shall be continually evaluated. Exposure to either hot or cold weather conditions along with long working hours, could adversely affect both the psychological and physiological condition of those involved. Continued exposure may result in physical discomfort, loss of efficiency, and a higher susceptibility to accidents and injuries.

Personnel must be constantly alert to signs of distress and eliminate or protect against accident causes. There is a need to constantly review methods and procedures for routine work and emergency response situations so that all personnel may function as safely and effectively as possible.

Supervision shall keep the following procedures and safety precautions in mind when working with petroleum and petroleum products and as decisions are made in how the work is to be conducted:

- A job shall be planned, and all personnel briefed as to the procedures to be followed and the responsibilities of each person.
- Supervision shall always remain on the job or designate a qualified person to take their place if called away.
- When responding to hydrocarbon spills or gas leaks, the hazardous area shall be defined. No personnel or equipment shall be permitted in the area of a spill until the hazards associated with the contaminated area have been clearly defined by a qualified person.
- Before moving to the job site, supervision should check tools and safety equipment (including personal protective equipment), to ensure everything is safe, usable, and all required tools and safety equipment are available
- Vehicles, heavy equipment, hand tools, and power equipment shall not be moved into a spill area until adequate precautions have been taken. When power equipment is moved into a spill area to expedite repairs, it should be removed from the area as soon as work with it is completed. Personnel who are not required should be kept out of the work area.
- Use of matches, lighters, and smoking materials shall be in a place designated as safe by supervision.
- Upon completion of equipment repairs, necessary operating checks should be made

before placing the unit in service.

- The senior official at an emergency response site is the most senior official on the site who has the responsibility for controlling operations at the site.
- Medical Surveillance – Any emergency response person who exhibits signs or symptoms which may have resulted from exposure to hazardous substances during the course of an emergency shall be provided with medical consultation at no cost to them. This shall include all employees who are or may be exposed to hazardous substances or health hazards at or above the established permissible exposure limit, above the published exposure levels for these substances, without regard to the use of respirators, for 30 days or more a year.

Training

The Civil Works new hire orientation program trains all new Civil Works employees and independent contractors so they will know what to do in case they witness or discover a chemical release. They are instructed to leave the area and take no further action beyond notifying the Civil Works facility operations personnel of the release.

Training for employees expected to participate in an emergency or post-emergency response shall be completed before they take part in response operations. Civil Works and contractor personnel shall receive initial and refresher training. The level of training received will be commensurate with their assigned duties and functions and take place in the area they are working in.

Initial Emergency Response Training

Who Needs Emergency Response Training?

Support Personnel: This designation applies to Civil Works or contractor personnel who are supporting in the operation of equipment or material (such as general laborers, equipment operators, mechanized earth moving operators or crane and hoisting equipment operators), and who are needed temporarily to perform immediate emergency support work that cannot reasonably be done in a timely manner by Civil Works employee responders. Support personnel who will be or may be exposed to the hazards at an emergency response scene shall be trained on the use of personal protective equipment and also will cover work practices which minimize hazardous risks and safe use of engineering controls & equipment.

First Responder Awareness Level: Civil Works personnel who are likely to witness or discover a hazardous substance release and have been trained to initiate an emergency response sequence by notifying Civil Works facility operations personnel of the release. Personnel at this level must receive initial training or have had enough experience to objectively demonstrate competency. Annual refresher training or demonstration of competency is also required. First Responder Awareness Level employees shall have sufficient training or experience to objectively demonstrate competency in the following areas:

- An understanding of what hazardous substances are, and the risks associated with them in an incident.
- An understanding of the potential outcomes associated with an emergency created when hazardous substances are present.
- The ability to recognize the presence of hazardous substances in an emergency.
- The ability to identify the hazardous substances if possible.
- An understanding of the role of the first responder awareness individual in the client's emergency response plan including site security and control and the U.S. Department of Transportation's Emergency Response Guidebook.
- The ability to realize the need for additional resources, and to make appropriate notifications.

First Responder Operations Level: Civil Works personnel who are identified in contingency plans as responders to releases or potential releases of hazardous materials -- as part of the initial response to the site for the purpose of protecting nearby persons, property, or the environment from the effects of the release -- shall be trained to this level. Their function is to contain the release from a safe distance and help it from spreading. All personnel at this level must receive 8 hours of initial training or have had sufficient experience to objectively demonstrate competency. Annual refresher training or demonstration of competency is also required.

Hazardous Materials Technicians: Civil Works personnel, who are identified in contingency plans as responders to releases or potential releases of hazardous materials for the purpose of stopping the release, shall be trained to this level. Technicians have the knowledge of how to implement emergency response plans, know the classification, identification and verification of known or unknown substances, functions with an assigned role in the incident command system, how to select and use proper PPE, perform advanced containment and understands decontamination and toxicology. All personnel at this level must receive at least 24 hours of training equal to first responder operations level. Annual refresher training or demonstration of competency is required. Certification is required.

Hazardous Materials Specialists: All Civil Works and personnel working as field Safety Specialist shall be trained to this level. Material Specialists receive at least 24 hours of training the technical level and have the ability to develop a site and safety control plan. Annual refresher training or demonstration of competency is also required. Certification is required.

On-Scene Incident Commander: The Incident Commander must have at least 24 hours of training equal to the first responder operations level and know how to implement the program and system, PPE requirements, hazard and risk assessment, state and federal regulations and all elements of decontamination. Certification is required.

Post-Emergency Response Training

For chemical spills, a minimum of four hours of training for post-emergency response workers who have job duties and responsibilities with a low magnitude of risk shall occur.

Refresher Training

- Employees trained for Initial Emergency Response Training must receive annual refresher training of sufficient content and duration to maintain their competencies or shall demonstrate competencies in those areas at least annually. Civil Works must keep records of all employee training or competency demonstrations.
- Participation in drills, completion of approved response training modules, and on-the-job training based on the duties and functions each employee is expected to perform during an emergency response may be substituted for, or used in conjunction with, formal classroom training to demonstrate competency. If demonstrated competency is used in lieu of or in conjunction with classroom training then Civil Works must keep a record of the methodology used to demonstrate competency.

Trainers and Training Material

The Safety Manager shall designate who has the responsibility to approve trainers and training materials used in Civil Works provided training for employees who are identified in contingency plans as responders to hazardous material spills, emergency and post-emergency response operations. All instructors shall have the training and or academic credentials and instructional experience to demonstrate competency.

10.14 Housekeeping

Purpose

Housekeeping is vital to safety on all Civil Works Contracting jobsites and in all company workplaces. The process of regularly removing trash and debris from all work areas is a continuous, company-wide process.

General Guidelines

Good housekeeping skills are essential for personal safety. All Civil Works Contracting employees are responsible for reducing potential hazards and keeping their work areas safe and clutter-free.

Good housekeeping general guidelines include the following:

- Keeping aisles and stairways free from clutter
- Cleaning spills
- Minimizing combustibles in workplace and storage areas
- Keeping all exits free from obstructions, and
- Maintaining clear and unobstructed access to emergency equipment such as fire extinguishers, pull stations, eye wash units, showers, etc.

Housekeeping on Project Jobsites

Civil Works Contracting's policy on housekeeping and storage on jobsites is that all equipment, tools and materials will be stored, stacked, located, placed, temporarily spotted, or set up in such a manner as to make it highly improbable that an accident/incident or injury could occur in the work area. All areas should give the obvious impression of a clean and orderly workplace.

Work areas must be maintained in an orderly and clean manner at all times.

Mud and dirt tracked onto public and private streets will be removed continuously during the workday.

Following are the minimum housekeeping and material storage requirements for Civil Works Contracting projects:

- All material, spoils, debris, etc. should be cleaned up as it accumulates and at the end of each work shift.
- Trash containers will be placed at a variety of locations for the removal of trash and debris but will be kept a minimum of 20 feet from buildings.
- Accumulation of trash and debris will not be tolerated.
- Access walkways, roadways, and fire lanes will not be blocked with material, tools, ladders, scaffolds, welding leads, air hoses or electrical cords.
- Electrical extension cords, light stringers, air hoses, and welding leads will be elevated above walkways a minimum of seven feet and /or properly protected and marked to prevent slips, trips, and cord damage.
- Welding rod, nuts, bolts, and washers will be kept in proper containers.
- Rigging and personal protective equipment will be removed from the work area when not needed and properly stored.
- Stacks of lumber, structural steel, and similar materials will be maintained so the stack is stable, to prevent falling or collapsing. No lumber, structural steel, or similar materials will be stacked/stored above 14 feet.
- All building materials must be secured during high wind conditions.

- Trash containers will be placed at appropriate locations.
- Trash, and debris will be removed from the work area as needed throughout the shift.
- Oxygen tanks will be kept at least 20 feet from combustibles, gas tanks, etc. Cylinders will be stored, held securely, with valves closed and caps on.
- Oily rags and similar items will be kept separate and will be disposed of separately in metal containers with metal lids and with some water in the bottom.
- At all locations where drinking water is dispensed, an adequate trash container will be located for disposal of used drinking cups.
- Glass drink bottles are prohibited except in office areas/trailers.
- Designated areas will be used for eating/drinking/smoking.

10.15 Hydrogen Sulfide

Purpose

The purpose of this program is to establish minimum requirements for site specific H2S safety, which will enhance safety in the occupational setting where hydrogen sulfide is present or is recognized as being potentially present.

Scope

This program sets forth accepted practices for Hydrogen Sulfide (H2S). This program applies to all employees of Civil Works, temporary employees, and any contractors working for Civil Works. When work is performed on a non-owned or operated site, the operator's program shall take precedence, however, this document covers Civil Works employees and contractors and shall be used on owned premises, or when an operator's program doesn't exist or is less stringent.

Definitions

Contingency Plan - a site-specific written document that provides an organized plan for alerting and protecting the public within an area of exposure following the accidental release of all potentially hazardous atmospheric concentrations of hydrogen sulfide.

Exposure Level - permissible exposure level of hydrogen sulfide is 10 PPM for an 8-hour, time weighted average.

Gas Detector Instrument - An instrument/detector to measure levels of H2S. Instruments may be electronically or manually operated.

Hydrogen Sulfide (H2S) - is an extremely deadly, toxic gas that in its pure state is colorless and is heavier than air. Additionally:

- It is the second most toxic gas known to man, ranking behind hydrogen cyanide and ahead of carbon monoxide.
- It has the odor of rotten eggs at low concentrations.
- In higher concentrations rapidly paralyze the olfactory nerves (sense of smell).
- Is soluble in water and is flammable and poses a definite threat of explosion.

Parts Per Million (PPM) - parts of vapor or gas per million parts of contaminated air by volume.

Personal H2S Monitor - An electronic instrument worn on the person that is set to alarm at 10 PPM of H2S.

Possible Locations of Where May Be Exposed to H2S During Their Job Functions – While clients are required to notify Civil Works of known H2S locations the majority of time H2S can be located in drilling operations, recycled drilling mud, blowouts, water from sour crude wells, blowouts, tank gauging (tanks at producing, pipeline and refining operations), during routine field maintenance involving hydrocarbons, tank batteries and wells.

Venting - the process of discharging a material to the atmosphere through a series piping and/or venting devices, to facilitate the proper and safe dispersion of toxic materials and to minimize personnel exposure.

Key Responsibilities

Managers and Supervisors

- Shall ensure all employees who are to be assigned to work at locations where hydrogen sulfide is known to be present, or suspected to be present in any concentration, have been trained in hydrogen sulfide safety.
- To ensure employees have been medically approved to wear respirators and trained on the safe use of respirators, including a respirator fit test in accordance with Civil Works' Respiratory Protection Program.
- To ensure employees have been trained and familiar with personal H2S monitors and gas detection instruments.
- To have been provided with the client's safety procedures.
- To ensure the necessary respiratory equipment to perform the work safely is available.
- That each employee has been provided with a copy of this program.

Employees

- Employees are responsible to comply with this program.

Characteristics of Hydrogen Sulfide

The characteristics of hydrogen sulfide include being toxic, colorless, with the odor or rotten eggs at low concentrations, is soluble in water and is flammable:

- Toxicity – See table below. Hydrogen sulfide is a very dangerous and deadly gas - it is colorless and heavier than air. It can accumulate in low places and in small concentrations. Exposure to certain concentrations of H2S can cause serious injury or death.
- Color - H2S is colorless – you can't see it.
- Odor – it has a strong, pungent, somewhat distasteful odor similar to rotten eggs.in higher concentrations, it can deaden the sense of smell (olfactory nerve). Do Not Rely On Smell To Detect H2s – Rely Strictly On Instruments Designed To Measure Concentrations Of H2S.
- Solubility – H2S mixes with water.
- Flammability – H2S is an explosive gas.
- Toxic By Products – H2S presence can create sulfur dioxide which can ignite without warning

Toxic Effects of Hydrogen Sulfide

CONCENTRATION	PHYSICAL EFFECT
.01 PPM	Can smell odor.

10 PPM	Obvious and unpleasant odor. Beginning eye irritation. ANSI permissible exposure level for 8 hours (enforced by OSHA).
100 PPM	Immediately Dangerous to life or Health (IDLH) Kills smell in 3-15 minutes; may sting eyes and throat. May cause coughing and drowsiness. Possible delayed death within 48 hours.
200 PPM	Kills smell shortly, stings eyes and throat. Respiratory irritation. Death after 1-2 hours exposure.
500 PPM	Dizziness; breathing ceases in a few minutes. Need prompt rescue breathing (CPR). Self-rescue impossible because of loss of muscle control.
700 PPM	Unconscious quickly; death will result if not rescued promptly. 1000 PPM Unconscious at once, followed by death within minutes.

Health Effect of Exposure to Hydrogen Sulfide: Some basic health effects of H2s can include eye irritations, effects nerve centers of the brain which control breathing.

GENERAL REQUIREMENTS

Civil Works should have a written confined space program per 29 CFR 1910.146 and employees must be aware of site-specific contingency/emergency plans and owners contingency plan provisions.

Each person entering a H2S designated location, regardless of the concentration, shall wear a personal H2S monitor that is set to alarm at 10 PPM and shall carry a 5-minute escape pack with them at all times.

When work requires opening any equipment on location that has the potential of releasing concentrations of H2S at 100 PPM or higher, two or more H2S trained persons shall be present and follow these procedures prior to and during the opening of the equipment:

- Each person entering the H2S location shall don a personal H2S monitor prior to entry.
- A tailgate meeting will be held with everyone on location to discuss the work plan, the responsibilities of each person and the site-specific contingency plan.
- Each person shall have either a self-contained breathing apparatus (SCBA) or a supplied airline respirator equipped with a 5-minute escape pack and shall be worn when opening the equipment to the surrounding atmosphere.
- At least one person (per two workers), equipped with a SCBA will act as a stand-by person and may not participate in the work being performed until the atmosphere has been tested and found to have no H2S present in quantities over 10 PPM. The stand-by person shall be stationed up wind, within 100 feet and in clear view of the workers.
- If an operator or other third party provides the stand-by person, it will be the responsibility of the Civil Works manager/supervisor in charge to verify that the person has been H2S, CPR, and First Aid trained, and that they have been provided the proper respiratory equipment.
    - Only Civil Works employees may wear Civil Works respirator equipment.
    - If Civil Works employees will use client or other third-party equipment, the equipment must be inspected to ensure it is safe to use and meets Civil Works' requirements.
- After the equipment has been locked and tagged out (per Civil Works Lockout/Tagout Program), opened and the H2S concentration has been cleared to less than 10 PPM, the stand-by person

will no longer be required. Work may then be performed without respiratory equipment, except for the required 5-minute escape pack.

Safe Work Procedures

- Maintain compliance with permit requirements of Civil Works and any requirements by the client.
- Verify that proper safety equipment is available, functioning properly and is utilized.
- Check and remain aware of wind conditions and direction.
- Perform a thorough check of the downwind area prior to the start of any potentially hazardous work activity.
- Check for other personnel and ignition sources.
- Ventilate work areas by venting and purging lines and vessels prior to beginning any work activities.
- Keep all non-essential personnel away from work areas.
- Immediately vacate the area when any H2S monitor sounds and do not re-enter without proper respiratory protection.

REQUIRED EQUIPMENT

The following equipment shall be provided and used as required by this program:

- Methods of detecting H2S by the use of fixed or portable monitors and will alarm at the appropriate permissible exposure limits of 20 PPM for 1910 or 10 PPM for 1926? Personal or area monitors that alarm when PEL exceeds the preset level of 20 PPM for OSHA 1910 or 10 PPM for OSHA 1926 requirements.
- Portable H2S gas testing instrument, either electronic or manual pump operated, capable of testing the suspected concentrations of H2S in the system.
- Each testing instrument must be capable of testing the suspected concentrations of H2S by using the manufacturer's recommended calibrated tube or other means of measuring the concentration of gas.
- Testing instruments shall be calibrated periodically according to the manufacturer's recommendation, and at least annually.
- Calibration kits with regulator for calibrating the personal monitor.
- Calibration gas cylinder for testing the personal monitor.
- Approved self-contained breathing apparatus or airline respirator with escape SCBA should be used with H2S with a 5-minute escape pack and shall be worn when opening the equipment to the surrounding atmosphere.
- At least one person (per two workers), equipped with a SCBA will act as a stand-by person and may not participate in the work being performed until the atmosphere has been tested and found to have no H2S present in quantities over 10 PPM. The stand-by person shall be stationed up wind, within 100 feet and in clear view of the workers.
- If an operator or other third party provides the stand-by person, it will be the responsibility of the Civil Works manager/supervisor in charge to verify that the person has been H2S, CPR, and First Aid trained, and that they have been provided the proper respiratory equipment.
    - Only Civil Works employees may wear Civil Works respirator equipment.
    - If Civil Works employees will use client or other third-party equipment, the equipment must be inspected to ensure it is safe to use and meets Civil Works' requirements.
- Respirator wearers requiring corrective eyewear will be fitted with spectacle kits according to the respirator manufacturer, at no expense to the employee.
- Respirators and their components, including all fittings of hoses, shall not be interchanged, which if done, would violate the approval rating of said respirator or related equipment.

Medical

Each employee shall have completed a medical evaluation by a physician or licensed health care professional to determine the employee's ability to wear a respirator as required by the Civil Works Respiratory Protection Program.

Each employee will successfully complete the medical questionnaire and examination before being allowed to be fit tested with a respirator.

Training

Employees required to work on H2S locations will be trained. Training shall consist of:

- Physical and chemical properties of H2S Sources of H2S
- Human physiology
- Signs and symptoms of H2S exposure, acute and chronic toxicity
- Symptomatology of H2S exposure
- Medical evaluation
- Work procedures
- Personal protective equipment required working around H2S
- Use of contingency plans and emergency response
- Burning, flaring, and venting of H2S
- State and federal regulatory requirement
- H2S release dispersion models
- Rescue techniques, first aid, and post exposure evaluation
- Use, care, and calibration of personal monitors and gas detection instruments
- Respirator inspections and record keeping
- Each respirator wearer will complete Respiratory Protection training and a Respirator Fit Test, after being given a medical clearance and before entering any H2S location.
- Employees and other personnel visiting H2S locations who will not be involved in the work shall be briefed on the following prior to entering:
- Site-specific sources of H2S
- Health hazards of H2S
- Routes of egress
- Emergency assembly areas
- Applicable alarm signals and
- How to respond in the event of an emergency.

Rescue

Each employee, when working alone in a H2S designated area, shall plan and become familiar with self-escape procedures to include being aware of wind direction and obstacles to avoid when exiting the work area.

Employees working under the buddy system shall pre-plan an emergency rescue and/or evacuation procedure prior to commencing work and arrange for periodic communications with his/her supervisor and document the discussion on each employee’s service report.

Respirator Inspections

Respirators will be inspected by the employee before each use and at least monthly.

The inspection will include the respirator face piece, hose, harness, 5minute escape pack cylinder and all other components of the air supply systems used.

Monthly inspections will be documented as per Civil Works Respiratory Protection Program and will be kept on file at the local office for review during safety audits.

Monitors and Gas Detector Calibration

Each personal H2S monitor shall be calibrated at least monthly and the results recorded on the calibration log.

Those monitors that do not require calibrating shall be bump checked with calibration gas to test alarms, monthly or prior to use if not used routinely

10.16 Ladders, Scaffolds, MEWPS (mobile equipment work platforms)

Ladders

Ladders can make many tasks easier, but they are also a continual safety hazard. Even the best ladder is not safe unless you are trained and proficient in using ladders. Each year, many people suffer serious injuries from incidents involving ladders. Before you use a ladder, take a moment to think about doing it safely.

A secure, well-made ladder is necessary for safe ladder use. Ladders come in different styles, including step, straight, and extension. They also vary in construction and may consist of wood, aluminum, or fiberglass.

All ladders sold within the U.S. are rated as follows:

- Type IA- Heavy-duty industrial ladder rated to hold up to 300 pounds.
- Type II - Medium-duty commercial ladder rated to hold up to 225 pounds.
- Type III - Light-duty household ladder rated to hold up to 200 pounds.

Follow these guidelines for safe ladder usage:

- Always inspect a ladder before you climb it. Make sure all mechanisms are in good working order.
- Carry ladders horizontally with the front end slightly higher than the back end
- To open a stepladder, make sure the spreader is locked and the pail shelf is in position. To open an extension ladder, brace the bottom end and push the rungs or rails out.
- Place ladders on a solid, level surface to ensure safety.
- Watch for overhead obstructions and power lines.
- Position a straight or extension ladder so that the base of the ladder is one foot away from the vertical support for every four feet of working ladder height (e.g., if you are working with eight feet of ladder, place the base of the ladder two feet from the wall).
- Do not place the top of a ladder against a window or an uneven surface
- Secure the ladder to prevent displacement.
- Ladders used to gain access to another elevation, must extend at least three feet above the level being accessed
- Do not place a ladder in front of a door unless you lock and barricade the door and post a warning sign on the opposite side of the door
- Use common sense when climbing or working on ladders
- Wear shoes with slip-resistant soles and make sure they are dry before climbing

- Never allow more than one person on a ladder at a time
- To climb or descend a ladder, face the ladder and firmly grip the rails, not the rungs with both hands while maintaining 3 (three) points of contact with the ladder at all times.
- Always keep your body between the rails. Do not shift your weight to one side.
- Have somebody steady the ladder if it cannot be secured otherwise.
- Do not stand on the top four rungs of an extension ladder or the top two rungs of a stepladder.
- When working on a ladder, always keep two feet and one hand on the ladder.
- Do not stand on the bucket shelf of a ladder.
- When working on a ladder, carry small tools on a tool belt. Use a rope to raise and lower heavy tools.
- Never leave a raised or open ladder unattended.
- Store ladders away from heat and moisture.
- Destroy damaged or unsafe ladders.

Scaffolds

Prior to Erection of All Scaffold Assemblies:

- The jobsite should be inspected to determine ground conditions or strength of supporting structure, and for proximity of electric power lines, overhead obstructions, wind conditions, the need for overhead protection or weather protection coverings. These conditions must be evaluated and adequately provided for.
- Frame spacing and mudsill size can only be determined after the total loads to be imposed on the scaffold and the strength of the supporting soil or structure are calculated and considered. A qualified person must do this analysis. Load carrying information on components is available from the manufacturer.
- Stationary scaffolds over 125 feet in height and rolling scaffolds over 60 feet in height must be designed by a State Registered Professional Engineer.
- All equipment must be inspected to see that it is in good condition and is serviceable. Damaged or deteriorated equipment should not be used.
- Wood plank should be inspected to see that it is graded for scaffold use, is sound and in good condition, straight grained, free from saw cuts, splits and holes. (Not all species and grades of lumber can be used as scaffold plank. Wood planks used for scaffolding must be specifically graded for scaffold use by an approved grading agency).
- The scaffold assembly must be designed to comply with local, State and Federal safety requirements.

Erection of Fixed Scaffold

- Scaffold must be erected, moved, or disassembled only under the supervision of qualified persons. Hard hats must be worn by all persons erecting, moving, dismantling or using scaffolding.
- Mudsills must be adequate size to distribute the loads on the scaffolding to the soil or supporting structure. Special care is needed when scaffolding is to be erected on fill or other soft ground or on frozen ground. Sills should be level and in full contact with the supporting surface.
- Base plates or screw jacks with base plates must be in firm contact with both the sills and the legs of the scaffolding. Compensate for uneven ground with screw jacks with base plates. DO NOT USE unstable objects such as blocks, loose bricks, etc.
- Plumb and level scaffold until connections can be made with ease. Do not force members to fit. Be sure scaffold stays level and plumb as erection progresses.

- Ties, guys, bracing and/or outriggers may be needed to assure a safe stable scaffold assembly. The height of the scaffold in relation to the minimum base width, wind loads, the use of brackets or cantilevered platforms and imposed scaffold loads determines the need for stability bracing. The following general guides are minimum requirements.
- OSHA requires that scaffolding must always be secure when the height of the scaffold exceeds for (4) times the minimum base width.
- Scaffolds must be secured to the adjacent structure or by guy cable or equivalent at the closest horizontal member to the 4:1 height-to-base ratio and repeated vertically at locations of horizontal members every 20 feet or less thereafter for scaffolds 3 feet wide or less and every 26 feet or less thereafter for scaffolds greater than 3 feet wide.
- Guys, ties or braces must be installed at each end of the scaffold and at horizontal intervals not to exceed 30 feet. Guys, ties, direct connections or braces used to secure scaffolds must meet the scaffold manufacturer's recommendations and OSHA requirements.
- Ties should be installed as the erection progresses and not removed until the scaffold is dismantled to that height.
- Side brackets, cantilevered platforms, pulleys or hoist arms and wind conditions introduce overturning and uplift forces that must be considered and compensated for. These assemblies may require additional bracing, tying or guying.
- Circular scaffolds erected completely around or within a structure may be restrained from tipping by the use of "stand off" bracing members.
- Each leg of a freestanding tower must be guyed at the intervals outlined above or otherwise restrained to prevent tipping or overturning.

Walking Working Surfaces

- Work platforms must be fully planked either with scaffold graded solid sawn or laminated plank, in good sound condition, or with fabricated platforms in good condition.
- Each plank must overlap the support by a minimum of 6 inches or be cleated, i.e. 8-foot planks on 7-foot spans must be cleated.
- Plank should not extend beyond the support by more than 18 inches. Such overhangs should be separated from the work platform by guard railing so that they cannot be walked on.
- Plank on continuous runs must extend over the supports and overlap each other by at least 12 inches.
- Spans of full thickness, 2 inch by 10-inch scaffold grade planks, should never exceed 10 feet. Loads on plank should be evenly distributed and not exceed the allowable loads for the type of plank being used. No more than one person should stand on an individual plank at one time.
- Planks and/or platforms should be secured to scaffolding when necessary to prevent uplift of displacement because of high winds or other job conditions.
- When there is a change in elevation of the planks and/or platform to 19 inches or higher, proper access and egress must be established.

Falling Object Protection

- Guardrails must be used on all open sides and ends of scaffold platforms. Both top and mid-rails are required. Local codes specify the minimum heights where guardrails are required, however, use at lower heights if falls can cause injury.
- Toe boards are required whenever people are required to work or pass under or around the scaffold platform.
- Access must be provided to all work platforms. If it is not available from the structure, access ladders, frames with built-in ladders, or stairways must be provided. When frames with built-in ladders are used, cleated plank or fabricated

- plank must be used at platform levels to minimize or eliminate platform overhang. Access ladders must extend at least three (3) feet above platforms.
- Side and end brackets are designed to support people only. Materials should never be placed on cantilevered platforms unless the assembly has been designed to support material loads by a qualified person. (These types of platforms cause overturning and uplift forces that must be compensated for. All frames should be fastened together to prevent uplift an overturning moment compensated for with counterweights or adequate ties).

Additional Support

- Putlogs must never be used for the storage of materials. They are designed for personnel use only. Special care should be taken when putlogs are used.
- Putlogs should overhang the support points by at least 6 inches. Use putlogs hangers with bolts fastened to support putlogs on frames.
- Putlog spans of greater than 12 feet require knee-bracing and lateral support.
- Putlogs used as side or end brackets need special bracing.
- Bridging between towers should not be done with plank or stages unless a qualified person designs the assembly and overturning moments have been compensated for.

Scaffold should not be used as material hoist towers or for mounting derricks unless a qualified person designs the assembly.

Inspections

Check the erected assembly before use. A qualified person should thoroughly inspect the completed assembly to see that is complies with all safety codes, that nuts and bolts are tightened, that it is level and plumb, that work platforms are fully planked, that guardrails are in place and safe access is provided.

Erection of Rolling Scaffolds

- Height of the tower must not exceed four (4) times the minimum base dimension. Outrigger frames or outrigger units on both sides of the tower may be used to increase base width dimension when necessary.
- All casters must be secured to frame legs or screw jacks with a nut and bolt or other secure means. Total weight of tower should not exceed the capacity of the casters.
- Screw jacks must not be extended more than 12 inches above caster base. Tower must always be kept level and plumb.
- Horizontal/diagonal bracing must be used at the bottom and top of tower and at intermediate levels of 20 feet. Fabricated planks with hooks may replace the top diagonal brace.
- All frames must be fully cross-braced.
- Only prefabricated plank or cleated plank should be used.
- Casters must always be locked when the scaffold is not being moved.

Use of Scaffolds

All Scaffolds

Inspect the scaffold assembly before each use to see that it is assembled correctly, that it is level and plumb, base plates are in firm contact with sills, bracing is in place and connected, platforms are fully planked, guardrails in place, safe access is provided, that it is properly tied and/or guyed and that there are no overhead obstructions or electric lines within 12 feet of the scaffold assembly.

Use only the safe means of access that is provided. Do not climb bracing or frames not specifically

designed for climbing. If such access is not provided, insist that it be provided.

- Climb safely
- Face the rungs as you climb up or down.
- Use both hands.
- Do not try to carry materials while you climb.
- Be sure of your footing and balance before you let go with your hands.
- Always keep one hand firmly on frame or ladder.
- Do not work on slippery rungs to avoid slipping. Do not overload platforms with materials.

Working heights should not be extended by planking guardrails or by use of boxes or ladders on scaffold platforms.

Do not remove any component of a completed scaffold assembly except under the supervision of a qualified person. Any component that has been removed should be immediately replaced.

Rolling Towers

All of the above precautions plus:

- Do not ride manually propelled rolling scaffold. No personnel should be on the tower while it is being moved.
- Lock all casters before getting on the tower.
- Work only within the platform area: do not try to extend overhead work area by reaching out over guard railing.
- Do not bridge between two rolling towers with plank or stages.
- Secure all materials before moving scaffolds.
- Be sure floor surface is clear of obstructions or holes before moving scaffold.
- Be sure there are no overhead obstructions or electric power lines in the path of rolling scaffold.
- Rolling towers must only be used on level surfaces.
- Move rolling towers by pushing at the base level only. Do not pull from the top.

MEWPS (mobile equipment work platforms)

MEWPs used by Civil Works Contracting and its subcontractors will meet the design and construction requirements for MEWPs established in the American National Standard for MEWPs in the updated A92 standards that went into effect on June 1, 2020. The new standard address improvements on the design, safe use, and training.

It is the policy of Civil Works Contracting to minimize employee exposure to hazards associated with MEWPs and to comply with all regulatory requirements for the safe operation of such equipment. Management will train selected supervisors and operators to become the designated Qualified Person(s) (QP) for the MEWPs being used.

Supervisors, operators, and occupants must receive appropriate training prior to lift use and are considered trainees until they are trained and qualified to perform the task and operate a specific lift. MEWP set-up and use must be performed by at least two persons trained and qualified regarding the task to be performed on the specific lift type. All training must be documented. A written risk assessment, safe use plan, and rescue plan must be in place prior to using any lift.

Definitions

Aerial Ladder - An aerial device that consists of a single or multiple section rung ladder.

Aerial Lift - A mobile or manually propelled device that has an adjustable position platform, supported from ground level by a structure.

Articulating Boom - An aerial device that has two or more hinged boom sections.

Authorized Person - A person who is approved and assigned to perform specific types of duties by the employer and who is qualified to perform those duties because of his or her training or experience.

Chassis - Part of the MEWP that provides support for mobility of the elevating assembly. A commercial chassis is built for over-the-road (roadway) travel.

Examiner - A qualified person who evaluates or tests the competency of the trainee.

Group A MEWP - MEWPs on which the vertical projection of the center of the platform area, in all platform configurations at the maximum chassis inclination specified by the manufacturer, is always inside the tipping lines.

Group B MEWP - MEWPs not included in Group A.

Insulated Aerial Device - MEWP that is designed with dielectric components to meet specific electrical insulating ratings.

Mobile Elevating Work Platform (MEWP) - Machine/device intended for moving persons, tools, and material to working positions, consisting of at least a work platform with controls, an extending structure, and a chassis. Examples include manual or self-propelled units; push around vertical, track mount, scissor lifts, articulating booms, telescoping booms, and vehicle mounted articulating booms.

Occupant - A person on the MEWP platform who is not the Operator.

Operator - Person responsible for controlling the operation of the MEWP and the safety of the occupant.

Platform - Portion of an MEWP, such as a bucket, basket, stand, cage, or the equivalent, that is designed to be occupied by personnel.

Qualified Person (QP) - Person who possesses a recognized degree, certificate, professional standing, or skill and who, by knowledge, training, and experience, has demonstrated the ability to deal with problems relating to the subject matter, the work, or the project.

Supervisor - Monitors Operator performance and supervises the Operator's work.

Training - Instruction to enable the trainee to become a qualified person regarding the task to be performed, including knowledge regarding potential hazards.

Type 1 MEWP - MEWP for which travelling is allowed only when in the stowed position.

Note: Refer to Section 1.1.3 MEWP Classification for application of groups and types.

Type 2 MEWP - MEWP for which travelling with the work platform in the elevated travel position is controlled from a point on the chassis. Note: Type 2 and type 3 MEWPs can be combined.

Type 3 MEWP - MEWP for which travelling with the work platform in the elevated travel position is controlled from a point on the work platform. Note: Type 2 and type 3 MEWPs can be combined.

Under bridge MEWP - MEWP intended to provide access to the sides or beneath a bridge structure

and equipped to inspect and maintain bridge structures that can elevate/lower personnel above/below grade.

Vehicle - Any carrier that is not manually propelled. May be mounted elevating and rotating MEWP; Aerial device or MEWP.

Supervisor

The supervisor ensures that only authorized and trained staff use MEWPs, and that employees comply with the procedures in this Plan. The supervisor ensures that designated staff successfully complete the qualification procedures outlined in this Plan prior to using MEWPs. The manager/supervisor designates the Qualified Person for each use of an MEWP by his or her employees. The manager/supervisor ensures training documentation is maintained.

Qualified Person (QP)

The QP conducts a risk assessment of the job or task, selects the appropriate MEWP for the task, develops a Safe Work Plan, and ensures operator, supervisor, and occupant competencies for each task. The QP conducts frequent and annual inspections on any MEWP she or he is qualified to inspect. The QP shall also monitor, supervise, and evaluate operators on a regular basis. QPs are designated by Civil Works Contracting.

Operators

Operators who use MEWPs are responsible for complying with this program and participating in the Risk Assessment and Safe Work Plan. Operators are also responsible for reporting equipment defects and discontinuing operations when unsafe conditions exist. Operators are responsible for ensuring all occupants can work safely. Operators are responsible for familiarizing themselves with any MEWP they are not familiar with including:

- Reading the operator manual.
- Performing a walk-around inspection.
- Familiarizing themselves with the controls.
- Understanding any limitations of the equipment.
- It is expected that departments will provide detailed training to staff based on the general type of MEWP that their staff will operate (e.g., vehicle-mounted MEWP, manually propelled elevating lift, boom-supported MEWP, and self-propelled MEWP).
- When operating equipment similar to the equipment on which an operator was trained, the trained operator is responsible for reviewing the model specific hazard information provided in the owner's manual, and for familiarizing themselves with all applicable operational requirements.

Training

Training Program Implementation

Civil Works Contracting will have each employee who performs work while on a scaffold or aerial lift trained by a person qualified in the subject matter to recognize the hazards associated with the type of scaffold or aerial lift being used and to understand the procedures to control or minimize those hazards.

Trainees may operate an aerial lift only under the direct supervision of persons who have the knowledge, training, and experience to train operators and evaluate their competence; and where such operation does not endanger the trainee or other employees.

Training will consist of a combination of *formal instruction* (e.g., lecture, discussion, interactive computer learning, video tape, written material), *practical training* (demonstrations performed by the trainer and practical exercises performed by the trainee), and *evaluation* of the operator's performance

in the workplace.

Training documentation will be retained in the employee's training record. A wallet card is not considered an official training document unless supported by the employee's training file.

Trainer Qualification

All operator training and evaluation will be conducted by persons who have the knowledge, training, and experience to train aerial lift operators and evaluate their competence.

Training Program Content

MEWP operators will receive initial training in the following topics

Theory (classroom/online) training shall include MEWP safe use as defined in A92.22, and shall also include the following:

- The selection of appropriate MEWPs from the various classifications including available options.
- The purpose and use of operation manuals, placards and decals, and safety rules.
- Understanding that operation manuals are an integral part of the MEWP and need to be stored properly in the weather-resistant compartment on the MEWP when not in use.
- Validation that annual inspection is current on the placard when present on the MEWP.
- Knowledge of how to perform a pre-start inspection.
- Responsibilities associated with problems or malfunctions affecting the operation of the MEWP.
- Knowing and understanding factors affecting stability.
- Recognition and avoidance of hazards associated with operation.
- Knowing and understanding workplace inspections and that they must be performed prior to each use.
- Knowing and understanding wind hazards and weather conditions.
- Thorough understanding of the intended purpose and function of the MEWP controls, including platform, ground, and emergency descent controls.
- General knowledge of various MEWPs and features and devices specified by the MEWP manufacturer to include physical characteristics and other machine options.
- Applicable regulations, standards, and safety rules.
- Use of personal protective equipment (PPE) appropriate to the task, worksite, and environment and those required by the manufacturer.
- Safe traveling practices.
- Issues associated with transport (if appropriate).
- Understanding that authorization by the QP is required to operate MEWP.
- Understanding that securing the MEWP from unauthorized use is required.
- The requirement for familiarization in addition to training.
- Understanding of hazardous location(s) (flammable or explosive atmospheres).
- Warnings and instructions.
- Familiarity with the requirements of operators.
- The dangers associated with high pressure systems.
- Other subjects required by the MEWP manufacturer.

Practical (Hands-On) Training: The qualified trainer shall conduct a risk assessment of the location of the hands-on training and evaluation. Operator training shall include a sufficient period of time for the trainee to operate the MEWP to demonstrate to a qualified trainer proficiency in:

- Walk around and familiarization with the MEWP.
- Major components – identification and function.
- Perform pre-start inspection – carry out daily checks and inspections.

- Planning the route of travel and worksite inspection.
- Setting the MEWP for work (if applicable).
- Operation and function of all controls – completing course tasks.
- Parking and securing the MEWP.

Operators must complete **training and demonstrate proficiency** in the recognition and mitigation of hazards associated with the operation of each type of MEWP. To achieve proficiency, operators will demonstrate the following:

- Ability to find and locate specific safety information located in the operator's manual and safety placard.
- Ability to complete a prework inspection checklist from the operators' manual and record findings.
- Conduct a site evaluation risk assessment.
- Ability to safely move and operate the MEWP.
- Ability to select and use the proper personal protective equipment (PPE); and
- Pass an exam at the end of the training demonstrating knowledge of the MEWP they are being trained on.

Employees must be trained in the hazards associated with the use of MEWPs before their use. This training must include safety guidelines for avoiding hazards above, below, and beside the MEWP. This training at a minimum must include:

- Fall protection, risk assessment, safe use plans
- Unstable surfaces
- Live power proximity

Refresher Training and Evaluation

When a Civil Works Contracting employee's supervisor has reason to believe that an employee lacks the skill or understanding needed for safe work involving the erection, use or dismantling of scaffolds, the supervisor will retrain that employee so that the requisite proficiency is regained. Retraining is required in at least the following situations:

- Where changes at the worksite present a hazard about which an employee has not been previously trained
- Where changes in the types of scaffolds, fall protection, falling object protection, or other equipment present a hazard about which an employee has not been previously trained
- Where inadequacies in an affected employee's work involving scaffolds indicate that the employee has not retained the requisite proficiency

Operator Qualifications

All MEWP operators are required to be fully qualified and competent in the operation of each piece of equipment they are required to operate.

All newly hired operators are required to:

- Provide proof of training and or experience valid within one (1) year and pass an examination prior to acceptance or;
- Successfully complete the MEWP Training Program.

Acceptable forms of proof of training and or experience are:

- Previous employers' training and certification dated within one year of hire; (some facilities do not recognize proof of training from other facilities)

- Verification of classroom training conducted by a professionally recognized safety organization or company.

Equipment Inspection Pre-Operational Checks

MEWPs will be examined before being placed in service and will not be placed in service if the examination shows any condition adversely affecting the safety of the equipment. Such examination will be made at least daily using the MEWP pre-operational checklist

Where MEWPs are used on a round-the-clock basis, they will be examined before and after each shift. Defects when found will be immediately reported and corrected.

If at any time an MEWP is found to be needing repair, defective, or in any way unsafe, the lift will be taken out of service until it has been restored to safe operating condition.

Maintenance

MEWPs will be kept in a clean condition, free of lint, excess oil, and grease. Precautions regarding toxicity, ventilation, and fire hazard will be consonant with the agent or solvent used.

10.17 Lockout/Tagout

Description

The purpose of this LOTO policy is to establish the minimum set of safety requirements for isolating energy sources to prevent the unexpected energization of equipment or release of hazardous energy when service and/or maintenance are performed. Following the steps contained in this policy can prevent injury and/or death to personnel due to unexpected energization or startup of machines and equipment, or release of stored energy. This process achieves its purpose by requiring that certain precautions be taken before servicing or repairing equipment such as shutting off, isolating, locking out, and tagging out all electrical power sources to or within the equipment being serviced. On pneumatic and hydraulic systems, this process also requires that any stored energy be isolated, safely released and that the controlling valves be locked out and tagged out.

Definitions

Affected Employee – An employee whose job requires him/her to operate or use a machine or equipment on which service or maintenance is being performed under lockout or tagout, 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 service or maintenance on the machine or equipment. An affected employee becomes an authorized employee when that employee's duties include performing service or maintenance covered under this section. An employee must have completed mandatory training to be qualified as an authorized employee.

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 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-type devices are not energy isolating devices.

Lockout Device – A device that utilizes a positive means such as a lock, each individually keyed, to hold an energy isolating device in a safe position and prevent the energizing of a machine or equipment. Included are blank flanges and bolted slip blinds. This must be the same throughout the

project for easy identification.

Lockout – The placement of a standard 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.

Isolation – A physical activity using a device that prevents the transmission or release of energy. Examples of devices used to isolate equipment/systems include, but are not limited to the following: restraint blocks, electrical circuit breakers, disconnect switches, fuses, slip gates, slip binds, or double valves. Control circuit devices, motor controllers etc., are not acceptable isolation devices.

Nearest Emergency Energy Isolation Device – The energy isolating device that is closest to this device in the direct electrical circuit path between this device and the source of emergency electrical energy to this device.

Nearest Load Side Isolation Device – The energy isolating device that is closest to this device in the direct electrical circuit path between this device and the electrical loads supplied by energy originating at this device or passing through this device.

Tagout – The placement of a tagout 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 tagout device is removed.

Tagout 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 tagout device is removed.

Stored or Residual Energy – Energy such as that stored in capacitors, springs, elevated machine members, rotating flywheels, hydraulic systems, compressed air, gas, water, or steam, etc.

Responsibilities

Affected Employee – Understand the use and purpose of the lockout/tagout policy.

Authorized Employee – Obtain training on the lockout/tagout policy; Follow all required steps in the lockout/tagout policy; Conduct periodic inspections of the lockout/tagout policy.

Corporate Management – Reinforce the need to comply with requirements; Maintain the lockout/tagout policy; Review and revise the lockout/tagout policy as required.

Project Management – Review, approve, implement and enforce the project lockout/tagout policy; Designate authorized person(s) to conduct activities within the project's lockout/tagout policy.

HSE Director – Develop, monitor and assist in implementing the logout/tagout policy; Conduct initial training and retrain personnel whenever there is a change in job assignments or the introduction of a new hazard due to changes in circuitry, machinery, equipment or procedure; Evaluate the periodic inspections of the lockout/tagout procedure to determine the need for additional training and ensure inspections are being performed; Conduct orientations that cover the project lockout/tagout policy for subcontractors and new employees; Provide regulatory expertise to ensure that activities are conducted in compliance with applicable codes, standards and regulations; Maintain and archive lockout/tagout inspection reports and training records; Review subcontractor lockout/tagout policies to determine if there are any differences and inform the authorized or affected employees about any differences in the two company's policies that could cause confusion.

Subcontractors – Comply with all Civil Works Contracting logout/tagout policy requirements if their

lockout/tagout policies are not at least as effective as the Civil Works Contracting policy.

Field Supervisor – Facilitate compliance with and enforce lockout/tagout policy; Responsible for all employees working under the protection of a group lockout/tagout; Investigate violations of the lockout/tagout policy and complete a report of the findings.

Application of Lockout/Tagout Policy

Authorized personnel must adhere to this policy at all times when servicing, maintaining, adjusting, repairing, or performing any type of work on any electrical or mechanical equipment supplied with energy originating from or passing through the equipment where the unexpected energizing, startup, or release of stored energy could occur and cause injury.

Workers may be exposed to hazardous energy in several forms and
combinations during installation, maintenance, service and repair work:

- Kinetic (mechanical) Energy in the moving parts of mechanical systems
- Potential Energy stored in pressure vessels, gas tanks, hydraulic or pneumatic systems, and springs – Potential Energy can be released as Kinetic Energy
- Electric Energy from generated electrical power, static sources, or electrical storage devices (such as batteries or capacitors) Thermal Energy (high or low temperature) resulting from mechanical work, radiation, chemical reaction, or electrical resistance

Authorized and Affected Employee Training

Authorized employees will be trained on the recognition of hazardous energy sources and the methods and means necessary for the control of the hazardous energy. All Authorized personnel will have received training in the following areas:

- Relevant OSHA federal, state and local standards
- Proper lockout/tagout procedures
- Limitations of tagout
- Types and magnitudes of energy sources present
- Electrical distribution system design and operation
- Procedures for placing/removing locks and tags
- Procedures for the restoration of energy

Affected employees will be trained in the purpose and use of the lockout/tagout procedure and the potentially serious consequences relating to the attempt to restart, restore or re-energize equipment.

The HSE Department will conduct initial training and retrain personnel whenever there is a change in job assignments or the introduction of a new hazard due to changes in circuitry, machinery, equipment or procedure. In addition, the Safety Manager will evaluate the periodic inspections of the lockout/tagout procedure to determine the need for additional training. When those reviews indicate a general lack of knowledge, the Safety Manager will initiate and retrain associated personnel

The HSE Department will produce and maintain records detailing the lockout/tagout training received by personnel. These records will include the employee's name, signature and the date of training, as well as the instructor's name. All lockout/tagout training records must be kept up to date, on file and available for review.

Lockout/Tagout Steps

The following steps, in their entirety, must only be performed by an Authorized Employee:

Preparation for Shutdown

1. Identify and label all sources of hazardous energy including “emergency” electrical energy by making a survey to locate and identify all supply side, load side, and emergency energy isolating devices to be certain which switch(es), breaker(s), valve(s), or other energy isolating device(s) require locking out and tagging out.

Identify and document all sources of hazardous mechanical or stored energy where shutting down electrical energy could result in the unexpected energizing, startup, or release of stored energy with the potential to cause personnel injury. Include: a. nearest supply side, b. nearest load side, c. nearest emergency, d. energy isolating device.

Check existing one-line documents, verify and redraw to match actual conditions.

Notify all affected employees before machines, equipment, power and lighting are shut down and de-energized.

Isolation of Electrical Equipment

Proper PPE will be identified and used to perform the following steps in the lockout/tagout process:

1. Locate the nearest load side energy isolating device(s) and switch to isolate (disconnect) this equipment from all electrical energy loads.

2. Locate the nearest emergency energy isolating device(s) (if applicable) and switch to isolate (disconnect) this equipment from all sources of emergency electrical energy.

3. Locate the nearest supply side energy isolating device(s) and switch to isolate (disconnect) this equipment from all sources of electrical energy.

4. Switch all main breakers to the “OFF” position. Once switched, place a lock and tag on each disconnecting means used to de-energize and isolate this device. Lockout all energy isolating devices with individual, pre-assigned locks.

Verify Isolation of Equipment

1. Ensure appropriate PPE has been selected and used during these steps.
2. Determine all possible sources of energy.
3. Disconnect of shut down engines or motors.
4. De-energize and ensure that no personnel are exposed to the de-energized circuit or its associated equipment.
5. Block fluid (gas or liquid) flow in hydraulic, gas or pneumatic systems.
6. Block machine parts against motion.
7. Discharge Capacitors.
8. Release or block springs that are under compression or tension.
9. Vent fluid, pneumatic energy from vessels, lines.
10. Operate the normal operating controls to verify the associated equipment will not operate or energize. CAUTION: Return all operating controls to their “OFF” or “Disconnected” position once this test is complete.
11. Electrical - Test using a verified voltmeter or test device to ensure that the supply and load side circuits are de-energized.
12. Electrical - Test on known energized circuit.
13. Electrical - Test the locked-out circuit.
14. Electrical - Re-test on known energized circuit.

15. Visually inspect all sources of mechanical energy to ensure that no stored residual energy remains or presents a hazard to personnel.

Control the Stored Energy

1. Ensure appropriate PPE has been selected and used during these steps.
2. Control the stored energy which might endanger personnel. Stored energy must be released or blocked or relieved to the extent that the parts cannot be accidentally energized by this device. Capacitors or associated equipment must be treated as energized.
3. Test and apply temporary safety grounds to all verified de-energized transformers and switches in the isolated circuit.

End-of-Shift Transfer of Responsibility

1. If only one shift or individual is to work on the equipment or machine, the attached locks/tags remain in place until maintenance/servicing is complete.
2. If another shift continues the maintenance or service, the authorized individuals from the off-going and on-coming shifts conduct a turnover of the task. The off-going shift personnel remove their locks and tags ONLY AFTER the on-coming shift personnel have installed their own locks and tags in accordance with this policy.
3. If an employee is working on equipment or machinery and is transferred to another job or assignment, a turnover of the task must be performed with the newly assigned authorized individual. The employee must remove his/her locks/tags ONLY AFTER the newly assigned individual has installed his/her locks/tags in accordance with this policy.

Restoring Equipment to Normal Service

1. Upon completion of the required maintenance or service, obtain approval for temporary or permanent restoration of equipment.
2. Survey the entire work area to ensure that all nonessential items such as tools, trash, scrap or debris, etc. have been removed and do not present a potential hazard to equipment or personnel.
3. Notify all “affected” employees that the lockout/tagout is being removed and that machines, equipment, power and lighting are going to be re-energized.
4. Ensure that all personnel are located in a safe position.
5. Ensure that all temporary safety grounds have been removed.
6. Ensure that all equipment covers are in place and properly secured, and that all conductors are properly connected with securing mechanisms properly torqued to specification.
7. Close all vents, drains.
8. Remove machine blocks.
9. Remove blinds, other isolation devices from mechanical, hydraulic, gas, and pneumatic systems.
10. Notify all “affected” employees that mechanical systems have been restored.
11. Complete NFPA 70E documentation, equipment verification and testing as necessary.
12. Verify that the nearest load side energy isolating device(s) is/are in the “disconnected” or “open” position.
13. Remove the nearest supply side energy isolating device(s), lock(s) and tag(s), and switch to close (connect) this equipment to the source of electrical energy.
14. Remove this device’s lock(s) and tag(s), and switch each main breaker, one at a time, to the “ON” position to connect the nearest load side energy isolating device(s) to the source of electrical energy. WARNING: The nearest load side energy isolating device(s) is/are now energized.

15. Remove the nearest emergency energy isolating devices' lock(s) and tag(s) (if applicable) and switch to close (connect) this equipment to all sources of emergency electrical energy.
16. Remove the nearest load side energy isolating devices' lock(s) and tag(s) and switch to close (connect) the electrical loads to the source of electrical energy.
17. Notify all "affected" employees that electrical service has been restored.

Lockout/Tagout Removal by Other Than Original Installer

Only the employee who applied the lockout/tagout device is allowed to remove that device. If the person who applied the device is not available, the device may be removed by the authorized employee's supervisor/Field Supervisor if the following requirements are met:

2. The machine/equipment must be placed in service because of an emergency, national security, the employee is no longer on the job, or as justified by the job supervisor/Field Supervisor.
3. If the employee is not available, the supervisor/Field Supervisor must: a. Verify the authorized employee who applied the device is not at the facility; b. Make all reasonable efforts to contact the employee to advise that the device has been removed; c. Ensure that the authorized employee knows that the device has been removed before returning to work; d. Verify that the task that was being performed is complete or the task is at a point where the equipment or machine can be put back in service without damage to the equipment, machine, or personnel, and that there are no unprotected or exposed parts downstream on the re-energized circuit.
4. After verifying that the equipment is safe, the supervisor/Field Supervisor in charge of the work directs the removal of the lock.
5. The supervisor/Field Supervisor must submit a written report to the Field Supervisor outlining the removal of locks/tags and the reason for this action.

Group Lockout/Tagout

In cases in which equipment or machinery maintenance or servicing is provided by a group, the following requirements apply:

1. The Field Supervisor has primary responsibility for all employees working under the protection of a group lockout/taqout.
2. The Field Supervisor ensures that the protection of each employee in a group lockout/tagout is equal to or better than that of individual lockout/tagout.
3. When more than one crew is involved, the responsibility of the overall job-associated lockout/tagout control is assigned to an authorized employee designated to coordinate affected work forces and ensure continuity of protection.
4. Each authorized employee affixes his/her personal lockout/tagout device to the group locking device (multiplier) when he/she begins work and removes those devices when he/she stops working on the machine or equipment being serviced or maintained.

Periodic Inspection

To ensure that the lockout/tagout procedures are being followed, a designated authorized employee (other than those using the energy control procedures) must conduct an annual inspection using the Lockout/Tagout Inspection Report form. The authorized employee must submit the completed inspection form to the HSE Department for future reference.

Subcontractors

Upon request, subcontractors must submit copies of their lockout/tagout procedures to the Field Supervisor for review if they plan on conducting service or maintenance on equipment.

If a subcontractor does not have a lockout/tagout policy and procedure that is at least as effective as Civil Works Contracting's, the Civil Works Contracting policy and procedure must be used.

Enforcement of this Policy

No device will be operated with a lock and tag attached, regardless of circumstances: No person will remove a lock or tag without following this policy and procedures. Violations of this policy and procedures must be investigated by the Field Supervisor and a written report submitted to project management.

10.18 Material Handling, Storage, Use and Disposal

General Requirements

- All materials stored in tiers will be stacked, racked, blocked, interlocked, or otherwise secured to prevent sliding, falling or collapse.
- Maximum safe load limits of floors within buildings and structures, in pounds per square foot, will be conspicuously posted in all storage areas, except for floor or slab on grade.
- Maximum safe loads will not be exceeded.
- Aisles and passageways will be kept clear to provide for the free and safe movement of material handling equipment or employees. Such areas will be kept in good repair.
- When a difference in road or working levels exist, means such as ramps, blocking, or grading will be used to ensure the safe movement of vehicles between the two levels.

Lifting and Carrying

- Lift correctly - with legs, not the back. Get help if the load is too heavy.
- Inspect the object to be moved for sharp corners, nails and other projections that may cause an injury. Check out the container or object to make an intelligent decision as to your capabilities and limitations for making a lift. Look for a label or stamp indicating the weight to determine how much you will be lifting.
- Size up the load. Clear away anything on the floor that might cause you to lose your footing.
- Avoid reaching as you lift or lower. If something is in your way, move it. Set feet firmly, placing one foot alongside the load and the other slightly behind the load. When lifting, keep the object close to your body. Choose the lifting position that feels most comfortable, with or without a straight back. Set muscles of legs, hips and back ready to take the strain.
- When grasping an object to lift, get a firm grip with fingers under the load if there are no handholds. Lift steadily, avoiding jerky motions. Never twist while lifting or lowering. Lift first, and then turn your body by repositioning your feet.
- Do not lift awkward or heavy materials alone. If in doubt, contact your Field Supervisor, contractor, Site Manager, to get someone to help you or utilize a mechanical lifting device.
- When two or more workers are "team lifting," decide how the object will be handled and what route to use. Keep in step and agree on signals for changing directions, stopping, placing object, etc.
- When using material handling equipment, be sure you fully understand how to operate the lifting or hoisting equipment before you start.

Material Storage

- Material stored inside buildings under construction will not be placed within 6 feet of any hoist-way or inside floor openings, nor within 10 feet of an exterior wall which does not extend above the top of the material stored.

- Each employee required to work on stored material in silos, hoppers, tanks, and similar storage areas will be equipped with personal fall arrest equipment meeting the requirements of CFR 1926, Subpart M.
- Non-compatible materials will be segregated in storage.
- Bagged materials will be stacked by stepping back the layers and cross keying the bags at least every 10 bags high.
- Materials will not be stored on scaffolds or runways in excess of supplies needed for immediate operations.
- Brick stacks will not be more than 7 feet in height. When a loose brick stack reaches a height of 4 feet, it will be tapered back 2 inches in every foot of height above the 4-foot level.
- When masonry blocks are stacked higher than 6 feet, the stack will be tapered back one-half block per tier above the 6-foot level.
- Lumber:
  - Used lumber will have all nails withdrawn before stacking.
  - Lumber will be stacked on level and solidly supported sills.
  - Lumber will be so stacked as to be stable and self-supporting.
  - Lumber piles will not exceed 20 feet in height provided that lumber to be handled manually will not be stacked more than 16 feet high.
- Structural steel, poles, pipe, bar stock, and other cylindrical materials, unless racked, will be stacked and blocked to prevent spreading or tilting.
- Storage areas will be kept free from accumulation of materials that constitute hazards from tripping, fire, explosion, or pest harborage. Vegetation control will be exercised when necessary.

Rigging Equipment

- Rigging equipment for material handling will be inspected prior to use on each shift and as necessary during its use to ensure that it is safe. Defective rigging equipment will be removed from service.
- Rigging equipment will not be loaded in excess of its recommended safe working load, as prescribed in Tables H-1 through H-20 in this Subpart, following CFR 1926.252(e) for the specific equipment.
- Rigging equipment, when not in use, will be removed from the immediate work area so as not to present a hazard to employees.
- Special custom design grabs, hooks, clamps, or other lifting accessories, for such units as modular panels, prefabricated structures and similar materials, will be marked to indicate the safe working loads and will be proof- tested prior to use to 125 percent of their rated load.

Disposal of Waste Materials

- Whenever materials are dropped more than 20 feet to any point lying outside the exterior walls of the building, an enclosed chute of wood, or equivalent material, will be used. For the purpose of this paragraph, an enclosed chute is a slide, closed in on all sides, through which material is moved from a high place to a lower one.
- When debris is dropped through holes in the floor without the use of chutes, the area onto which the material is dropped will be completely enclosed with barricades not less than 42 inches high and not less than 6 feet back from the projected edge of the opening above. Signs warning of the hazard of falling materials will be posted at each level. Removal will not be permitted in this lower area until debris handling ceases above.
- All scrap lumber, waste material, and rubbish will be removed from the immediate work area as the work progresses.

- Disposal of waste material or debris by burning will comply with local fire regulations.
- All solvent waste, oily rags, and flammable liquids will be kept in fire resistant covered containers until removed from worksite.

10.19 Office and General Workplace Safety

Purpose

A large percentage of workplace accidents and injuries occur in offices, warehouses and other buildings. Like the jobsite, the office and other workplaces require preventive measures to ensure a safe and healthful environment. Common causes of accidents include the following:

- Slipping, tripping, and falling hazards
- Burning, cutting, and pinching hazards
- Improper lifting and handling techniques
- Unobservant and inattentive employees
- Improper office layout and arrangement
- Dangerous electrical wiring
- Exposure to toxic substances
- Horseplay

This section addresses workplace safety practices for Civil Works Contracting employees.

Housekeeping

Many workplace accidents are caused by poor housekeeping practices. By keeping the floor both neat and clean, you can eliminate most slipping, tripping, and falling hazards.

Other good housekeeping practices include the following:

- Ensure that lighting is adequate and available. Replace burned out light bulbs, and have additional lighting installed, as necessary.
- Ensure that electrical cords and phone cords do not cross walkways or otherwise pose a tripping hazard. If you cannot move a cord, have a new outlet installed or secure the cord to the floor with cord covering strips. Do not tape cords down or run them underneath carpet.
- Report or repair tripping hazards such as defective tiles, boards, or carpet immediately.
- Clean spills and pick up fallen debris immediately. Even a loose pencil could cause a serious falling injury.
- Keep office equipment, facilities, and machines in good condition.
- Store items in an approved storage space. Take care to not stack boxes too high or too tight. Ensure that boxes are clearly labeled with their contents.

Weapons, Hazardous Objects and Hazardous Materials

Unauthorized hazardous objects such as firearms, hunting/assault knives, etc. are not permitted in the workplace (including the jobsite). In addition, hazardous chemicals and materials should not be stored in the general office environment. Hazardous materials include, but are not limited to, the following: carcinogens, combustibles, flammables, gas cylinders, irritants, oxidizers, and reactives.

Preventing Cuts and Punctures

Cuts and punctures happen when employees use everyday supplies without exercising care. Follow

these guidelines to help reduce the chance for cuts and punctures:

- Be careful when using kitchen knives, scissors, staplers, letter openers, and box openers. Any of these items could cause a painful injury and should only be used for their intended purpose.
- Avoid picking up broken glass with your bare hands. Wear gloves and use a broom and a dustpan.
- Place used blades or broken glass in a rigid container, such as a box, before disposing in a specified disposal area.

Preventing Machine Accidents

Only use machines that you know how to operate. Never attempt to operate an unfamiliar machine without reading the machine instructions or receiving directions from a qualified employee. In addition, follow these guidelines to ensure machine safety:

- Secure machines that tend to move during operation.
- Do not place machines near the edge of a table or desk.
- Ensure that machines with moving parts are guarded to prevent accidents. Do not remove these guards. Defective guards should be replaced.
- Unplug defective machines and have them repaired immediately.
- Do not use any machine that smokes, sparks, shocks, or appears defective in any way.
- Close hand-operated paper cutters after each use and activate the guard.
- Take care when working with copy machines. If you have to open the machine for maintenance, repair, or troubleshooting, remember that some parts may be hot. Always follow the manufacturer's instructions for troubleshooting.
- Unplug paper shredders before conducting maintenance, repair, or troubleshooting.

Some items can be very dangerous when worn around machinery with moving parts. Avoid wearing the following items around machines within unguarded moving parts:

- Loose belts
- Jewelry
- Long, loose hair
- Long, loose sleeves or pants
- Scarves
- Ties

Preventing Slips and Falls

The easiest way to avoid slips and falls is to pay attention to your surroundings and to avoid running or rushing. To ensure safety for yourself and others in the workplace, follow these guidelines:

- Arrange furnishings and equipment in a manner that provides unobstructed areas for movement.
- Keep stairs, steps, flooring, and carpeting well maintained.
- Ensure that glass doors have some type of marking to keep people from walking through them.
- Clearly mark any difference in floor level that could cause an accident.
- Clean up fluid spills.
- Do not place wastebaskets or other objects in walkways.
- Be aware of added risk of falling when entering a building if outside weather is rain or snow.

Preventing Stress

To reduce stress and prevent fatigue, it is important to take mini breaks throughout the day. If possible, change tasks at least once every two hours. Stretch your arms, neck, and legs often if you do the same type of work for long periods of time. Rest your eyes often by closing them or looking at something other than the work at hand. For a quick pick-me-up, breathe deeply several times by inhaling through your nose and exhaling through your mouth. In addition, always try to eat your lunch somewhere other than your desk.

Other examples of stress-relieving exercises include the following:

- Head and Neck Stretch: Slowly turn your head to the left and hold it for three seconds. Slowly turn your head to the right and hold it for three seconds. Drop your chin gently towards your chest, and then tilt it back as far as you can. Repeat these steps five to ten times.
- Shoulder Roll: Roll your shoulders forward and then backward using a circular motion.
- Upper Back Stretch: Grasp one arm below the elbow and pull gently towards the other shoulder. Hold this position for five seconds and then repeat with the other arm.
- Wrist Wave: With your arms extended in front of you, raise and lower your hands several times.
- Finger Stretch: Make fists with your hands and hold tight for one second, then spread your fingers wide for five seconds.

Equipment Safety

Common office machines such as the following require special safety consideration: copiers, papers shredders, paper cutters, and computers. Be sure you know how to operate these machines before using them, and never use one of these machines if you think it is defective.

Other office equipment that requires safety consideration includes furniture such as file cabinets, bookshelves, desks, and chairs.

10.20 Personal Protective Equipment (PPE)

Purpose and Scope

Personal Protective Equipment (PPE) includes protective clothing and accessories designed to protect employees from workplace hazards. Protective equipment should not replace engineering, administrative, or procedural controls for safety; it should be used in conjunction with these controls. All Civil Works Contracting employees must wear appropriate PPE as required by established policies and when instructed by their supervisor.

Civil Works performs worksite hazard assessments for each jobsite. The hazard assessment must indicate a determination if hazards are present or are likely to be present, which necessitate the use of PPE. Sources of hazards include but are not limited to hazards from impact/motion, high/low temperatures, chemicals, materials, radiation, falling objects, sharp objects, rolling or pinching objects, electrical hazards, and workplace layout. Certifies in writing the tasks evaluated, hazards found, and PPE required to protect employees against hazards and ensures exposed employees are made aware of hazards and required PPE before they are assigned to the hazardous task.

Field employees must provide for themselves and wear on the jobsite sturdy steel-toe shoes or boots with substantial sole and ankle protection.

Civil Works Contracting provides hardhats, non-prescription eye protection (goggles and face shields), hearing protection, respiratory protection, and high-visibility vests. If you do not have PPE when you arrive at the jobsite, ask your Field Supervisor for the PPE prior to working. Employees not wearing PPE will be sent home with a warning notice.

Civil Works Contracting does not provide everyday clothing such as long sleeve/short sleeve shirts, long pants, street shoes, work boots, ordinary clothing for protection from weather (winter coats, jackets, gloves, parkas, rubber boots, hats, raincoats, ordinary sunglasses, sunscreen).

Field employees are required to wear appropriate work attire which is defined as a shirt with a minimum of a three-inch sleeve, long pants, and steel-toe work shoes or boots. Clothing that is loose fitting is not safe or appropriate.

Employees who have lost or intentionally damaged company-provided PPE must replace it at their own expense.

Training

Employees who require or may need to wear PPE shall be properly trained and PPE must be fitted to each affected employee. Training shall include:

- When PPE is necessary.
- What PPE is necessary.
- How to properly don, doff, adjust and wear PPE.
- The limitations of PPE.
- Useful life and disposal of PPE.
- How to clean and maintain PPE in a sanitary and reliable condition.

- Reporting and replacing defective or damaged PPE, which shall NOT be used.

Retraining

Retraining is required when:

- The workplace changes, making the previous training obsolete.
- The type of PPE changes.
- When the employee demonstrates lack of use, improper use, or insufficient skill or understanding in PPE selection, necessity, use and limitations.

Documentation

Training shall be documented, and records kept at the local office. The training certification shall include:

- Name of employee(s) trained
- The dates of training
- The certification subject

Arm and Hand Protection

Arms and hands are vulnerable to cuts, abrasions, avulsions, burns, crushing, bruises, electrical shock, chemical spills, and amputation.

The following forms of hand protection are available for employees:

- Disposable exam gloves (only good for keeping clean from dirt, dust & biological agents)
- Rubber gloves
- Neoprene gloves

- Leather gloves
- Non-asbestos heat-resistant gloves
- Cotton gloves

Always wear the appropriate hand and arm protection. Double your hand protection by wearing multiple gloves when necessary. For arm protection, wear a long-sleeved shirt, chemical-resistant sleeves, or gauntlet-length gloves.

Follow these guidelines to ensure arm and hand safety:

- Inspect and test new gloves for defects.
- Always wash your hands before and after using gloves.
- Wash chemical-protective gloves with soap and water before removing them.
- Do not wear gloves near moving machinery; the gloves may become caught.
- Do not wear gloves with metal parts near electrical equipment.

Body Protection

Hazards that threaten the torso tend to threaten the entire body. A variety of protective clothing, including long pants, coveralls, and disposable body suits are available for specific work conditions. Rubber, neoprene, and plastic clothing protect employees from most acids and chemical splashes. Coveralls and disposable body suits protect employees and everyday clothing from contamination. Welding aprons provide protection from sparks.

Launder reusable protective clothing separate from other clothing.

Ear and Hearing Protection

If you work in a high noise area, wear hearing protection. Most hearing protection devices have an assigned rating that indicates the amount of protection provided. Depending on your level of exposure, you may choose from the following devices:

- Disposable earplugs
- Reusable earplugs
- Headband earplugs
- Sealed earmuffs

Earplugs may be better in hot, humid, or confined work areas. They may also be better for employees who wear other PPE, such as safety glasses or hard hats. Earmuffs, on the other hand, may be better for employees who move in and out of noisy areas, because the muffs are easier to remove. Before resorting to hearing protection, attempt to control noise levels through engineering or operational changes.

To avoid contamination, follow these guidelines when using earplugs:

- Wash your hands before inserting earplugs.
- Replace disposable earplugs after each use.
- Clean reusable earplugs after each use.

Eye and Face Protection

Employees must wear protection if hazards exist that could cause eye or face injury. Eye and face protection should be used in conjunction with equipment guards, engineering controls, and safe

practices.

- Always wear adequate eye and face protection when performing tasks such as grinding, buffing, welding, chipping, cutting, or pouring chemicals. Safety glasses with side shields provide protection against impact and splashes, but safety goggles provide protection against impact, splashes, and hazardous atmospheres.
- Safety glasses or chemical splash goggles are required when an active laboratory environment.
- Do not wear contact lenses where hazardous atmospheres may be present. Contact lenses do not provide eye protection and may reduce the effectiveness of emergency eyewash.
- If you wear prescription glasses, wear goggles or other safety protection over the glasses.
- Safety glasses with side shields provide primary protection to eyes and are four times as resistant as prescription glasses to impact injuries.
- Goggles protect against impacts, sparks, chemical splashes, dust, and irritating mist. Wear full goggles, not just safety glasses, when working with chemicals.
- Eyecup welding goggles with filter lenses give protection from glare and sparks.
- A welding helmet protects from flash burn due to welding, soldering, or brazing, but does not provide primary eye protection; safety glasses or goggles should be worn with the helmet.
- A face shield is designed to protect the face from some splashes or projectiles but does not eliminate exposure to vapors. A face shield should be worn with goggles or safety glasses.
- Workers assisting welders must wear absorbent safety glasses that protect the wearer from ultra-violet (UV) and/or infrared rays (IR).
- Dark shaded lens (sunglasses) darker than a # 1 shade is prohibited to be worn indoors unless welding or assisting a welder.

Eye Wash Stations

Eye wash stations provide emergency eye treatment for people exposed to hazardous materials. There are two common types of eye wash stations:

- Eye Wash Bowls: These stations are ANSI approved and are usually attached to emergency showers. They provide a continuous water flow and are recommended for laboratories and other locations with hazardous materials.
- Plastic Eye Wash Bottles: These do not provide a continuous water flow, and they do not allow free use of both hands. Eye wash bowls are ideal, however, for portable eye wash needs and short-term operations where continuous flowing water is not immediately available, plastic eye wash bottles may be used. If you have a plastic eye wash bottle in your first aid kit, make sure it is filled and not expired.

If the eyes are exposed to hazardous materials or irritating elements, immediately flush the eyes with water for at least 15 minutes. Seek medical assistance if necessary.

Foot Protection

To protect feet and legs from falling objects, moving machinery, sharp objects, hot materials, chemicals, or slippery surfaces, employees should wear closed-toed shoes, boots, foot guards, leggings, or safety shoes as appropriate. Safety shoes are designed to protect people from the most common causes of foot injuries: impact, compression, and puncture. Special foot protection is also available for protection against static electricity, sparks, live electricity, corrosive materials and slipping.

Head Protection

Accidents that cause head injuries are difficult to anticipate or control. If hazards exist that could cause

head injury, employees should try to eliminate the hazards, but they must also wear head protection.

Hard hats protect the head from impact, penetration, and electrical shock.

Hard hats should be water-resistant, flame resistant, and adjustable. Wear one of the following hard hats as appropriate for your work situation:

- Class A - General service, limited voltage protection
- Class B -Utility service, high-voltage protection
- Class C - Special service, no voltage protection

Follow these guidelines for head safety:

- Inspect the shell and suspension of your headgear for damage before each use. Look for cracks, dents, gouges, chalky appearance, and torn or broken suspension threads.
- Replace damaged hats or replace broken parts with replacements from the original manufacturer.
- Do not wear a hard hat backwards, unless this is necessary to accommodate other protective equipment (e.g., welders face shield).
- Do not paint the plastic shell of a hard hat or alter it in any way.

Safety Showers

Emergency safety showers provide emergency treatment for people exposed to harmful materials. If a person is contaminated with harmful chemicals, an emergency shower provides an instant deluge to protect the person from further exposure.

Emergency showers must be located (when exposure dictates) to ensure accessibility within 10 seconds. Travel distance between a shower and potential hazards may not exceed 100 feet.

Emergency showers are for emergencies only. If a chemical spill occurs involving personal exposure, pull the cord and remove affected clothing immediately. Stay in the shower for at least 15 minutes.

10.21 Preventive Maintenance

Purpose

All tools, equipment and vehicles must be properly maintained so that employees are not endangered. A documented system of monitoring and maintaining company equipment is used by Civil Works Contracting to prevent vehicles, equipment, and machinery from becoming hazardous. Company management is responsible for monitoring and maintaining the Civil Works Contracting Preventive Maintenance program.

Scope

Included in this preventive maintenance system are the following:

- Fleet maintenance for company-owned trucks and vehicles
- Inspections and maintenance/repairs for powered industrial trucks, aerial lifts, and crane equipment
- Routine and required maintenance for respiratory equipment and other PPE
- Routine and required maintenance for power tools

10.22 Respiratory Protection

Purpose

The purpose of the Respiratory Protection Program is to ensure that all Civil Works Contracting employees have adequate respiratory protection in the workplace where engineering controls or work practices are inadequate or not feasible to reduce the exposure to airborne contaminates.

In all cases, engineering controls must be considered and implemented to the extent that they are feasible.

Scope

This program will cover all Civil Works Contracting employees who wear respiratory protection during work activities and those who anticipate wearing respiratory equipment during an emergency incident.

Responsibilities

Civil Works Contracting will provide respirators, training, fit testing, and medical fitness evaluations, as required, at no cost to the employee.

Program Administrator Responsibilities

- The designated Program Administrator will be the HSE Director or his/her designated representative.
- The Program Administrator will have the authority to make decisions and implement changes to the program as necessary.
- The Program Administrator will administer/oversee the program.
- The Program Administrator will conduct the required evaluations of program effectiveness.
- The Program Administrator will ensure that all employees who wear a negative or positive pressure tight-fitting face-piece will be fit tested before use in the workplace.
- The Program Administrator will assist projects in identifying, evaluating, and surveying work areas that require respiratory protection.
- The Program Administrator will maintain the required records.

Supervisory Personnel Responsibilities

This section refers to those supervisory personnel who have at least one work area that requires the use of respiratory equipment. Supervisory personnel would include such people as Installation Managers, Supervisors, etc.

- Supervisors will be trained and familiarized with this program.
- Supervisors will ensure that workers are identified, medically evaluated, trained, fit tested, and equipped for respiratory protection usage.
- Supervisors will ensure that respiratory equipment is available.
- Supervisors will ensure that all respirator users are properly trained and fit tested.
- Supervisors will enforce the proper use and maintenance of respiratory equipment as necessary.
- Supervisors will monitor work areas to identify potential respiratory hazards.
- Supervisors will coordinate and consult with the Program Administrator on the administration of this program.

Employee Responsibilities

- The employee will be responsible for the routine care and maintenance of the respirator. The employee will inform his/her supervisor for remediation of any problems with the respirator.
- The employee will inform his/her supervisor of any respiratory hazards or any aspects of the program that the employee feels is not being adequately addressed.
- The employee will maintain a facial surface consistent with a proper fit of the respiratory device; i.e., no beards and clean-shaven.

Physician or Licensed Health Care Professional Responsibilities

- The designated employee health clinic is the Physician or Other Licensed Health Care Professional (PLHCP) as defined in 29 CFR 1910.134(b) for the Company.
- The HCP will make the determination whether an employee is medically fit to wear respiratory protection equipment.
- The (PLHCP) will determine what tests, evaluations, etc. are necessary to make the determination whether an employee is medically fit to wear respiratory protection equipment.
- The Program Administrator and designated employee health clinic will maintain records.

Engineering Controls

Engineering controls will be used when feasible. Examples of engineering controls are:

- Changes in the work process that reduce or eliminate worker exposure;
- Substitute less hazardous chemicals or products for more hazardous materials;
- Enclose or isolate the work process from the affected workers; and/or
- Use ventilation to dilute or remove the contaminant.

Types of Respiratory Protection

This program covers the use of both air-filtered and air-supplied respirators. Civil Works Contracting will use certified and approved respirators and cartridges, will identify and evaluate respirator hazards, and will select and provide an appropriate respirator for the hazard.

Civil Works Contracting Supervisors will select respirators from a sufficient number of respirator models and sizes so that the respirator is acceptable to and correctly fits the user."

Medical Fitness Evaluations of Employees

Civil Works Contracting will provide a medical fitness evaluation to determine the employee's ability to use a respirator before the employee is fit tested or required to use the respirator in the workplace. Civil Works Contracting will discontinue an employee's medical fitness evaluations when the employee is no longer required to use a respirator.

Fit Testing Procedures

Before an employee wears a negative or positive pressure tight-fitting face-piece, the employee must be fit tested with the same make, model, style and size of respirator to be used.

The employee must pass an appropriate QLFT or QNFT. The employee will be fit tested:

- Prior to initial use of a respirator, and
- Whenever a different respirator face-piece (size, style, model or make) is used, and
- On an annual basis.

The employee will be given additional fit testing whenever the employee reports or the PLHCP, Supervisors, or Program Administrator makes visual observations of, changes in the employee's physical condition that could affect respirator fit. Such conditions are, but not limited to:

- Facial scarring
- Dental changes
- Cosmetic surgery
- Obvious change in body weight

Maintenance and Care of Respirators

Civil Works Contracting will provide each respirator user with a respirator that is clean, sanitary, and in good working order.

Civil Works Contracting will provide the materials needed to clean and disinfect the respirators.

Each respirator user will clean and disinfect his/her respirator according to the manufacturer's recommendations. This includes disassembly, cleaning and disinfecting, rinsing, drying and reassembly.

Storage

Respiratory equipment will be stored in a manner that protects the equipment from damage, contamination, dust, sunlight, extreme temperatures, excessive moisture, and damaging chemicals.

The respiratory equipment will be stored in a manner that prevents the deformation of the face-piece and the exhalation valve.

Inspection of Respiratory Equipment

Civil Works Contracting will ensure that respiratory equipment is inspected according to the following schedule.

The respiratory equipment will be visually inspected for damaged or missing parts before each use and during cleaning.

Replacement and Repair

The employee or his/her supervisor will replace defective or missing valve flaps, gaskets and head straps on air-purifying respirators. This is considered to be routine maintenance and not repair.

Repairs will be made by qualified technicians.

The employee will immediately inform his/her supervisor of any repairs to be made to the defective respirator equipment and take the equipment out of service.

The supervisor will ensure that the defective respiratory equipment is either repaired or replaced. He/she will also ensure that the defective equipment is not used in the interim.

Training and Information

Civil Works Contracting will ensure that the employee can demonstrate knowledge in the following areas:

- Why respiratory protection is necessary
- The limitations and capabilities of respiratory equipment

- The use of respiratory equipment in an emergency
- How to inspect, put on and remove a respirator, and how to perform user check seals
- Procedures for maintenance and storage of respiratory equipment
- How to recognize medical signs and symptoms

Program Evaluation

Supervisors will evaluate the Respiratory Protection Program for the workplace. This evaluation is dependent upon various workplace practices.

At a minimum, he/she will assess:

- The proper respirator fit on the employee.
- Whether the respirator use is interfering with effective work performance.
- Whether appropriate respiratory protection has been selected.
- Whether the respirator is used properly.
- Whether the respiratory equipment is used properly.

Supervisors will inquire about the workers' usage of respiratory equipment and its effect on them:

- Interference with hearing or vision
- Fatigue
- Breathing difficulties
- Interference with movement or job performance
- Comfort
- Confidence in using the respirator correctly
- Confidence that respiratory equipment is performing adequately

Supervisors will have any problems corrected.

Recordkeeping

The Program Administrator will ensure that the following documents are maintained:

- A written record that certifies that the employee is medically fit to wear a respirator and any limitations.
- A written record of the last Respiratory Fit Test administered to the employee. At a minimum, the record will contain:
  - Name of the employee tested
  - Type of fit test used
  - Make, model and size of the respirator tested
  - Date of the respiratory fit test
  - Test results
  - A current, written copy of the Respiratory Protection Program.

The PLHCP will maintain all written medical records of the employees who wear respiratory equipment.

Access to Records

Only the affected employee and the PLHCP will have access to the affected employee's medical records.

The Program Administrator will make available for review and copying the written records of an affected employee. An employee is restricted to his/her records only.

Voluntary Usage (Where Respirator Use is Not Required)

When respiratory protection is not required and paper dust masks are voluntarily used, employees are either verbally or in writing given the information contained in Appendix D of 29 CFR 1910(134).

10.23 Respirable Silica Exposure Control Plan

Health Effects of Silica Dust

Breathing in very small ("respirable") crystalline silica particles, causes multiple diseases, including silicosis, an incurable lung disease that leads to disability and death. Respirable crystalline silica also causes lung cancer, chronic obstructive pulmonary disease (COPD), and kidney disease. Exposure to respirable crystalline silica is related to the development of autoimmune disorders and cardiovascular impairment. These occupational diseases are life-altering and debilitating disorders that annually affect thousands of workers across the United States.

Silicosis

Breathing crystalline silica dust can cause silicosis, which in severe cases can be disabling, or even fatal. When silica dust enters the lungs, it causes the formation of scar tissue, which makes it difficult for the lungs to take in oxygen. There is no cure for silicosis.

Silicosis typically occurs after 15–20 years of occupational exposure to respirable crystalline silica. Symptoms may or may not be obvious; therefore, workers need to have a chest x-ray to determine if there is lung damage. As the disease progresses, the worker may experience shortness of breath upon exercising. In the later stages, the worker may experience fatigue, extreme shortness of breath, chest pain, or respiratory failure.

Because silicosis affects the immune system, exposure to silica increases the risk of lung infections, such as tuberculosis. In addition, smoking causes lung damage and adds to the damage caused by breathing silica dust.

In rare instances, individuals exposed to very high concentrations of respirable crystalline silica can develop typical silicosis symptoms as well as fever and weight loss within weeks instead of years. In these cases, medical evaluation should be performed as soon as possible.

Lung Cancer

Exposure to respirable crystalline silica increases the risk of developing lung cancer. Lung cancer is a disease where abnormal cells grow uncontrollably into tumors, interfering with lung function. The abnormal cancer cells can also travel ("metastasize") and cause damage to other parts of the body. Most cases are not curable.

Chronic Obstructive Pulmonary Disease (COPD)

Exposure to respirable crystalline silica increases the risk of other lung diseases, primarily COPD, which includes emphysema and chronic bronchitis. The main symptom of COPD is shortness of breath due to difficulty breathing air into the lungs. COPD is not usually reversible and may worsen over time.

Kidney Disease

Studies of workers exposed to respirable crystalline silica have found that these workers are at increased risk of developing kidney disease. For instance, kidney failure has been observed among workers with high silica exposure, such as in abrasive blasters who also were suffering from silicosis.

Scope and Application

This section applies to all occupational exposures to respirable crystalline silica in construction work, except where employee exposure will remain below 25 micrograms per cubic meter of air (25 µg/m3) as an 8-hour time-weighted average (TWA) under any foreseeable conditions.

The contents of this plan shall be reviewed by all Civil Works Contracting staff including but not limited to; their management staff, site personnel, subcontractors, subcontractor personnel, USACE personnel and facility personnel.

The scope of work for projects could have operations that include:

- Hammer Drilling
- Concrete Cutting
- Concrete Demo

Additional silica exposure control methods for unexpected construction activities are addressed in the plan below.

Responsibilities

Competent Person - Supervisors who oversee personnel with responsibilities to work in areas where there is a risk of exposure to silica dust, will serve as the silica competent person and be responsible for the implementation of this written control plan. They must ensure their employees are properly trained on the applicable contents of the Silica Exposure Control Program and that they are provided appropriate personal protective equipment (PPE) when conducting such work.

Authorized Person - Employees working in areas where there is an identified risk of silica dust exposure above the action limit must be properly trained on all applicable elements of the Silica Exposure Control Program; and be provided and utilize the appropriate PPE for the task being performed.

Definitions

For the purposes of this section the following definitions apply:

Action Level - a concentration of airborne respirable crystalline silica of 25 µg/m3 , calculated as an 8-hour TWA.

Assistant Secretary - the Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, or designee.

Director - the Director of the National Institute for Occupational Safety and Health (NIOSH), U.S. Department of Health and Human Services, or designee.

Competent Person - an individual who is capable of identifying existing and foreseeable respirable crystalline silica hazards in the workplace and who has authorization to take prompt corrective measures to eliminate or minimize them. The competent person must have the knowledge and ability necessary to fulfill the responsibilities set forth in this section.

Employee Exposure - the exposure to airborne respirable crystalline silica that would occur if the employee were not using a respirator.

High-efficiency Particulate Air [HEPA] Filter - a filter that is at least 99.97 percent efficient in

removing mono-dispersed particles of 0.3 micrometers in diameter.

Objective Data - information, such as air monitoring data from industry-wide surveys or calculations based on the composition of a substance, demonstrating employee 2 exposure to respirable crystalline silica associated with a particular product or material or a specific process, task, or activity. The data must reflect workplace conditions closely resembling or with a higher exposure potential than the processes, types of material, control methods, work practices, and environmental conditions in the Civil Works Contracting current operations.

Physician or Other Licensed Health Care Professional [PLHCP] - an individual whose legally permitted scope of practice (i.e., license, registration, or certification) allows him or her to independently provide or be delegated the responsibility to provide some or all of the particular health care services required by this section.

Respirable Crystalline Silica - quartz, cristobalite, and/or tridymite contained in airborne particles that are determined to be respirable by a sampling device designed to meet the characteristics for respirable-particle-size-selective samplers specified in the International Organization for Standardization (ISO) 7708:1995: Air Quality – Particle Size Fraction Definitions for Health-Related Sampling.

Specialist - an American Board-Certified Specialist in Pulmonary Disease or an American Board-Certified Specialist in Occupational Medicine.

This section - this respirable crystalline silica standard, 29 CFR 1926.1153.

Specified Exposure Control Methods

For each employee engaged in a task identified on Table 1, Civil Works Contracting shall fully and properly implement the engineering controls, work practices, and respiratory protection specified for the task on Table 1, unless Civil Works Contracting assesses and limits the exposure of the employee to respirable crystalline silica.

TABLE 1: SPECIFIED EXPOSURE CONTROL METHODS WHEN WORKING WITH MATERIALS CONTAINING CRYSTALLINE SILICA 3

Equipment / Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤ 4 hours /shift	> 4 hours /shift
(i) Stationary masonry saws	Use saw equipped with integrated water delivery system that continuously feeds water to the blade. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.	None	None
(ii) Handheld power saws (any blade diameter)	Use saw equipped with integrated water delivery system that continuously feeds water to the blade. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. − When used outdoors. − When used indoors or in an enclosed area.	None APF 10	APF 10 APF 10
(iii) Handheld power saws for cutting fiber-cement board (with blade diameter of 8 inches or less)	For tasks performed outdoors only: Use saw equipped with commercially available dust collection system. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency.	None	None

Equipment / Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤ 4 hours /shift	> 4 hours /shift
(iv) Walk-behind saws	Use saw equipped with integrated water delivery system that continuously feeds water to the blade. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. − When used outdoors. − When used indoors or in an enclosed area.	None APF 10	None APF 10
(v) Drivable saws	For tasks performed outdoors only: Use saw equipped with integrated water delivery system that continuously feeds water to the blade. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.	None	None
(vi) Rig-mounted core saws or drills	Use tool equipped with integrated water delivery system that supplies water to cutting surface. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.	None	None
(vii) Handheld and stand-mounted drills (including impact and rotary hammer drills)	Use drill equipped with commercially available shroud or cowling with dust collection system. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism. Use a HEPA-filtered vacuum when cleaning holes.	None	None

Equipment / Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤ 4 hours /shift	> 4 hours /shift
(viii) Dowel drilling rigs for concrete	For tasks performed outdoors only: Use shroud around drill bit with a dust collection system. Dust collector must have a filter with 99% or greater efficiency and a filter- cleaning mechanism. Use a HEPA-filtered vacuum when cleaning holes.	APF 10	APF 10
(ix) Vehicle-mounted drilling rigs for rock and concrete	Use dust collection system with close capture hood or shroud around drill bit with a low-flow water spray to wet the dust at the discharge point from the dust collector. OR Operate from within an enclosed cab and use water for dust suppression on drill bit.	None None	None None
(x) Jackhammers and handheld powered chipping tools	Use tool with water delivery system that supplies a continuous stream or spray of water at the point of impact. − When used outdoors. − When used indoors or in an enclosed area OR Use tool equipped with commercially available shroud and dust collection system. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism. − When used outdoors. − When used indoors or in an enclosed area.	None APF 10 None APF 10	APF 10 APF 10 APF 10 APF 10

Equipment / Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤ 4 hours /shift	> 4 hours /shift
(xi) Handheld grinders for mortar removal (i.e., tuckpointing)	Use grinder equipped with commercially available shroud and dust collection system. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. Dust collector must provide 25 cubic feet per minute (cfm) or greater of airflow per inch of wheel diameter and have a filter with 99% or greater efficiency and a cyclonic pre-separator or filter-cleaning mechanism.	APF 10	APF 25
(xii) Handheld grinders for uses other than mortar removal	For tasks performed outdoors only: Use grinder equipped with integrated water delivery system that continuously feeds water to the grinding surface. Operate and maintain tool in accordance with manufacturer’s instructions to minimize dust emissions. OR Use grinder equipped with commercially available shroud and dust collection system. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. Dust collector must provide 25 cubic feet per minute (cfm) or greater of airflow per inch of wheel diameter and have a filter with 99% or greater efficiency and a cyclonic pre-separator or filter-cleaning mechanism. − When used outdoors. − When used indoors or in an enclosed area.	None None None	None None APF 10

Equipment / Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤ 4 hours /shift	> 4 hours /shift
(xiii) Walk-behind milling machines and floor grinders	Use machine equipped with integrated water delivery system that continuously feeds water to the cutting surface. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. OR Use machine equipped with dust collection system recommended by the manufacturer. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. Dust collector must provide the air flow recommended by the manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism. When used indoors or in an enclosed area, use a HEPA-filtered vacuum to remove loose dust in between passes.	None None	None None
(xiv) Small drivable milling machines (less than half-lane)	Use a machine equipped with supplemental water sprays designed to suppress dust. Water must be combined with a surfactant. Operate and maintain machine to minimize dust emissions.	None	None

Equipment / Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤ 4 hours /shift	> 4 hours /shift
(xv) Large drivable milling machines (half-lane and larger)	For cuts of any depth on asphalt only: Use machine equipped with exhaust ventilation on drum enclosure and supplemental water sprays designed to suppress dust. Operate and maintain machine to minimize dust emissions. For cuts of four inches in depth or less on any substrate: Use machine equipped with exhaust ventilation on drum enclosure and supplemental water sprays designed to suppress dust. Operate and maintain machine to minimize dust emissions. OR Use a machine equipped with supplemental water spray designed to suppress dust. Water must be combined with a surfactant. Operate and maintain machine to minimize dust emissions.	None None None	None None None
(xvi) Crushing machines	Use equipment designed to deliver water spray or mist for dust suppression at crusher and other points where dust is generated (e.g., hoppers, conveyers, sieves/sizing or vibrating components, and discharge points). Operate and maintain machine in accordance with manufacturer's instructions to minimize dust emissions. Use a ventilated booth that provides fresh, climate-controlled air to the operator, or a remote-control station.	None	None

Equipment / Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤ 4 hours /shift	> 4 hours /shift
(xvii) Heavy equipment and utility vehicles used to abrade or fracture silica-containing materials (e.g., hoe-ramming, rock ripping) or used during demolition activities involving silica-containing materials	Operate equipment from within an enclosed cab. When employees outside of the cab are engaged in the task, apply water and/or dust suppressants as necessary to minimize dust emissions.	None None	None None
(xviii) Heavy equipment and utility vehicles for tasks such as grading and excavating but not including: demolishing, abrading, or fracturing silica-containing materials	Apply water and/or dust suppressants as necessary to minimize dust emissions. OR When the equipment operator is the only employee engaged in the task, operate equipment from within an enclosed cab.	None None	None None

When implementing the control measures specified in Table 1, each employer shall:

1. For tasks performed indoors or in enclosed areas, provide a means of exhaust as needed to minimize the accumulation of visible airborne dust;
2. For tasks performed using wet methods, apply water at flow rates sufficient to minimize release of visible dust;
3. For measures implemented that include an enclosed cab or booth, ensure that the enclosed cab or booth:
    a. Is maintained as free as practicable from settled dust;
    b. Has door seals and closing mechanisms that work properly;
    c. Has gaskets and seals that are in good condition and working properly;
    d. Is under positive pressure maintained through continuous delivery of fresh air;
    e. Has intake air that is filtered through a filter that is 95% efficient in the 0.3-10.0 µm range (e.g., MERV-16 or better); and 15
    f. Has heating and cooling capabilities.

Where an employee performs more than one task on Table 1 during the course of a shift, and the total duration of all tasks combined is more than four hours, the required respiratory protection for each task is the respiratory protection specified for more than four hours per shift. If the total duration of all tasks on Table 1 combined is less than four hours, the required respiratory protection for each task is the respiratory protection specified for less than four hours per shift.

Alternative exposure control methods - For tasks not listed in Table 1, or where Civil Works Contracting does not fully and properly implement the engineering controls, work practices, and respiratory protection described in Table 1:

1. Permissible exposure limit (PEL). Civil Works Contracting shall ensure that no employee is exposed to an airborne concentration of respirable crystalline silica in excess of 50 µg/m3, calculated as an 8-hour TWA.

General Exposure Assessment

Civil Works Contracting shall assess the exposure of each employee who is or may reasonably be expected to be exposed to respirable crystalline silica at or above the action level in accordance with either the performance option or the scheduled monitoring option of this section.

Performance option - Civil Works Contracting shall assess the 8-hour TWA exposure for each employee on the basis of any combination of air monitoring data or objective data sufficient to accurately characterize employee exposures to respirable crystalline silica.

Scheduled monitoring option - Civil Works Contracting shall perform initial monitoring to assess the 8-hour TWA exposure for each employee on the basis of one or more personal breathing zone air samples that reflect the exposures of employees on each shift, for each job 16 classification, in each work area.

1. Where several employees perform the same tasks on the same shift and in the same work area, Civil Works Contracting may sample a representative fraction of these employees in order to meet this requirement. In representative sampling, Civil Works Contracting shall sample the employee(s) who are expected to have the highest exposure to respirable crystalline silica.
2. If initial monitoring indicates that employee exposures are below the action level, Civil Works Contracting may discontinue monitoring for those employees whose exposures are represented by such monitoring.
3. Where the most recent exposure monitoring indicates that employee exposures are at or above the action level but at or below the PEL, Civil Works Contracting shall repeat such monitoring within six months of the most recent monitoring.
4. Where the most recent exposure monitoring indicates that employee exposures are above the PEL, Civil Works Contracting shall repeat such monitoring within three months of the most recent monitoring.
5. Where the most recent (non-initial) exposure monitoring indicates that employee exposures are below the action level, Civil Works Contracting shall repeat such monitoring within six months of the most recent monitoring until two consecutive measurements, taken seven or more days apart, are below the action level, at which

time Civil Works Contracting may discontinue monitoring for those employees whose exposures are represented by such monitoring, except as otherwise provided.

Reassessment of exposures - Civil Works Contracting shall reassess exposures whenever a change in the production, process, control equipment, personnel, or work practices may reasonably be expected to result in new or additional exposures at or above the action level, or 17 when Civil Works Contracting has any reason to believe that new or additional exposures at or above the action level have occurred.

Methods of sample analysis - Civil Works Contracting shall ensure that all samples taken to satisfy the monitoring requirements of the project are evaluated by a laboratory that analyzes air samples for respirable crystalline silica in accordance with the procedures in Appendix A to this section.

Employee Notification of Assessment Results

(A) Within five working days after completing an exposure assessment, Civil Works Contracting shall individually notify each affected employee in writing of the results of that assessment or post the results in an appropriate location accessible to all affected employees.

(B) Whenever an exposure assessment indicates that employee exposure is above the PEL, Civil Works Contracting shall describe in the written notification the corrective action being taken to reduce employee exposure to or below the PEL.

Observation of Monitoring

(A) Where air monitoring is performed to comply with the requirements of this section, Civil Works Contracting shall provide affected employees or their designated representatives an opportunity to observe any monitoring of employee exposure to respirable crystalline silica.

(B) When observation of monitoring requires entry into an area where the use of protective clothing or equipment is required for any workplace hazard, Civil Works Contracting shall provide the observer with protective clothing and equipment at no cost and shall ensure that the observer uses such clothing and equipment.

Methods of Compliance

Engineering and work practice controls - Civil Works Contracting shall use engineering and work practice controls to reduce and maintain employee exposure to 18 respirable crystalline silica to or below the PEL, unless Civil Works Contracting can demonstrate that such controls are not feasible.

Wherever such feasible engineering and work practice controls are not sufficient to reduce employee exposure to or below the PEL, Civil Works Contracting shall nonetheless use them to reduce employee exposure to the lowest feasible level and shall supplement them with the use of respiratory protection that complies with the requirements of the project specifications.

Abrasive Blasting

In addition to the requirements of this section, Civil Works Contracting shall comply with other OSHA standards, when applicable, such as 29 CFR 1926.57 (Ventilation), where abrasive blasting is conducted using crystalline silica-containing blasting agents, or where abrasive blasting is conducted on substrates that contain crystalline silica.

General Respiratory Protection

Where respiratory protection is required by this section, Civil Works Contracting must provide each employee an appropriate respirator that complies with the requirements of this paragraph and 29 CFR 1910.134. Respiratory protection is required:

1. Where specified by Table 1; or
2. For tasks not listed in Table 1, or where Civil Works Contracting does not fully and properly implement the engineering controls, work practices, and respiratory protection described in Table 1:
    A. Where exposures exceed the PEL during periods necessary to install or implement feasible engineering and work practice controls;
    B. Where exposures exceed the PEL during tasks, such as certain maintenance and repair tasks, for which engineering and work practice controls are not feasible; and
    C. During tasks for which an employer has implemented all feasible engineering and work practice controls and such controls are not sufficient to reduce exposures to or below the PEL. 19
3. Respiratory protection program. Where respirator use is required by this section, Civil Works Contracting shall institute a respiratory protection program in accordance with 29 CFR 1910.134.

Specified exposure control methods - For the tasks listed in Table 1, if Civil Works Contracting fully and properly implements the engineering controls, work practices, and respiratory protection described in Table 1, Civil Works Contracting shall be considered to be in compliance of the requirements for selection of respirators in 29 CFR 1910.134(d)(1)(iii) and (d)(3) with regard to exposure to respirable crystalline silica.

Housekeeping

Civil Works Contracting shall not allow dry sweeping or dry brushing where such activity could contribute to employee exposure to respirable crystalline silica unless wet sweeping, HEPA- filtered vacuuming or other methods that minimize the likelihood of exposure are not feasible.

Civil Works Contracting shall not allow compressed air to be used to clean clothing or surfaces where such activity could contribute to employee exposure to respirable crystalline silica unless:

- The compressed air is used in conjunction with a ventilation system that effectively captures the dust cloud created by the compressed air; or
- No alternative method is feasible.

Communication of Respirable Crystalline Silica Hazards to Employees - Hazard Communication

Civil Works Contracting shall include respirable crystalline silica in the program established to comply with the hazard communication standard (HCS) (29 CFR 1910.1200). Civil Works Contracting shall ensure that each employee has access to labels on containers of crystalline silica and safety data sheets, and is trained in accordance with the provisions of HCS and paragraph (i)(2). Civil Works Contracting shall ensure that at least the following hazards are addressed: Cancer, lung effects, immune system effects, and kidney effects.

Employee information and training - Civil Works Contracting shall ensure that each employee covered by this section can demonstrate knowledge and understanding of at least the following:

A. The health hazards associated with exposure to respirable crystalline silica;
B. Specific tasks in the workplace that could result in exposure to respirable crystalline silica;
C. Specific measures Civil Works Contracting has implemented to protect employees from exposure to respirable crystalline silica, including engineering controls, work practices, and respirators to be used;
D. The contents of this section;
E. The identity of the competent person designated by Civil Works Contracting in accordance with paragraph (g)(4); and
F. The purpose and a description of the medical surveillance program required.

Civil Works Contracting shall make a copy of this section readily available without cost to each employee covered by this section.

Medical Examinations

Initial examination - Civil Works Contracting shall make available an initial (baseline) medical examination within 30 days after initial assignment, unless the employee has received a medical examination that meets the requirements of this section within the last three years. The examination shall consist of:

1. A medical and work history, with emphasis on: past, present, and anticipated exposure to respirable crystalline silica, dust, and other agents affecting the respiratory system; 21 any history of respiratory system dysfunction, including signs and symptoms of respiratory disease (e.g., shortness of breath, cough, wheezing); history of tuberculosis; and smoking status and history;
2. A physical examination with special emphasis on the respiratory system;
3. A chest X-ray (a single posteroanterior radiographic projection or radiograph of the chest at full inspiration recorded on either film (no less than 14 x 17 inches and no more than 16 x 17 inches) or digital radiography systems), interpreted and classified according to the International Labor Office (ILO) International Classification of Radiographs of Pneumoconiosis by a NIOSH-certified B Reader;
4. A pulmonary function test to include forced vital capacity (FVC) and forced expiratory volume in one second (FEV1) and FEV1/FVC ratio, administered by a spirometry technician with a current certificate from a NIOSH-approved spirometry course;
5. Testing for latent tuberculosis infection; and

6. Any other tests deemed appropriate by the PLHCP.

Periodic examinations - Civil Works Contracting shall make available medical examinations that include the procedures described in paragraph (h)(2) of CFR 1926.1153 (except paragraph (h)(2)(v)) at least every three years, or more frequently if recommended by the PLHCP.

Information provided to the PLHCP - Civil Works Contracting shall ensure that the examining PLHCP has a copy of this standard, and shall provide the PLHCP with the following information:

- A description of the employee's former, current, and anticipated duties as they relate to the employee's occupational exposure to respirable crystalline silica; 22
- The employee's former, current, and anticipated levels of occupational exposure to respirable crystalline silica;
- A description of any personal protective equipment used or to be used by the employee, including when and for how long the employee has used or will use that equipment; and
- Information from records of employment-related medical examinations previously provided to the employee and currently within the control of Civil Works Contracting.

PLHCP's written medical report for the employee - Civil Works Contracting shall ensure that the PLHCP explains to the employee the results of the medical examination and provides each employee with a written medical report within 30 days of each medical examination performed. The written report shall contain:

- A statement indicating the results of the medical examination, including any medical condition(s) that would place the employee at increased risk of material impairment to health from exposure to respirable crystalline silica and any medical conditions that require further evaluation or treatment;
- Any recommended limitations on the employee's use of respirators;
- Any recommended limitations on the employee's exposure to respirable crystalline silica; and

- A statement that the employee should be examined by a specialist (pursuant to paragraph (h)(7) of CFR 1926.1153) if the chest X-ray provided in accordance with this section is classified as 1/0 or higher by the B Reader, or if referral to a specialist is otherwise deemed appropriate by the PLHCP. 23

PLHCP's written medical opinion - Civil Works Contracting shall obtain a written medical opinion from the PLHCP within 30 days of the medical examination. The written opinion shall contain only the following:

A. The date of the examination;
B. A statement that the examination has met the requirements of this section; and
C. Any recommended limitations on the employee's use of respirators.

If the employee provides written authorization, the written opinion shall also contain either or

both of the following:

1. Any recommended limitations on the employee's exposure to respirable crystalline silica;
2. A statement that the employee should be examined by a specialist (pursuant to paragraph (h)(7) of CFR 1926.1153) if the chest X-ray provided in accordance with this section is classified as 1/0 or higher by the B Reader, or if referral to a specialist is otherwise deemed appropriate by the PLHCP.

Civil Works Contracting shall ensure that each employee receives a copy of the written medical opinion described in this section within 30 days of each medical examination performed.

Additional examinations - If the PLHCP's written medical opinion indicates that an employee should be examined by a specialist, Civil Works Contracting shall make available a medical examination by a specialist within 30 days after receiving the PLHCP's written opinion.

Civil Works Contracting shall ensure that the examining specialist is provided with all of the information that Civil Works Contracting is obligated to provide to the PLHCP in accordance with paragraph (h)(4) of CFR 1926.1153.

Civil Works Contracting shall ensure that the specialist explains to the employee the results of the medical examination and provides each employee with a written medical report within 30 days of the examination. The written report shall meet the requirements of paragraph (h)(5) (except paragraph (h)(5)(iv)) of CFR 1926.1153.

Civil Works Contracting shall obtain a written opinion from the specialist within 30 days of the medical examination. The written opinion shall meet the requirements of paragraph (h)(6) (except paragraph (h)(6)(i)(B) and (ii)(B)) of CFR 1926.1153.

Recordkeeping

Air monitoring data - Civil Works Contracting shall make and maintain an accurate record of all exposure measurements taken to assess employee exposure to respirable crystalline silica, as prescribed in the specifications. This record shall include at least the following information:

A. The date of measurement for each sample taken;
B. The task monitored;
C. Sampling and analytical methods used;
D. Number, duration, and results of samples taken;
E. Identity of the laboratory that performed the analysis;
F. Type of personal protective equipment, such as respirators, worn by the employees monitored; and
G. Name, social security number, and job classification of all employees represented by the monitoring, indicating which employees were actually monitored.

Civil Works Contracting shall ensure that exposure records are maintained and made available in accordance with 29 CFR 1910.1020.

Objective data - Civil Works Contracting shall make and maintain an accurate record

of all objective data relied upon to comply with the requirements of this section. 26

This record shall include at least the following information:

A. The crystalline silica-containing material in question;
B. The source of the objective data;
C. The testing protocol and results of testing;
D. A description of the process, task, or activity on which the objective data were based; and
E. Other data relevant to the process, task, activity, material, or exposures on which the objective data were based.

Civil Works Contracting shall ensure that objective data are maintained and made available in

accordance with 29 CFR 1910.1020.

Medical surveillance - Civil Works Contracting shall make and maintain an accurate record for each employee covered by medical surveillance. The record shall include the following information about the employee:

A. Name and social security number;
B. A copy of the PLHCPs' and specialists' written medical opinions; and
C. A copy of the information provided to the PLHCPs and specialists.

Civil Works Contracting shall ensure that medical records are maintained and made available in accordance with 29 CFR 1910.1020.

10.24 Spill Prevention and Response Plan

Purpose

The purpose of this plan is to document spill prevention and response requirements. Each Civil Works work site will develop a spill prevention and response plan based on the requirements and template provided.

Scope

This procedure applies to all Civil Works operations. When work is performed on a non-owned or operated site, the operator's program shall take precedence, however, this document covers Civil Works employees and contractors and shall be used on owned premises, or when an operator's program doesn't exist or is less stringent.

REQUIREMENTS

Each work site spill prevention and response plan shall contain the following requirements.

Chemical substances should be stored in proper containers to minimize the potential for a spill. Whenever possible, chemicals should be kept in closed containers and stored so they are not exposed to storm water.

The program must identify chemicals used that may be potentially spilled or released. This will include both liquid chemicals used at our facilities or brought on to owner client sites.

Spill kits must be adequate for any anticipated spills. A proper spill kit must contain the appropriate supplies for materials that may be spilled. Supplies must be easily accessible when required, and considerations must be made for both the type and quantity of materials. The contents of spill response kits shall be periodically assessed to ensure the availability of adequate spill response supplies and adjust inventory as necessary.

Civil Works shall ensure the availability of adequate spill response supplies by periodic inspection to assess their availability and adjust the inventory as necessary.

Employees must be instructed on spill prevention and the proper response procedures for spilled materials. The training should include materials available for use, proper waste disposal and communication procedures.

Areas where chemicals may be used or stored must be maintained using good housekeeping best management practices. This includes, but is not limited to clean and organized storage, labeling and secondary containment where necessary.

Proper communication measures for employees to initiate in the event of a spill will be created on a site-by-site basis. Communication procedures will be based on type and quantity of materials spilled.

Environmental spills shall be reported to environmental authorities when required. Reporting procedures will be based on type and quantity of materials spilled.

10.25 Tools – Hand and Power

General Requirements

This policy covers the basic practices to be followed when using hand tools and portable power tools at Civil Works Contracting jobsites.

- Tools and equipment must be in good condition and well maintained.
- Only qualified, trained employees may use tools and equipment.
- Tools, guards, and protective devices must not be altered.
- Tools are only to be used for their designed purpose.
- Homemade tools are not allowed.
- If a tool comes with a guard or handle the guard/handle must be on the tool when used.
- All tools, regardless of type or application, will be inspected prior to use and after repairs. Defective tools will be removed from service until repaired or replaced. It is the responsibility of each employee to inspect personal tools for safe operation and serviceability.

Hand Tools

Hand tools are non-powered tools including axes, wrenches, hammers, chisels, screwdrivers, and other hand-operated mechanisms. Although hand tool injuries tend to be less severe than power

tool injuries, they are more common.

Following are the most common causes of hand tool incidents with injury:

- Failure to use the right tool
- Failure to use a tool correctly
- Failure to keep edged tools sharp
- Failure to replace or repair a defective tool
- Failure to store tools safely

Guidelines for general hand tool safety:

- Wear safety glasses whenever you hammer or cut, especially when working with surfaces that chip or splinter.
- Do not use a screwdriver as a chisel. The tool can slip and cause a deep puncture.
- Do not use a chisel as a screwdriver. The tip of the chisel may break and cause an injury.
- Do not use a knife as a screwdriver. The blade can snap and injure an eye.
- Never carry a screwdriver or chisel in your pocket. If you fall, the tool could cause a serious injury. Instead, use a tool belt holder.
- Replace loose, splintered, or cracked handles. Loose hammer, axe, or maul heads can fly off defective handles.
- Use the proper wrench to tighten or loosen nuts. Pliers can chew the comers off a nut.
- When using a chisel, always chip or cut away from yourself. Use a softheaded hammer or mallet to strike a wooden chisel handle. A metal hammer or mallet may cause the handle to split.
- Do not use a wrench if the jaws are sprung.
- Do not use impact tools, such as chisels, wedges, or drift pins, if their heads are mushroom-shaped. The heads may shatter upon impact.
- Direct saw blades, knives, and other tools away from aisle areas and other employees.
- Keep knives and scissors sharp. Dull tools are more dangerous than sharp tools.
- Iron or steel hand tools may cause sparks and be hazardous around flammable substances. Use spark-resistant tools made from brass, plastic, aluminum, or wood when working around flammable hazards.

Guidelines to ensure proper tool storage:

- Have a specific place for each tool.
- Do not place unguarded cutting tools in a drawer. Many hand injuries are caused by rummaging through drawers that contain a jumbled assortment of sharp-edged tools.
- Store knives or chisels in their scabbards.
- Hang saws with the blades away from someone's reach.
- Provide sturdy hooks to hang most tools on.
- Rack heavy tools, such as axes and sledges, with the heavy end down.

Power Tools

Power tools can be extremely dangerous if they are used improperly. Each year, thousands of

people are injured or killed by power tool incidents. Common injuries associated with power tools include abrasions, cuts, lacerations, amputations, burns, electrocution, and broken bones and are often caused by the following:

- Touching the cutting, drilling, or grinding components
- Getting caught in moving parts
- Suffering electrical shock due to improper grounding, equipment defects, or operator misuse
- Being struck by particles that normally eject during operation
- Touching hot tools or work pieces
- Falling in the work area
- Being struck by falling tools

When working around power tools, you must wear personal protective equipment and avoid wearing loose clothing or jewelry that could catch in moving machinery. In additional to basic safety practices, follow these guidelines for working with power tools:

- Use the correct tool for the job. Do not use a tool or attachment for something it was not designed to do.
- Select the correct bit, blade, cutter, or grinder wheel for the material at hand. This precaution will reduce the chance for an accident and improve the quality of your work.
- Keep all guards in place. Cover exposed belts, pulleys, gears, and shafts that could cause injury.
- Always operate tools at the correct speed for the job at hand. Working too slowly can cause an accident just as easily as working too fast.
- Watch your work when operating power tools. Stop working if something distracts you.
- Do not rely on strength to perform an operation. The correct tool, blade, and method should not require excessive strength. If undue force is necessary, you may be using the wrong tool or have a dull blade.
- Before clearing jams or blockages on power tools, disconnect from power source. Do not use your hand to clear jams or blockages, use an appropriate tool.
- Never reach over equipment while it is running.
- Never disable or tamper with safety releases or other automatic switches.
- When the chance for operator injury is great, use a push stick to move material through a machine.
- Disconnect power tools before performing maintenance or changing components.
- Keep a firm grip on portable power tools. These tools tend to "get away" from operators and can be difficult to control.
- Remove chuck keys or adjusting tools prior to operation.
- Keep bystanders away from moving machinery.
- Do not operate power tools when you are sick, fatigued, or taking strong medication.
- When possible, secure work pieces with a clamp or vise to free the hands and minimize the chance of injury. Use a jig for pieces that are unstable or do not lie flat.

Guards

Moving machine parts must be safeguarded to protect operators from serious injury. Belts, gears, shafts, pulleys, flywheels, chains, and other moving parts must be guarded if there is a chance that they could contact an employee.

Hydraulic Tools

Hydraulic tools are powered by a hydraulic pump which can be hand, foot, or engine powered, or even built into the tool itself. Hydraulics tools are used for the generation, control, and transmission of power by the use of pressurized liquids. Examples of hydraulic tools include jacks, presses, and impact wrenches. Hydraulic power tools present various hazards, including trip hazards or slipping hazards from oil leaks.

Safety Guidelines for Hydraulic Tools

- Never exceed the load limit marked on the tool.
- Always use a hydraulic jack on a firm and level surface.
- Inspect all hydraulic tools at least once every six months
- Inspect all jacks used outside the shop before they go out and when they return.
- Immediately inspect any hydraulic tool when subjected to an abnormal load, pressure, or shock.
- Always use leather gloves, safety shoes, and face, eye and ear protection. Consider using impact-resistant gloves.

Pneumatic Tools

Pneumatic tools are powered by compressed air. Common types of these air-powered hand tools include nail guns, stapling guns, grinders, drills, riveting guns, and jackhammers. These tools can cause injuries due to flying parts or loose attachments. Before you begin a job, make sure that pneumatic tools are fastened securely to their air hoses to prevent them from becoming disconnected while in use.

Safety Guidelines for Pneumatic Tools

- Review the manufacturer's instructions before using a tool.
- Wear safety glasses or a face shield and, where necessary, safety shoes or boots
- and hearing protection.
- Make sure air hoses do not present a tripping hazard.
- Never point a compressed air gun at another person.
- Use the recommended air pressure for the task.
- Post warning signs where pneumatic tools are used. Set up screens or shields in areas
- where nearby workers may be exposed to flying fragments, chips, dust, and excessive
- noise.
- Ensure that the compressed air supplied to the tool is clean and dry. Dust, moisture,
- and corrosive fumes can damage a tool. An in-line regulator filter and lubricator
- increases tool life.

- Keep tools clean and lubricated, and maintain them according to the manufacturers'
- instructions.
- Do not attempt to catch falling machinery or power tools.
- Support heavy tools with a counterbalance when possible.

Air Compressors

Air Compressor Operation

- Air compressor equipment should be operated only by authorized and trained personnel.
- The air intake should be from a clean, outside, fresh air source. Screens or filters can be used to clean the air.
- Air compressors should never be operated at speeds faster than the manufacturer's recommendation.
- Equipment should not become overheated.
- Moving parts, such as compressor flywheels, pulleys, and belts that could be hazardous
- should be effectively guarded.

Air Compressor Equipment Maintenance

- Only authorized and trained personnel should service and maintain air compressor equipment.
- Exposed, non-current carrying, metal parts of compressor should be effectively grounded.
- Low flash point lubricants should not be used on compressors because of its high operating temperatures that could cause a fire or explosion.
- Equipment should not be over-lubricated.
- Gasoline or diesel fuel powered compressors shall not be used indoors.
- Equipment placed outside but near buildings should have the exhausts directed away from doors, windows and fresh air intakes.
- Soapy water of lye solutions can be used to clean compressor parts of carbon deposits, but kerosene or other flammable substances should not be used. Frequent cleaning is necessary to keep compressors in good working condition.
- The air systems should be completely purged after each cleaning.
- During maintenance work, the switches of electrically operated compressors should be locked open and tagged to prevent accidental starting.
- Portable electric compressors should be disconnected from the power supply before performing maintenance.

10.26 Traffic Control Program

Traffic Control Plans (TCP's) play a vital role in providing continuity of safe and efficient traffic flow, to the extent interruptions in normal flow are necessary for temporary traffic control operations or other events that must temporarily disrupt normal traffic flow. Important auxiliary provisions that cannot conveniently be specified on project plans can easily be incorporated into Special Provisions within the TCP.

A TCP describes traffic controls to be used for facilitating vehicle and pedestrian traffic through a temporary traffic control zone. The plan may range in scope from being very detailed, to merely referencing typical drawings contained in the MUTCD, standard approved highway agency drawings and manuals, or specific drawings contained in contract documents. The degree of detail in the TCP depends entirely on the complexity of the situation, and TCP's should be prepared by persons knowledgeable about the fundamental principles of temporary traffic control and the work activities to be performed.

Traffic control planning requires forethought. Provisions may be incorporated into the project bid documents that enable contractors to develop alternate traffic control plans, which may be used only if the responsible agency finds they are as good as those provided in the plans/specifications. For maintenance and minor utility projects that do not require bidding, forethought must be given to selecting the best traffic control before occupying the temporary traffic control zone. Also, coordination must be made between projects to ensure that duplicate signing is not used and to ensure compatibility of traffic control between adjacent projects.

Modifications of TCP's may be necessary because of changed conditions or determination of even better ways of handling traffic safely and efficiently, while permitting efficient temporary traffic control activities to progress.

Definitions

The temporary traffic control zone includes the entire section of roadway between the first advance warning sign through the last traffic control device, where traffic returns to its normal path and conditions. Most temporary traffic control zones can be divided into four areas: the advance warning area, the transition area, the activity area, and the termination area. Figure VI-1 illustrates these four areas. The four components that constitute a temporary traffic control zone are described in the order that drivers encounter them. They include the following:

- *Advance Warning Area* **-** In the advance warning area, drivers are informed of what to expect. The advance warning may vary from a single sign or flashing lights on a vehicle to a series of signs in advance of the temporary traffic control zone transition area. On freeways and expressways, where driver speed is generally in the higher range (45 mph or more), signs may be placed from 500 feet to 1/2 mile or more before the temporary traffic control zone. The true test of adequacy of sign spacing is to evaluate how much time the driver has to perceive and react to the condition ahead. In this regard, the use of speed, roadway condition, and related driver expectancy must be considered in order to derive a practical sign spacing distance.

  Effective placement of warning signs for urban and rural locals is as follows:

  (1) *Urban*: Warning sign spacing in advance of the transition area normally range from four to eight times the speed (mph) in feet, with the high end of the range being used when speeds are relatively high. When single advance warning signs are used (as in the case of low-speed residential streets), the advance warning area can be as short as 200 feet. When two or more advance signs are used on higher-speed streets such as major arterials, the advance warning area should extend a greater distance. (See table VI-3.)

  (2) *Rural* roadways are characterized by higher speeds. Spacing for the placement of warning signs is substantially longer-from 8 to 12 times the speed (mph) in feet. Two or more advance warning signs are normally used in these conditions, the advance warning

area should extend 1,500 feet or more in open highway conditions.

- *Transition Area* - When redirection of the driver's normal path is required, traffic must be channelized from the normal path to a new path. This redirection is intended to occur at the beginning of the transition area. In mobile operations, this transition area moves with the workspace. Transition areas usually involve strategic use of tapers, which (because of their importance) are discussed in more detail in the Taper section.
- Activity Area - The activity area is an area of roadway where the work takes place. It is composed of the workspace and the traffic space and may contain one or more buffer spaces.

(1) *Workspace* - The workspace is that portion of the roadway closed to traffic and set aside for workers, equipment, and material. Workspace may be fixed or may move as work progresses. Long-term workspaces are usually delineated by channelizing devices or shielded by barriers to exclude traffic and pedestrians.

(2) *Traffic Space* - The traffic space is the portion of the roadway in which traffic is routed through the activity area.

(3) *Buffer Space* - The buffer space is an optional feature in the activity area that separates traffic flow from the work activity or a potentially hazardous area and provides recovery space for an errant vehicle. Neither work activity nor storage of equipment, vehicles, or material should occur in this space. Buffer spaces may be positioned longitudinally and laterally, with respect to the direction of traffic flow.

(4) *Incident Management Vehicle Storage Space* - When work occurs on a high-volume, highly congested facility in an urban area, it is optional to allow space to store emergency vehicles (e.g., tow trucks) to respond quickly to traffic incidents. The storage space is typically provided at the beginning or end of the activity area, or both. An emergency vehicle storage area should not extend into any portion of the buffer space.

Termination Area - The termination area is used to return traffic to the normal traffic path. The termination area extends from the downstream end of the work area to the END ROAD WORK signs, if posted. Conditions may be such that posting of END ROAD WORK signs is not helpful. For example, the END ROAD WORK signs should normally not be used if other temporary traffic control zones begin within a mile of the end of the workspace in rural areas, or about a quarter-mile within urban areas. For normal daytime maintenance operations, the END ROAD WORK SIGN is optional.

Tapers

A common important element of a temporary traffic control zone is a roadway taper. Tapers may be used in both the transition and termination areas. Tapers are created using a series of channelizing devices or pavement markings placed to move traffic out of or into its normal path. Whenever tapers are to be used near interchange ramps, crossroads, curves, or other influencing factors, it may be desirable to adjust the length of tapers. Longer tapers are not necessarily better than shorter tapers (particularly in urban areas characterized by short block lengths, driveways, etc.), because extended tapers tend to encourage sluggish operation and to encourage drivers to delay lane changes unnecessarily. The real test of taper length involves observation of driver performance after traffic control plans are put into effect. The maximum space between devices in a taper normally approximates the distance in feet of the speed in miles per hour (i.e.: a 55

mph speed road should normally have devices spaced about 55 feet apart).

Merging Taper

A merging taper requires the longest distances because drivers are required to merge with an adjacent lane of traffic at the prevailing speed. The taper should be long enough to enable merging drivers to adjust their speeds and merge into a single lane before the end of the transition. For freeways, expressways, and other roadways having a speed of 45 mph or greater, the minimum length for merging tapers should be computed by a formula L = W x S. For residential, urban, and other streets with speeds less than 45 mph, the formula L = (W X S^2)/60 should be used. Under either formula, L is the taper length in feet, W is the lateral shift of traffic due to the partially or fully closed lane (in feet), and S is the posted speed, the off-peak 85th percentile speed prior to work starting or the anticipated operating speed. The formula L = (W X S^2)/60 is used for speeds less than 45 mph because slower traffic can merge safely in a shorter distance.

Shifting Taper

A shifting taper is used when merging is not required, but a lateral shift is needed. Approximately one-half L has been found to be adequate. Where more space is available, it may be beneficial to use longer distances. Guidance for changes in alignment may also be accomplished by using horizontal curves designed for normal highway speeds.

Shoulder Taper

A shoulder taper may be beneficial on high- speed roadways with improved shoulders that may be mistaken for driving lanes (when work is occurring in the shoulder area). If used, shoulder tapers approaching the activity area should have a length of about one-third L. If a shoulder is used as a travel lane either through practice or during a temporary traffic activity, a normal merging or shifting taper should be used.

Downstream Taper

The downstream taper may be useful in termination areas to provide a visual cue to the driver that access is available to the original lane/path that was closed. When a downstream taper is used, it should have a minimum length of about 100 feet per lane, with devices spaced about 20 feet apart.

One-Lane, Two-Way Taper

The one-lane, two-way traffic taper is used in advance of an activity area that occupies part of a two-way roadway in such a way that a portion of the road is used alternately by traffic in each direction. Typically, traffic is controlled by a temporary traffic signal or a flagger. A short taper having a maximum length of 100 feet with channelizing devices at approximately 20-foot spacings should be used to guide traffic into the one-way section.

DETOURS AND DIVERSIONS

At detours, traffic is directed onto another roadway to bypass the temporary traffic control zone. Detours should be signed clearly over their entire length so that motorists can easily determine how to return to the original roadway.

At diversions, traffic is directed onto a temporary roadway or alignment placed in or next to the right-of-way, e.g., median crossovers or lane shifts.

ONE-LANE, TWO-WAY TRAFFIC CONTROL

Where traffic in both directions must, for a limited distance, use a single lane, provision should be made for alternate one-way movement through the constricted section. Some means of coordinating movements at each end shall be used to avoid head-on conflicts and to minimize delays. Control points at each end should be chosen to permit easy passing of opposing lines of vehicles. At a "spot" obstruction, however, such as an isolated pavement patch on roadways with lower speeds and adequate sight distance, the movement may be self-regulating.

Alternate one-way traffic control may be accomplished as appropriate by flagger control, a flag-carrying or official car, a pilot car, traffic signals, or by using stop or yield control. This section discusses each of these traffic control techniques. (See section flagger section for flagger qualifications.)

Flagger Method

Where a one-lane two-way temporary traffic control zone is short enough to allow visibility from one end to the other, traffic may be controlled by either a single flagger or by a flagger at each end of the section. When a single flagger is used, the flagger should be stationed on the shoulder opposite the obstruction or workspace, or in a position where good visibility and traffic control can be maintained at all times. When good visibility and traffic control cannot be maintained by one flagger station, traffic may be controlled by a flagger at each end of the section. One of the flaggers should be designated as the coordinator. Flaggers should be able to communicate orally or with signals. These signals should not be mistaken for flagging signals. The use of radios may also be desirable even though visual contact is possible.

Flag Transfer Method

Flag carrying is effective when the route is well defined. It should be employed only when the one-way traffic is confined to a relatively short length of road, usually not more than 1 mile in length.

The driver of the last vehicle proceeding into the one-lane section is given a red flag (or other token) and instructed to deliver it to the flagger at the other end. The opposite flagger, upon receipt of the flag, then knows that it is safe to allow traffic to move in the other direction. The flag being carried should always be clean and dry. A variation of this method is the use of an "official" car that always follows the last vehicle proceeding through the section. The use of an official car eliminates the possibility of loss of the flag.

Temporary Traffic Signal Method

Traffic signals may be used to control vehicular traffic movements in temporary traffic control zones. Traffic signals should also be considered for half-width bridge reconstruction on low- to moderate-volume highways. Typical applications include highway or street intersections with a temporary haul road or equipment crossing and through areas requiring alternating one-way traffic operations.

Stop or Yield Control Method

A yield or stop sign may be installed on low- volume, two-lane roads where one side of the roadway is closed, and the other side must serve both directions. The side that is closed should yield to or stop for oncoming traffic on the side that is open. The approach to the side that is not closed must be visible (for a distance equal to the safe-passing sight distance for that approach) to the driver who must yield or stop.

TRANSIT CONSIDERATIONS

Provision for effective continuity of transit service needs to be incorporated into the temporary traffic control planning process. Oftentimes, public transit buses cannot efficiently be detoured in the same manner as other vehicles (particularly for short-term maintenance projects). On transit routes, the TCP shall provide for features such as temporary bus stops, pull-outs, and waiting areas for transit patrons.

PEDESTRIAN CONSIDERATIONS

There are three threshold considerations in planning for pedestrian safety in temporary traffic control zones on highways and streets:

Pedestrians should not be led into direct conflicts with work site vehicles, equipment, or operations.

Pedestrians should not be led into direct conflicts with mainline traffic moving through or around the work site.

Pedestrians should be provided with a safe, convenient travel path that replicates as nearly as possible the most desirable characteristics of sidewalks or footpaths.

WORKER SAFETY CONSIDERATIONS

Of equal importance to the safety of the public traveling through the temporary traffic control zone is the safety of the worker performing the many varied tasks within the work site. Work areas present temporary and constantly changing conditions that are unexpected by the traveler. Further, these work area conditions almost always present situations that are more confusing for the driver. This creates an even higher degree of vulnerability for the personnel on or near the roadway.

Below are key elements of traffic control management that should be considered in any procedure for assuring worker safety:

- *Training*: All workers should be trained in how to work next to traffic in a way that minimizes their vulnerability. In addition, workers with specific traffic control responsibilities should be trained in traffic control techniques, device usage, and placement.
- *Worker Clothing*: Workers exposed to traffic should be attired in bright, highly visible clothing similar to that of flaggers.
- *Barriers*: Barriers should be placed along the workspace depending on such factors as lateral clearance of workers from adjacent traffic, speed of traffic, duration of operations, time of day, and volume of traffic.

- *Speed Reduction*: In highly vulnerable situations, consideration should be given to reducing the speed of traffic through regulatory speed zoning, funneling, use of police, lane reduction, or flaggers.
- *Use of Police*: In highly vulnerable work situations, particularly those of relatively short duration, stationing police units heightens the awareness of passing traffic and will likely cause a reduction in travel speed.
- *Lighting*: For nighttime work, lighting the work area and approaches may allow the driver better comprehension of the requirements being imposed. Care should be taken to ensure that the lighting does not cause blinding.
- *Special Devices*: Judicious use of special warning and control devices may be helpful for certain difficult work area situations. These include rumble strips, changeable message signs, hazard identification beacons, flags, and warning lights. Flagger activated audible warning devices may be used to alert workers to the approach of erratic vehicles. Misuse and overuse of special devices/techniques can greatly lessen their effectiveness.
- *Public Information*: Improved driver performance may be realized through a well-prepared and complete public relations effort that covers the nature of the work, the time and duration of its execution, and its anticipated effects upon traffic and possible alternate routes and modes of travel.
- *Road Closure*: If alternate routes are available to handle detoured traffic, the road may be closed temporarily during times of greatest worker hazard-which, in addition to offering maximum worker safety, may facilitate quicker project completion and thus further reduce worker vulnerability.

HAND-SIGNALING CONTROL

QUALIFICATIONS FOR FLAGGERS

Because flaggers are responsible for public safety and make the greatest number of public contacts of all highway workers, they should have the following minimum qualifications:

- Sense of responsibility for the safety of the public and workers
- Training in safe traffic control practices
- Average intelligence
- Good physical condition, including sight and hearing
- Mental alertness and the ability to react in an emergency
- Courteous but firm manner
- Neat appearance

HIGH-VISIBILITY CLOTHING

For daytime work, the flagger's vest, shirt, or jacket shall be orange, yellow, strong yellow green or fluorescent versions of these colors. For nighttime work, similar outside garments shall be retroreflective. The retroreflective material shall be orange, yellow, white, silver, strong yellow-green, or a fluorescent version of one of these colors and shall be visible at a minimum distance of 1,000 feet. The retroreflective clothing shall be designed to identify clearly the wearer as a person and be visible through the full range of body motions.

Uniformed law enforcement officers may be used as flaggers in some locations, such as an urban intersection, where enforcement of traffic movements is important. Uniformed law enforcement officers may also be used on freeways where traffic is channeled around work sites and it is necessary to assure that advisory and regulatory speeds are being enforced. For nighttime work and in low-visibility situations, a retroreflective garment as described above should be worn.

HAND-SIGNALING DEVICES

Hand-signaling devices, such as STOP/SLOW paddles, lights, and red flags are used to control traffic through temporary traffic control zones. The STOP/SLOW paddle, which gives drivers more positive guidance than red flags, should be the primary hand-signaling device. The standard STOP/SLOW sign paddle shall be 18 inches square with letters at least 6 inches high. A rigid handle should be provided. This combination sign should be fabricated from light semi-rigid material and shall have an octagonal shape. The background of the STOP face shall be red with white letters and border. To improve conspicuity, the STOP/SLOW paddles may be supplemented by one or two symmetrically positioned alternately flashing white high-intensity lamps on each side. The background of the SLOW face shall be orange with black letters and border. When used at night, the STOP/SLOW paddle shall be retro-reflectorized in the same manner as signs.

Flag use should be limited to emergency situations and at low-speed and/or low-volume locations which can best be controlled by a single flagger. Flags used for signaling shall be a minimum of 24 inches square, made of a good grade of red material, and securely fastened to a staff about 3 feet long. The free edge should be weighted so the flag will hang vertically, even in heavy winds. When used at night, flags shall be retroreflective red.

HAND-SIGNALING PROCEDURES

The following methods of signaling with STOP/SLOW paddles should be used:

- *To Stop Traffic*: The flagger shall face traffic and extend the STOP sign paddle in a stationary position with the arm extended horizontally away from the body. The free arm should be raised with the palm toward approaching traffic.
- *To Direct Stopped Traffic to Proceed:* The flagger shall face traffic with the SLOW paddle held in a stationary position with the arm extended horizontally away from the body. The flagger should motion with the free hand for traffic to proceed.
- *To Alert or Slow Traffic*: The flagger shall face traffic with the SLOW sign paddle held in a stationary position with the arm extended horizontally away from the body. The flagger may motion up and down with the free hand, palm down, indicating that the vehicle should slow down.

The following methods of signaling with a flag should be used:

- *To Stop Traffic*: The flagger shall face traffic and extend the flag staff horizontally across the traffic lane in a stationary position, so that the full area of the flag is visible hanging below the staff. The free arm should be raised with the palm toward approaching traffic.
- *To Direct Stopped Traffic to Proceed:* The flagger shall face traffic with the flag and arm lowered from view of the driver. With the free hand, the flagger should motion traffic to proceed. Flags shall not be used to signal traffic to proceed.

- *To Alert or Slow Traffic:* The flagger shall face traffic and slowly wave the flag in a sweeping motion of the extended arm from shoulder level to straight down, without raising the arm above a horizontal position.

FLAGGER STATIONS

Flagger stations shall be located far enough ahead of the workspace so that approaching traffic has sufficient distance to stop before entering the workspace. This distance is related to approach speeds, friction factors, and pavement and tire conditions.

The flagger should stand either on the shoulder adjacent to the traffic being controlled or in the barricaded lane. At a "spot" obstruction, a position may have to be taken on the shoulder opposite the barricaded section to operate effectively. A flagger should stand only in the lane being used by moving traffic after traffic has stopped, and the flagger needs to be visible to other traffic or to communicate with drivers. Because of the various roadway geometrics, flaggers should be clearly visible to approaching traffic at all times. For this reason the flagger should stand alone.

Other workers should not be permitted to congregate around the flagger station. The flagger should be stationed far enough ahead of the work force to warn them (for example with horns, whistles etc.) of approaching danger, such as vehicles out of control.

SIGNS

Temporary traffic control zone signs convey both general and specific messages by means of words or symbols and have the same three categories as all traffic signs: namely, regulatory signs, warning signs, and guide signs. Warning signs in temporary traffic control zones shall have a black legend on an orange background. Yellow warning signs within the traffic control zone which are still applicable may remain in place.

Where the color orange is specified, fluorescent red- orange or fluorescent yellow-orange colors may be used. The fluorescent versions of orange provide higher conspicuity than standard orange, especially during twilight.

All signs used at night shall be either retroreflective, with a material that has a smooth, sealed outer surface, or illuminated to show similar shape and color both day and

night. Sign illumination may be either internal or external. Roadway lighting does not meet the requirements for sign illumination.

Standard orange flags or Type B high intensity flashing warning lights may be used in conjunction with signs. However, they must not block the sign legend.

The dimensions of signs shown herein are for standard sizes, which may be increased wherever necessary for greater legibility or emphasis. On secondary highways and city streets, smaller signs may be used if authorized by lawful authority. Deviations from standard sizes as prescribed herein shall be in 6-inch increments. Sign design details are contained in Standard Highway Signs.

As a general rule, signs should be located on the right-hand side of the roadway. When special emphasis is needed, signs may be placed on both the left and right sides of the roadway. Signs may be mounted on portable supports placed within the roadway itself. Signs, although ordinarily mounted on posts, may also be mounted on or above barricades.

Signs erected at the side of the road should be mounted at a height of at least 7 feet, measured from the bottom of the sign to the near edge of the pavement. The height to the bottom of a secondary sign mounted below another sign may be 1 foot less than the appropriate height specified above.

Signs may be mounted on portable supports for short-term, short-duration, and mobile conditions. Signs mounted on Type III barricades should not cover more than 50 percent of the top two rails or 33 percent of the total area of the three rails. Unprotected sign systems should be crashworthy. The bottom of signs mounted on barricades or temporary supports shall be no less than 1 foot above the traveled way.

Signs used in temporary traffic control zones are moved frequently, loaded and unloaded from trucks, and in general receive much harsher treatment than permanent signs. For this reason, particular attention must be given to maintaining signs properly for cleanliness, visibility, and correct positioning. Signs are excessively worn, scratched, bent, or have lost a significant amount of retroreflectivity should be promptly replaced.

Regulatory Signs

Authority

Regulatory signs inform highway users of traffic laws or regulations and indicate the applicability of legal requirements that would not otherwise be apparent. Because regulatory signs impose legal obligations on all drivers, they shall be authorized by the public body or official having jurisdiction.

Design

Regulatory signs are generally rectangular, with a black legend and border on a white background. Exceptions include the STOP sign, the YIELD sign, the DO NOT ENTER sign, the WRONG WAY sign, and the one-way arrow sign. The one-way arrow sign may be either a horizontal or vertical rectangular plate.

Application

If temporary traffic control zones require regulatory measures different from those normally in effect, the existing permanent regulatory devices shall be temporarily removed or covered and superseded by the appropriate temporary regulatory signs and shall follow applicable ordinances or statutes of the jurisdiction.

List of Regulatory Signs

ROAD (STREET) CLOSED Signs

The ROAD (STREET) CLOSED sign may be used where the roadway is closed to all traffic except contractors' equipment or officially authorized vehicles and may be accompanied by appropriate detour signing. The sign should be erected at or near the center of the roadway on or above a Type III barricade that closes the roadway (section 6F-5F). The sign should have a minimum size of 48 inches by 30 inches. The words BRIDGE OUT or BRIDGE CLOSED may be substituted for ROAD CLOSED, where applicable. The ROAD (STREET) CLOSED sign shall not be used where traffic is maintained or where the actual closing is some distance beyond this sign.

LOCAL TRAFFIC ONLY Signs

The LOCAL TRAFFIC ONLY signs should be used where through traffic must detour to avoid a closing some distance beyond the sign, but where local traffic can move up to point of closure. The sign shall carry the legend ROAD CLOSED [10] MILES AHEAD-LOCAL TRAFFIC ONLY or, optionally for urban use, ROAD (STREET) CLOSED TO THRU TRAFFIC, and should be accompanied by appropriate warning and detour signing. The words BRIDGE OUT or BRIDGE CLOSED may be substituted for ROAD CLOSED where applicable.

WEIGHT LIMIT Signs

A WEIGHT LIMIT sign shows the gross weight or axle weight that can be permitted on the roadway or bridge. Weight restrictions should be consistent with state or local regulations and shall not be imposed without the approval of the authority having jurisdiction over the highway. When weight restrictions are imposed, a marked detour should be provided for vehicles weighing more than the limit posted.

Special Regulatory Signs

Special word message regulatory signs may be needed based on an engineering analysis. The sign should conform to the requirements of color, shape, and alphabet size and series. The sign message should be brief, legible, and clear. Regulatory speed limits are established by law or regulation.

Warning Signs

Function

Temporary traffic control zone warning signs notify drivers of general or specific conditions on or adjacent to a roadway.

D*esign & Application*

With some exceptions, warning signs shall be diamond- shaped with a black symbol or message on an orange background. Mounting or space considerations may justify a change from the standard diamond shape, but such variations require prior approval of the highway authority.

Warning signs developed exclusively and used for incident management shall have an orange background. However, in emergencies, available signs having yellow backgrounds may be used if orange signs are not readily available.

The standard size for each warning sign prescribed in this section is shown with the illustration accompanying the specification. Where roadway or traffic conditions require greater emphasis, larger signs should be used, with symbol or legend enlarged approximately in proportion to outside dimensions.

Where any part of the roadway is obstructed or closed, advance warning signs are required to alert traffic well in advance of these obstructions or restrictions. These signs may be used singly or in combination. Because of their importance, they shall have a standard size of 48 inches square and shall be the standard diamond shape for warning signs, except as provided above. Signs larger than 48 inches square may be used for additional emphasis of the temporary traffic

control zone.

Where speeds and volumes are moderately low, a minimum size of 36 inches square may be used for advance warning signs, if they have a minimum letter size of 5 inches.

On secondary roads or city streets where speeds are very low, signs smaller than the standard size, but not less than 24 inches square, may be used for warning signs having short word messages or clearly understood symbols.

Where distances are not shown on warning signs as part of the message, a separate panel with the distance legend may be mounted immediately below the sign on the same support.

Spacing of Warning Signs

Where highway conditions permit, warning signs should be placed at varying distances in advance of the work area, depending on the roadway type, condition, and speed. Where a series of two or more warning signs is used, the closest sign to the work area should be placed approximately 200 feet away for low-speed urban streets to 1,000 feet away or more for expressways and freeways.

Other Approach Warning Signs

Certain conditions require other advance warning signs, such as limited sight distance or because an obstruction may require a motorist to stop. There are no specified standards for such signs. The determination of the sign or signs to be used shall be based on an engineering study using the following sections as guidelines. As an alternative to a specific distance on these advance warning signs, the word AHEAD may be used.

Application of Warning Signs for Maintenance, Minor Road Work, and Utility Sites

At many maintenance, minor road work, and utility sites, particularly on lightly traveled roads, the sequence of advance warning signs prescribed for major road work may not be needed. The signs described in the following sections will usually provide sufficient advance warning in such situations, either by themselves or with other advance warning signs.

Maintenance or minor road work can occur within the temporary traffic control zone limits of a major project. Maintenance or minor road work warning signs, which be needed when traffic is permitted through such zones. Maintenance and minor road work signing, and traffic control should be coordinated with appropriate authorities so that drivers are not confused or misled by additional traffic control devices.

LIST OF WARNING SIGNS

ROAD (STREET) WORK Sign

The ROAD (STREET) WORK sign should be located ahead of the workspace or detour, to serve as a general warning of obstructions or restrictions. It carries the legend ROAD (STREET) WORK (1,500) FT or ROAD (STREET) WORK (1/2) MILE. It may be used in conjunction with appropriate distance legends, or with other warning signs.

DETOUR Sign

The DETOUR sign is used ahead of a detour that directs traffic onto another highway in order to bypass the temporary traffic control zone. It carries the legend DETOUR [1,000] FT or DETOUR [1/2] MILE. It may be used in conjunction with appropriate legends or with other warning signs.

ROAD (STREET) CLOSED Sign

The ROAD (STREET) CLOSED sign is used ahead of that point where a highway is closed to all traffic or to all but local traffic. If carries the legend ROAD (STREET) CLOSED [1,000] FT or ROAD (STREET) CLOSED [1/4] MILE. It may be used in conjunction with appropriate legends or with other warning signs.

ONE LANE ROAD Sign

The ONE LANE ROAD sign should be used ahead of that point where traffic in both directions must use a common single lane. It carries the legend ONE LANE ROAD [1,0001 FT or ONE LANE ROAD [1/41 MILE. The sign may be used in conjunction with appropriate legends or with other warning signs.

If the affected one-lane roadway is not visible from one end to the other, or if the traffic is such that simultaneous arrivals at both ends occur frequently, flagging procedures or signal control should be used to control alternate traffic flows.

LANE CLOSED Sign

The LANE CLOSED sign is used before that point where one lane of a multiple-lane roadway is closed. It carries the legend RIGHT (LEFT) LANE CLOSED [1,000] FEET or RIGHT (LEFT) LANE CLOSED [1/4] MILE. The sign may be used in conjunction with appropriate legends or with other warning signs.

FLAGGER Sign

The FLAGGER symbol sign should be used before any point where a flagger is stationed to control traffic. A distance legend may be displayed on a supplemental plate below the symbol sign. The sign may be used in conjunction with appropriate legends or with other warning signs, BE PREPARED TO STOP.

The FLAGGER sign shall be removed, covered, or turned to face away from traffic when the flagger is not at the station.

TWO-WAY TRAFFIC Sign

When one roadway of a normally divided highway is closed, the TWO-WAY TRAFFIC sign should be used at the beginning of the closing and at intervals to remind drivers that they are on a two-way highway with opposing traffic.

WORKERS Sign

A WORKERS sign may be used to alert drivers of workers in or near the roadway. (14)

FRESH OIL Sign

The FRESH OIL (TAR) sign should be placed ahead of the last exit to warn drivers that resurfacing has rendered the pavement temporarily slippery and that splashing may occur.

ROAD MACHINERY Sign

The ROAD MACHINERY sign may be used to warn of heavy equipment operating in or next to the roadway.

SHOULDER WORK Sign

The SHOULDER WORK sign may be used to warn of maintenance, reconstruction, or utility operations on the shoulder, where the traveled way is unobstructed.

SURVEY CREW Sign

The SURVEY CREW sign may be used to warn of survey crews working in or next to the roadway.

Advisory Speed Plate:

In combination with a warning sign, an advisory speed plate may be used to indicate a recommended safe speed through the temporary traffic control zone. When used with orange temporary traffic control zone signs, this plate shall have a black legend and border on an orange background. It shall not be used with any sign other than a warning sign, nor shall it be used alone. The sign shall be at least 24 inches square in size when used with a sign 36 inches square or larger. Except in emergencies, an advisory speed plate shall not be mounted until the recommended speed is determined by the highway authority.

Length of Work Sign

The Length of Work sign should be erected in advance of any temporary traffic control zone of more than 2 miles in length; it carries the legend ROAD WORK NEXT [5] MILES. The distance shall be stated to the nearest whole mile. The sign may be mounted on a Type III barricade. The sign may also be used for jobs of shorter length.

END ROAD WORK Sign

The END ROAD WORK sign should be placed about 500 feet past the work area. The sign may be erected on the back of a warning sign facing the opposite direction of traffic or on the back of a Type III barricade.

PORTABLE CHANGEABLE MESSAGE SIGNS

DESIGN

Portable Changeable Message Signs (PCMS) are traffic control devices with the flexibility to display a variety of messages to fit the needs of road and street authorities. Each message consists of one or more displays. Portable Changeable Message signs are used most frequently on high density, urban freeways, but have applications on all types of highways where highway alignment, traffic routing problems or other pertinent conditions require advance warning and information.

COMPONENTS

The components of a PCMS should include message sign panel, control systems, power source, and mounting and transporting equipment.

Message Sign Panel

PCMS cannot always conform to the exact sign shape, color, and dimensions specified in these standards. PCMS should subscribe to the principles established in the manual, and to the extent practicable, with the design (i.e., color, letter size and shape, and borders) and applications prescribed herein. The message sign panel can vary in size and may consist of one, two, or three lines. High-density urban freeways typically use three lines of eight characters per line. Each character module shall use, as a minimum, a five wide-pixel by seven high-pixel matrix. The front face of the sign should be covered with a protective material. Element colors for warning messages should be black on a yellow or orange background; for guide messages, white on a green background or black on an orange background; and for regulatory messages, black on a white background. Color reversals are also accessible.

The signs should be visible from 1/2 mile under ideal day and night conditions. Each sign message should be legible from all lanes, from the sign up to a minimum of 650 feet. In the field, the PCMS should be sited and aligned to optimize driver performance. The message panel should have adjustable flash rates, so that the entire message can be read at least twice at the posted speed, the off-peak 85th percentile speed prior to work starting, or the anticipated operating speed.

Under low light level conditions, the sign shall automatically adjust its light source so as to meet the legibility requirements and not impair the drivers, vision.

Control System: The control system shall include the following features:

- A display screen upon which messages can be reviewed before display on the message sign.
- A capability to provide an automatic programmed default message if power failure occurs.
- A backup battery to maintain memory when power is unavailable.

Power Source: The PCMS shall be equipped with a power source and a battery back-up to provide continuing operation when failure of the primary power source occurs.

Mounting: The mounting of the PCMS shall be such that the bottom of the message sign panel shall be a minimum of 7 feet above the roadway when it is in the operating mode.

APPLICATION

PCMS have a wide variety of applications in temporary traffic control zones, including roadway or ramp closures, accident or emergency incident management, width restriction information, advisories on roadwork scheduling, traffic management and diversion, warning of adverse conditions, and operation control. PCMS should be used with conventional signs, pavement markings, and lighting.

The primary purpose of PCMS in temporary traffic control zones is to advise the driver of unexpected traffic and routing situations. Some typical applications include the following:

- Where speed of traffic is expected to drop substantially
- Where significant queuing and delays are expected
- Where adverse environmental conditions are present
- Where there are changes in alignment or surface conditions
- To provide advance notice of ramp, lane, or roadway closures
- For accident or incident management

PCMS should be placed to be visible from at least 1/2 mile under both day and night conditions. Placement in advance of the temporary traffic control zone or incident should, as much as possible, take into account the following factors:

- PCMS will typically be placed in advance of any other temporary traffic control zone signing and should not replace any required signing.
- Where used for route diversion, PCMS should be placed far enough in advance of the work site to allow traffic ample opportunity to exit the affected highway.
- PCMS are normally placed on the shoulder of the roadway. However, if practical, placement further from the traveled lane is desirable.
- When two signs are needed to communicate multiple messages, they should be placed on the same side of the roadway, separated by at least 1,000 feet.

PCMS messages should be readily understood by drivers and thus will allow them adequate time to react. Messages should be designed taking into account the following factors:

- No more than two displays should be used within any message cycle.
- Each display should convey a single thought.
- Messages should be as brief as possible.
- When abbreviations are used, they should be easily understood.
- The entire message cycle should be readable at least twice at the posted speed, the off-peak 85th percentile speed prior to work starting, or the anticipated operating speed.
- Messages shall not scroll horizontally or vertically across the face of the sign.

ARROW DISPLAYS

An arrow display is a sign with a matrix of elements. The matrix, capable of either flashing or sequential displays, is intended to provide additional warning and directional information to assist in merging and controlling traffic through or around a temporary traffic control zone. An arrow display should be used in combination with appropriate signs, barricades, or other traffic control devices.

ARROW DISPLAY SPECIFICATIONS

Type A arrow displays are appropriate for use on low- speed urban streets. Type B are appropriate for intermediate- speed facilities and for maintenance or mobile operations on high-speed roadways. Type C arrow displays are intended to be used on high-speed, high-volume traffic control projects.

An arrow display shall be rectangular, of solid appearance, and finished in nonreflective black. The panel shall be mounted on a vehicle, a trailer, or other suitable support. A vehicle-mounted

panel should be provided with 5 remote controls. Minimum mounting height should be 7 feet from the roadway to the bottom of the panel, except on vehicle-mounted panels, which should be as high as practicable.

An arrow display shall have the following mode selections:

- A flashing arrow, sequential arrow, or sequential Chevron mode
- Flashing Double Arrow mode
- Flashing Caution mode

Arrow display elements shall be capable of a minimum 50 percent dimming from their full-rated lamp voltage. Full lamp voltage should be used for day and dimmed mode shall be used for night.

The arrow display shall have suitable elements capable of the various operating modes. If an arrow panel consisting of a bulb matrix is used, the elements should be recess-mounted or equipped with an upper hood of not less than 180 degrees. The color presented by the elements shall be yellow.

Minimum element "on time" shall be 50 percent for the flashing mode and equal intervals of 25 percent for each sequential phase. The flashing rate shall be no fewer than 25 nor more than 40 flashes per minute.

ARROW DISPLAY APPLICATION

An arrow display in the arrow or chevron mode may be used for stationary or moving lane closures. An arrow display in the caution mode shall be used only for shoulder work, blocking the shoulder, or roadside work near the shoulder.

Where the shoulder is narrow, the arrow display should be located in the closed lane. If arrow displays are used when multiple lanes are closed in tandem, the preferred position for additional arrow displays is in the closed lane at the start of the merge taper. Under various situations, such as for narrow shoulders, placement may be in the middle or at the end of the merge taper but always behind the channelizers. The panel shall be located behind any channelizing devices used to transition traffic from the closed lane.

CHANNELIZING DEVICES

General Requirements

The function of channelizing devices is to warn, and alert drivers of conditions created by work activities in or near the traveled way, to protect workers in the temporary traffic control zone, and to guide drivers and pedestrians safely. Channelizing devices include but are not limited to cones, tubular markers, vertical panels, drums, barricades, temporary raised islands, and barriers.

Devices used for channelization should provide for smooth and gradual traffic movement from one lane to another, onto a bypass or detour, or to reduce the width of the traveled way. They may also be used to separate traffic from the workspace, pavement drop-offs, pedestrian paths, or opposing directions of traffic.

Channelizing devices should be constructed and ballasted to perform in a predictable manner when inadvertently struck by a vehicle. If struck, they should yield or break away, and fragments

or other debris from the device should not penetrate the passenger compartment of the vehicle or be a potential hazard to workers or pedestrians in the immediate area.

Spacing of channelizing devices should not exceed a distance in feet equal to the speed when used for the taper channelization, and a distance in feet of twice the speed when used for tangent channelization.

Warning lights on channelizing devices. Consideration should be given to fog or snow areas, severe roadway curvature, and usually cluttered environments. Flashing warning lights may be placed on channelizing devices used singly or in groups to mark a spot condition. Warning lights on channelizing devices used in a series shall be steady burn.

The retroreflective material used on channelizing devices shall have a smooth, sealed outer surface.

Channelizing devices are elements in a total system of traffic control devices for use in temporary traffic control zones. These elements shall be preceded by a subsystem of warning devices that are adequate in size, number, and placement for the type of highway on which the work is to take place. Standard designs of channelizing devices are shown in figure VI-10.

The name and telephone number of the agency, contractor, or supplier may be shown on the non-retroreflective surface of all channelizing devices. The letters and numbers shall be a non-retroreflective color and not over 2 inches in height.

Particular attention should be given to assuring that channelizing devices are maintained and kept clean, visible, and properly positioned at all times. Devices shall be replaced that are damaged and have lost a significant amount of their retroreflectivity and effectiveness.

CONES

Cone Design

Cones shall be predominantly orange, fluorescent red-orange, orange, not less than 18 inches in height, or fluorescent yellow and shall be made of a material that can be struck without damaging vehicles on impact. Cones shall be a minimum of 28 inches in height when they are used on freeways and other high- speed highways, on all highways during nighttime, or whenever more conspicuous guidance is needed.

For nighttime use, cones shall be retroreflective or equipped with lighting devices for maximum visibility. Retroreflection of 28-inch or larger cones shall be provided by a white band 6 inches wide, no more than 3 to 4 inches from the top of the cone, and an additional 4-inch-wide white band a minimum of 2 inches below the 6-inch band.

Cone Application

Traffic cones are used to channelize traffic, divide opposing traffic lanes, divide traffic lanes when two or more lanes are kept open in the same direction, and delineate short-duration maintenance and utility work.

Steps should be taken to ensure that cones will not be blown over or displaced by wind or moving traffic. Cones can be doubled up to increase their weight. Some cones are constructed with bases

that can be filled with ballast. Others have special weighted bases, or weights such as sandbag rings that can be dropped over the cones and onto the base to provide added stability. Ballast, however, should not present a hazard if the cones are inadvertently struck.

TUBULAR MARKERS

Design

Tubular markers shall be predominantly orange, not less than 18 inches high, minimum 2 inches wide when facing traffic, and made of a material that can be struck without damaging impacting vehicles. Tubular markers shall be a minimum of 28 inches high when used on freeways and other high-speed highways, on all highways during nighttime, or whenever more conspicuous guidance is needed.

For nighttime use, tubular markers shall be retroreflective. Retroreflection of tubular markers shall be provided by two 3- inch-wide white bands placed a maximum of 2 inches from the top, with a maximum of 6 inches between the bands.

Application

Tubular markers have less visible area than other devices and should be used only where space restrictions do not allow for the use of other more visible devices. They may be used effectively to divide opposing lanes of traffic, divide traffic lanes when two or more lanes are kept open in the same direction, and delineate edge of pavement drop off where space limitations do not allow the use of larger devices.

Steps should be taken to assure that tubular markers will not be blown over or displaced by traffic by either affixing them to the pavement with anchor bolts or adhesive, using weighted bases, or weights that can be dropped over the tubular markers and onto the base to provide added stability. Ballast, however, should not be allowed to present a hazard if the tubular markers are inadvertently struck. If a noncylindrical device is used, and it could be displayed with a width less than the minimum facing traffic, it shall be attached to the pavement to ensure that the width facing traffic meets the minimum requirements.

VERTICAL PANELS

Design

Vertical panels shall be 8 to 12 inches wide and at least 24 inches high. They shall have orange (fluorescent red-orange or fluorescent yellow-orange) and white stripes, and be retroreflectorive. Panel stripe widths shall be 6 inches, except where panel heights are less than 36 inches, when 4-inch stripes may be used. If used for two-way traffic, back-to-back panels shall be used. Markings for vertical panels shall be alternating orange and white retroreflectorized stripes (sloping downward at an angle of 45 degrees in the direction traffic is to pass). Vertical panels used on expressways, freeways, and other high-speed roadways shall have a minimum of 270 square inches of retroreflective area facing traffic.

Application

Vertical panels may be used to channel traffic, divide opposing lanes of traffic, divide traffic lanes or in place of barricades where space is limited.

DRUMS

Design

Drums used for traffic warning or channelization shall be constructed of lightweight, flexible, and deformable materials and be a minimum of 36 inches in height; and have at least an 18- inch minimum width, regardless of orientation. Steel drums shall not be used. The markings on drums shall be horizontal, circumferential, alternating orange and white retroreflective stripes 4 to 6 inches wide. Each drum shall have a minimum of two orange and two white stripes. Any non-retroreflective spaces between the horizontal orange and white stripes, shall not exceed 2 inches wide. Drums shall have closed tops that will not allow collection of roadwork or other debris.

Application

Drums are most commonly used to channelize or delineate traffic flow but may also be used singly or in groups to mark specific locations. Drums are highly visible and have good target value, given the appearance of being formidable obstacles and, therefore, command the respect of drivers. They are portable enough to be shifted from place to place within a temporary traffic control project to accommodate changing conditions but are generally used in situations where they will remain in place for a prolonged period.

Drums should not be weighted with sand, water, or any material to an extent that would make them hazardous to motorists, pedestrians, or workers. When they are used in regions susceptible to freezing, they should have drainage holes in the bottom so water will not accumulate and freeze, causing a hazard if struck by a motorist. Ballast shall not be placed on top of drum.

BARRICADES

Design

A barricade is a portable or fixed device having from one to three rails with appropriate markings. It is used to control traffic by closing, restricting, or delineating all or a portion of the right-of-way.

Barricades shall be of three types: Type I, Type II, or Type III.

Stripes on barricade rails shall be alternating orange and white retroreflective stripes (sloping downward at an angle of 45 degrees in the direction traffic is to pass). The stripes shall be six inches wide, except where rail lengths are less than 36 inches, when 4-inch-wide stripes may be used. The minimum rail length is 24 inches. Barricades used on expressways, freeways, and other high-speed roadways shall have a minimum of 270 square inches of retroreflective area facing traffic.

Where a barricade extends entirely across a roadway, the stripes should slope downward in the direction toward which traffic must turn. Where both right and left turns are provided, the stripes may slope downward in both directions from the center of the barricade or barricades. Where no turns are intended, the stripes should slope downward toward the center of the barricade or barricades.

Barricade rails should be supported in a manner that will allow them to be seen by the motorist and provide a stable support not easily blown over by the wind or traffic. For Type I barricades, the support may include other unstriped horizontal panels necessary to provide stability.

Barricades are located adjacent to traffic and are therefore subject to impact by errant vehicles. Because of their vulnerable position and the hazard they could create, they should be constructed of lightweight materials and have no rigid stay bracing for A-frame designs.

On high-speed expressways or in other situations where barricades may be susceptible to overturning in the wind, sandbags should be used for ballasting. Sandbags may be placed on lower parts of the frame or stays to provide the required ballast but shall not be placed on top of any striped rail. Barricades shall not be ballasted by heavy objects such as rocks or chunks of concrete.

Application

Type I or Type II barricades are intended for use in situations where traffic is maintained through the temporary traffic control zone. They may be used singly or in groups to mark a specific condition, or they may be used in a series for channelizing traffic. Type I barricades normally would be used on conventional roads or urban streets and arterials. Type II barricades have more retroreflective area and are intended for use on expressways and freeways or other high-speed roadways.

Type III barricades used at a road closure may extend completely across a roadway or from curb to curb. Where provision is made for access of authorized equipment and vehicles, the responsibility for the Type III barricades should be assigned to a person to ensure proper closure at the end of each workday.

When a highway is legally closed, but access must still be allowed for local traffic, the Type III barricade should not be extended completely across a roadway. A sign with the appropriate legend concerning permissible use by local traffic shall be mounted.

Signs may be erected on barricades, particularly those of the fixed type, that offer a most advantageous facility for this purpose. The ROAD CLOSED and DETOUR ARROW signs, and the LARGE ARROW warning signs, for example, can be mounted effectively on or above the barricade that closes the roadway.

PORTABLE BARRIERS

The need for portable barriers should be determined by analysis and the protective requirements of the engineering and location, not the channelizing needs.

When serving the additional function of channelizing traffic, the barrier taper shall meet standard channelizing taper lengths. The channelizing barrier shall be supplemented by standard delineators, channelizing devices, or pavement markings. Channelizing barriers should not be used for a merging taper except in low-speed urban areas.

TEMPORARY RAISED ISLANDS

The temporary raised island should only be used on roadways with speeds of 45 mph or less except when recommended by an engineering study. Temporary raised islands, not to exceed 4 inches in height, may be used to supplement channelizing devices and pavement markings to separate traffic flows in two-lane, two-way operations (TLTWO). Pavement edge lines may be placed on the island itself. Islands may also have application in other than TLTWO where physical separation of traffic from the temporary traffic control zone is not required.

One type of temporary raised island is 4 inches high by 18 inches wide and has rounded or chamfered corners. They may be constructed of Portland cement concrete or bituminous concrete. They should be designed according to chapter 9 of the AASHTO Roadside Design Guide."

OTHER CHANNELIZING DEVICES

Channelizing devices, other than those specified above, may be required for special situations based on an engineering study. Such devices should conform to the general size, color, stripe pattern, retroreflection, and placement characteristics established for standard devices.

MARKINGS

PAVEMENT MARKING APPLICATIONS

Adequate pavement markings shall be maintained along paved streets and highways in temporary traffic control zones. Obliterated markings shall be unidentifiable as pavement markings under day or night, wet or dry conditions. The work should be planned and staged to provide the best possible conditions for the placement and removal of the pavement markings.

It is intended, to the extent possible, that motorists be provided markings within a work area comparable to the markings normally maintained along adjacent roadways, particularly at either end of the work area. The following guidelines set forth the level of markings and delineation for various work area situations.

Markings shall be maintained in long-term stationary work areas and shall match and meet the markings in place at both ends of the work area.

Markings shall be placed, along the entire length of any surfaced detour or temporary roadway, such detour or roadway is opened to traffic.

Centerline/lane lines should be placed, replaced, or delineated where appropriate before the roadway is opened to traffic.

Markings should be provided in intermediate-term stationary work areas, to the extent practicable.

In any work area where it is not practical to provide a clear path by markings, appropriate warning signs, channelizing devices, and delineation shall be used to indicate the required vehicle paths.

All markings and devices used to delineate vehicle and pedestrian paths shall be carefully reviewed during daytime and nighttime periods to avoid inadvertently leading drivers or pedestrians from the intended path.

Proper pavement marking obliteration leaves a minimum of pavement scars and completely removes old marking materials. Obliterated markings shall be unidentifiable as pavement marking under day or night, wet or dry conditions. Overlaying existing stripes with black paint or asphalt does not meet the requirements of covering, removal, or obliteration; however, the use of removable, nonreflective, preformed tape is permitted where markings need to be covered temporarily.

INTERIM MARKINGS

Interim pavement markings are those that may be used until it is practical and possible to install pavement markings that meet the full MUTCD standards for pavement markings. Normally, it should not be necessary to leave interim pavement markings in place for more than 2 weeks. All interim pavement markings, including pavement markings for no-passing zones, shall conform to the requirements of this section with the following exceptions:

- All interim broken-line pavement markings shall use the same cycle length as permanent markings and be at least 4 feet long, except that half-cycle lengths with a minimum of 2-foot stripes may be used for roadways with severe curvature. This applies to white lane lines for traffic moving in the same direction and yellow center lines for two-lane roadways when it is safe to pass.
- For those interim situations of 3 calendar days or less for a two- or three-lane road, no-passing zones may be identified by using signs rather than pavement markings. Also, signs may be used in lieu of pavement markings on low- volume roads for longer periods, when this practice is in keeping with the State's or highway agency's policy.
- The interim use of edge lines, channelizing lines, lane reduction transitions, gore markings and other longitudinal markings, and the various non-longitudinal markings (stop line, railroad crossings, crosswalks, words, symbols, etc.) should be in keeping with the state's or highway agency's policy.

RAISED PAVEMENT MARKERS

Raised/recessed pavement markers should be considered for use along surfaced detour or temporary roadways, and other changed or new travel lane alignments, because of the need to accentuate changed travel paths and their wet-weather performance capabilities.

Retro reflective raised/recessed pavement markers, or non- retro reflective raised/recessed pavement markers supplemented by retro reflective markers, may be substituted for, or used as a supplement to markings prescribed in the previous sections above.

DELINEATORS

Delineators may be used in work areas to indicate the alignment of the roadway and to outline the required vehicle path through the temporary traffic control zone. Delineators, when used, shall be used in combination with, or be supplemental to, other traffic control devices.

When used, delineators shall be mounted on suitable supports so that the reflecting unit is about 4 feet above the near roadway edge. The standard color for delineators used along both sides of two-way streets and highways and the right side of one- way roadways shall be white. Delineators used along the left side of one-way roadways shall be yellow.

LIGHTING DEVICES

FUNCTION

Temporary traffic control activities often create conditions on or near the traveled way that are particularly unexpected at night, when drivers, visibility is sharply reduced. It is often desirable and necessary to supplement retro reflectorized signs, barriers, and channelizing devices with lighting devices.

Four types of lighting devices are commonly used: floodlights, hazard identification beacons, steady-burning electric lamps, and warning lights.

In work areas where a study indicates a nighttime accident problem can be corrected with area illumination, consideration may be given to providing roadway lighting.

FLOODLIGHTS

On temporary traffic control projects, floodlights have a limited but important application. Temporary traffic control activities on urban freeways must frequently be conducted during nighttime periods when traffic volumes are lower. Sometimes, large temporary traffic control contracts are also operated on double shift, requiring night work. When nighttime work is required for these or similar types of projects, floodlights should be used to illuminate flagger stations, equipment crossings, and other areas where existing light is not adequate for the work to be performed safely.

In no case shall floodlighting be permitted to create a disabling glare for drivers. The adequacy of the floodlight placement and elimination of potential glare can best be determined by driving through and observing the floodlighted area from each direction on the main roadway after initial floodlight setup.

Maintenance activities on urban freeways with high-volume, high-density traffic conditions are frequently conducted during nighttime periods (with low traffic volumes). Good floodlighting of the work site is needed because the workers need to see what they are doing, and because the workers and the workspace be protected from, and seen by, passing drivers.

FLASHING IDENTIFICATION BEACONS (Flashing Electric Lights)

A flashing identification beacon is a flashing yellow light (minimum diameter, 8 inches) used at points of special to alert drivers' attention to these conditions. When used, the flashing beacon should operate 24 hours a day.

On temporary traffic control projects, because of the time and effort required to install these units and put them into operation, they are generally used at locations where frequent changes would not be required.

On projects where an existing dual highway is being upgraded to freeway standards (which requires the use of crossovers to permit stage construction), flashing beacons have been used effectively to call drivers, attention to the condition created by the channelizing devices. Similarly, the temporary terminus of a freeway (where all traffic is channelized into an exit) is a location where beacons have alerted drivers of the speed reduction necessary in transitioning from freeway to local road operations.

Flashing identification beacons may be used singly or in groups containing more than one unit. During normal daytime maintenance operations, the functions of flashing beacons are adequately provided by rotating dome or strobe lights on maintenance vehicles. However, flashing beacons may be installed at locations where maintenance activity requires an obstruction to remain in the roadway at night.

STEADY-BURNING ELECTRIC LAMPS

As used herein, steady-burning electric lamps shall mean a series of low-wattage yellow electric lamps. They may be used to mark obstructions, but they are generally less effective than flashing lights for such use, because of their attention-getting effect. However, lights are needed to delineate the traveled way through and around obstructions in a temporary traffic control zone, the delineation shall be accomplished by steady-burning lamps.

Steady-burning lamps, placed in a line on appropriate channelizing devices, are effective in delineating the proper vehicle path through temporary traffic control zones that require changing patterns of traffic movement. Steady-burning lamps are also used on detours, on lane closures, when the roadway alignment changes in tapers, and other situations where the headlights do not provide retro reflection to delineate the intended vehicle path.

The application of these devices during maintenance work is infrequent due to the generally short-term nature of the work. A type of maintenance activity where steady-burning lamps could be used is removal and replacement of a part of a bridge deck. The lamps could be mounted on barricades and help channel traffic around the workspace.

WARNING LIGHTS

The light weight and portability of warning lights are advantages that make these devices useful as supplements to the retro-reflectorization on hazard warning devices. The flashing lights are effective in attracting a driver's attention and, therefore, provide an excellent means of identifying the hazard.

As used herein, warning lights are portable, lens-directed, enclosed lights. The color of the light emitted shall be yellow. They may be used in either a steady-burn or flashing mode. Warning lights shall be in accordance with the current ITE Purchase Specification for Flashing and Steady-Burn Warning Lights.

Warning lights shall have a minimum mounting height of 30 inches to the bottom of the lens. Type A low intensity flashing warning lights are most commonly mounted on barricades, drums, vertical panels, or advance warning signs, and are intended to warn drivers that they are approaching or in a hazardous area.

Type B high-intensity flashing warning lights are normally mounted on advance warning signs or on independent supports. Extremely hazardous site conditions within temporary traffic control zones may require that the lights be effective in daylight as well as dark. They are designed to operate 24 hours per day. Flashers shall not be used for delineation, as they would tend to obscure the desired vehicle path.

Type C steady-burn lights are intended to be used to delineate the edge of the traveled way on detour curves, on lane changes, on lane closures, and on other similar conditions.

Type A low intensity flashing warning lights and Type C steady-burn warning lights shall be maintained so as to be visible on a clear night from a distance of 3,000 feet.

Type B high intensity flashing warning lights shall be maintained so as to be visible on a sunny day, when viewed without the sun directly on or behind the device from a distance of 1,000 feet.

TYPES OF TEMPORARY TRAFFIC CONTROL ZONE ACTIVITIES

Each traffic control zone is different. Many variables, such as location of work, road type, speed, volume, geometrics, vertical and horizontal alignment, pedestrians, and intersections affect t needs of each zone. The goal of traffic control in work areas is safety with minimum disruption to traffic, and the key factor in making the temporary traffic control zone safe and efficient is proper judgment.

Bicyclists also need protection and access to the roadway. Bicyclists should not be directed onto the same path used by pedestrians. For more detail on controlling bicycle traffic, see part IX of the MUTCD.

Utility work takes place both within the roadway and outside the shoulder, to construct and maintain the hardware and equipment used to provide power, light, water, gas, and telephone service. Utility operations are generally short daytime operations, except under emergency conditions. Often they are performed on low-volume, low-speed streets. Operations often involve intersection as that is where many of the network junctions occur. The crew size is usually small, only a few vehicles are involved, and the number and types of traffic control devices placed in the temporary traffic control zone may be minimal. However, the reduced number of devices in this situation should be offset by the use of high-visibility devices, such as special lighting units on work vehicles.

In this section, typical temporary traffic control zone situations are organized according to duration and location of work and highway type. Section 6H, which follows the same organization, presents layouts of these typical temporary traffic control zone situations.

TYPICAL APPLICATIONS

Typical applications include a variety of traffic control methods, but do not include a layout for every conceivable work situation. Typical applications should be altered, when necessary, to fit the conditions of a particular temporary traffic control zone.

SELECTING THE TYPICAL APPLICATION

Selecting the most appropriate typical application and modifications for a temporary traffic control zone requires knowledge and understanding of that zone. Although there are many ways of categorizing temporary traffic control zone applications, the three factors mentioned earlier (work duration, work location, and highway type) have been used to characterize the typical illustrated in section 6H.

DURATION OF WORK

Work duration is a major factor in determining the number and types of devices used in temporary traffic control zones. The five categories of work duration and their time at a location are as follows:

- Long-term stationary-Work that occupies a location more than 3 days.
- Intermediate-term stationary-Work that occupies a location from overnight to 3 days.
- Short-term stationary-daytime work that occupies a location from 1 to 12 hours.
- Short, Duration-Work that occupies a location up to 1 hour.
- Mobile-Work that moves intermittently or continuously.
- Long-Term Stationary

At long-term stationary temporary traffic control zones there is ample time to install and realize benefits from the full range of traffic control procedures and devices that are available for use. Generally, larger channelizing devices are used, as they have more retroreflective material and offer better nighttime visibility. The larger devices are also less likely to be displaced or tipped over-an important consideration during those periods when the work crew is not present. Furthermore, as long- term operations extend into nighttime, retroreflective and/or illuminated devices are required. Temporary roadways and barrier can be provided, and inappropriate markings should be removed and replaced with temporary markings.

Intermediate-Term Stationary

During intermediate-term stationary work, it may not be feasible or practical to use procedures or devices that would be desirable for long-term stationary temporary traffic control zone such as altered pavement markings, barriers, and temporary roadways. The increased time to place and remove these devices i some cases could significantly lengthen the project, thus increasing exposure time. In other instances, there might be insufficient payback time to make more elaborate traffic control economically attractive.

Short-Term Stationary

Most maintenance and utility operations are short-term stationary work. The work crew is present to maintain and monitor the temporary traffic control zone. The use of flagger is an option. Lighting and/or retroreflective devices should be chosen to accommodate varying seasonal, climatic, and visibility situations.

Short Duration

During short-duration work, there are hazards involved for the crew in setting up and taking down the traffic controls. Also, since the work time is short, the time during which motorists are affected is significantly increased as the traffic control is expanded. Considering these factors, it is generally held that simplified control procedures may be warranted for short-duration work. Such shortcomings may be offset by the use of other, more dominant devices such as special lighting units on work vehicles.

Mobile

Mobile operations are work activities that move along the road either intermittently or continuously. Mobile operations often involve frequent short stops, each as much as 15 minutes long, for activities such as litter cleanup, pothole patching, or utility operations and are similar to stationary operations. Warning signs, flashing vehicle lights, flags, and/or channelizing devices should be used.

Mobile operations also include work activities in which workers and equipment move along the road without stopping, usually at slow speeds. The advance warning area moves with the work area. Traffic should be directed to pass safely. Parking may be prohibited, and work should be scheduled during off-peak hours. For some continuously moving operations-such as street sweeping - where volumes are light and visibility is good, a well-marked and well-signed vehicle may suffice. If volumes and/or speeds are higher, a shadow or backup vehicle equipped as a sign truck, preferably supplied with a flashing arrow display, and should follow the work vehicle. Where feasible, warning signs should be placed along the roadway and moved periodically as the work progresses. In addition, vehicles may be equipped with such devices as flags, flashing vehicle

lights, truck-mounted attenuators, and appropriate signs. These devices may be required individually or in various combinations, including all of them, including all of them, as determined necessary.

Safety should not be compromised by using fewer devices simply because the operation will frequently change its location. Portable devices should be used. Flaggers may be used, but caution must be exercised so they are not exposed to unnecessary hazards. The control devices should be moved periodically to keep them near the work area. If mobile operations are in effect on a high-speed travel lane of a multilane divided highway, flashing arrow displays should be used.

LOCATION OF WORK

The choice of traffic control needed for a temporary traffic control zone depends upon where the work is located. As a general rule, the closer the work is to traffic, the more control devices are needed.

Work can take place in the following locations:

(1) **Outside of the shoulder edge.** Devices may not be needed if work is confined to an area 15 or more feet from the edge of the shoulder. Consideration should be given to roadway characteristics, roadway geometrics, and vehicle speed. A general warning sign like ROAD MACHINERY AHEAD should be used if workers and equipment must occasionally move closer to the highway.

(2) **On or near the shoulder edge.** The shoulder should be signed as if work were on the road itself, since it is part of the drivers' "recovery area." Advance warning signs are needed. Channelizing devices are used to close the shoulder, direct traffic, and keep the workspace visible to the motorist. Portable barriers may be needed to prevent encroachment of errant vehicles into the workspace and to protect workers.

(3) **On the median of a divided highway.** Work in the median may require traffic control for both directions of traffic, through the use of advance warning signs and channelization devices. If the median is narrow, with a significant chance for vehicle intrusion into long-term work sites and/or crossover accidents, portable barriers should be used.

(4) **On the traveled way.** Work on the traveled way demands optimum protection for workers and maximum advance warning for drivers. Advance warning must provide a general message that what is taking place, information about specific hazards, and actions the driver must take to drive through the temporary traffic control zone.

ROADWAY TYPE

Roadway type is also a primary factor in the use of temporary traffic control zone traffic control devices.

(1) Rural Two-lane Roadways

(2) Urban Arterial Roads

(3) Other Urban Streets

(4) Rural or Urban Multilane Divided and Undivided Highways

(5) Intersections

(6) Freeways

Rural two-lane roadways are characterized by relatively low volumes and high speeds. Urban arterial roads often have lower speeds, but they may require significant controls because of higher traffic volumes and closer spacing of such design features as intersections. Other urban streets with light traffic volumes will generally require fewer but more closely spaced devices. Major arterial and freeways need the highest type of traffic control, primarily because of high speeds and often high volumes of traffic.

To improve safety, typical designs may be modified to a more elaborate treatment, as indicated by the following:

Additional devices

- Additional signs

- Flashing arrow displays

- More channelizing devices at closer spacing

- Temporary raised pavement markers

- High-level warning devices

- Portable changeable message signs

- Portable traffic signals - Portable barriers

- Impact attenuators - Screens

- Rumble strips

Upgrading of devices

- A full complement of standard pavement markings in areas of high hazard

- Brighter and/or wider pavement markings

- Larger signs

- Higher type channelizing devices

- Barriers in place of channelizing devices

Improved geometrics at detours or crossovers

Increased distances

- Longer advance warning area

- Longer tapers

Lighting

- Temporary roadway lighting

- Steady-burn lights used with channelizing devices

- Flashing lights for isolated hazards

- Illuminated signs

- Floodlights

When conditions are not as difficult as those depicted in the typical applications, fewer devices may suffice. However, uniformity of devices and their application is always extremely important.

APPLICATION OF DEVICES

TYPICAL APPLICATIONS

Procedures for establishing temporary traffic control zones vary with such conditions as road configuration, location of the work, work activity, duration, traffic speed, traffic volume, and pedestrians. Other devices may added to supplement the devices and device spacing may be adjusted to provide additional reaction time or protection. Where the situation being addressed is less than typical, actual conditions may require fewer devices.

GENERAL NOTES

General notes for various application categories are provided below.

Work Performed on the Roadside (Outside Shoulder)

When work is being performed off the roadway (beyond shoulder yet within the right-of-way), little or no temporary traffic control may be needed. If there is no effect upon traffic, no devices are needed, but this is rarely the case. More commonly, there may be driver distraction, vehicles may be parked on the shoulder, vehicles may be accessing the work site via the highway, or equipment may on occasion need to travel on or cross the roadway to perform the work operation (e.g., mowing). Where these situations pertain, a single warning sign, such as ROAD WORK AHEAD will generally suffice.

If vehicles are using the shoulder, a SHOULDER WORK sign is appropriate. For mowing operations, the sign MOWING AHEAD may be used. Where the activity is spread out over a distance of more than 2 miles, the sign should be repeated every 2 miles. A supplementary plate with the message NEXT [X] MILES may be placed below the initial warning sign.

Work Performed on Shoulders

When a highway shoulder is occupied, warning is needed to advise the driver and protect the workers. As a minimum, the single warning sign SHOULDER WORK is adequate. When work

is performed on a paved shoulder 8 or more feet wide, a transition area is needed in which channelizing devices are placed on a taper of length that conforms to the requirements of a shoulder taper. When paved shoulders of width of 8 feet or more are closed on freeways and expressways, additional treatment is generally needed to alert traffic to the possibility of a disabled vehicle that cannot get off the traveled way. An initial general warning sign is needed (e.g., ROAD WORK AHEAD), followed by a RIGHT or LEFT SHOULDER CLOSED sign. Where the end of the shoulder closure extends beyond the distance that can be perceived by motorists, a supplementary plate bearing the message NEXT [X] FEET (or MILES) should be placed below the SHOULDER CLOSED sign.

When the shoulder is not occupied but work has adversely affected its condition, the LOW SHOULDER or SOFT SHOULDER sign should be used, if appropriate. Where the condition extends over a distance in excess of 1 mile, the sign should be repeated at 1-mile intervals. In addition, a supplementary plate bearing the message NEXT [X] MILES may be placed below the first such warning sign.

On multilane, divided highways, signs advising of shoulder work or the condition of the shoulder should be placed only on the side of the affected shoulder.

Mobile and Short-Duration Operations

As compared to stationary operations, mobile and short-duration operations are distinct activities that may involve different treatments. More mobile devices are needed (e.g., signs mounted on trucks), and larger, more imposing, and more visible devices can be used effectively and economically. For example, appropriately colored and marked vehicles with flashing or rotating lights, perhaps augmented with signs or arrow displays, may be used in place of signs and channelizing devices. The trade-off is economical because work duration is short. Mobility is essential, the crew is always onsite, and some of the vehicles may be required for the work activity or crew transportation. Safety is not compromised, as numerous small devices are merely replaced by fewer, more dominant and effective devices.

(1) Short Duration:

Short-duration activities are generally considered to be those in which it takes longer to set up and remove the traffic control zone than to perform the work. Typically, such operations can be accomplished in 60 minutes or less

There are hazards involved for the crew in setting up and taking down a traffic control zone. Also, as the work time is short, the time during which motorists are affected is significantly increased when additional devices are installed and removed. Considering these factors, it is generally held that simplified control procedures are warranted for short-duration activities. Such shortcomings may be offset by the use of other, more dominant devices, such as special lighting units on work vehicles.

(2) Mobile Operations:

Mobile operations include activities that stop intermittently and then move on (e.g., pothole patching and litter pickup) and those that move continuously (e.g., pavement striping).

With operations that move slowly (less than 3 mph), it may be feasible to use stationary signing that is periodically retrieved and repositioned in the advance warning area. At higher speeds,

trucks are typically used as components of the traffic control zones. Appropriately colored and marked vehicles with signs, flashing or rotating lights, and special lighting panels move as part of a train behind the work vehicles.

Mobile operations that move at speeds greater than 20 mph, such as snowplowing operations, shall have appropriate devices on the equipment, (i.e., rotating lights, signs, or special lighting) or shall use a protection vehicle with appropriate warning devices.

Lane Closings on Two-Lane Roads

When one lane of a two-lane road is closed, the remaining lane must accommodate both directions of travel. The typical procedure for short-term work is to utilize flaggers to alternate traffic flow. For long-term operations, a temporary traffic signal is an alternative.

Lane Closings on Multilane Roads

When a lane is closed on a multilane road, a transition area containing a merging taper is needed. Typically, the advance warning area contains three warning signs, such as ROAD WORK AHEAD RIGHT or LEFT LANE CLOSED AHEAD, and the Lane Reduction Transition sign.

When an interior lane is closed for use as a workspace, consideration should be given to closing an adjacent lane also. This procedure provides additional space for vehicles and materials and facilitates the movement of equipment within the workspace. On multilane undivided roads and streets where the left lane is closed, such additional space can be obtained by also closing the left lane in the opposing direction.

Work Performed in the Vicinity of Intersections

The typical application diagrams contained herein depict typical urban intersections on arterial streets. Where the posted speed, the off-peak 85th percentile speed prior to work starting, or the anticipated speed of traffic equals or exceeds 45 mph, additional warning signs may be needed in the advance warning area.

The typical application diagrams for intersections are classified according to the location of the workspace with respect to the intersection area (as defined by the extension of curb or edge lines.) Thus, there are three classifications-near-side, far-side and in-the-intersection.

Traffic control zones in the vicinity of intersections may block movements and interfere with normal traffic flows. Such conflicts frequently occur at complex signalized intersections having such features as traffic signal heads over particular lanes, lanes allocated to specific movements, multiple signal phases, and signal detectors for actuated control. Where such potential problems exist, the traffic engineering staff having.

Jurisdiction should be contacted.

It should be recognized that some workspaces may extend into more than one portion of the intersection. For example, work in one quadrant may create a near-side workspace on one street and a far-side workspace on the cross street. In such instances, the traffic control zone should incorporate features shown in two or more of the intersection and pedestrian typical application diagrams shown herein.

Workspace on the Near Side of Intersections:

Where space is restricted, as with short block spacings, two warning signs may be used in the advance warning area, and a third "action-type" warning or regulatory sign (e.g., KEEP LEFT) is placed within the transition area. The one significant problem that may occur with a near-side lane closure is a reduction in capacity, which during certain hours of operation could result in congestion and backups.

(2) Workspace on the Far Side of Intersections:

Far-side workspaces require additional treatment because motorists typically may enter the activity area by straight-through and left- or right-turning movements. Merging movements within the intersection should be avoided. Therefore, the applicable principle is to close any lanes on the near-side intersection approach that do not carry through the intersection as lanes. If, however, there is a significant number of vehicles turning from this lane, then it may be advantageous to convert the lane to an exclusive turn lane.

10.27 Trenching and Excavations

Scope and Application

This policy sets forth the official practices required for excavations made by employees and subcontractors of Civil Works Contracting.

Definitions

Aluminum hydraulic shoring - An engineered shoring system comprised of aluminum hydraulic cylinders (cross braces), used in conjunction with vertical rails (uprights) or horizontal rails (walers). Such a system is designed specifically to support the sidewalls of an excavation and prevent cave-ins.

Benching - A method of protecting employees from cave-ins by excavating the sides of an excavation to form one or a series of horizontal levels or steps, usually with vertical or near-vertical surfaces between levels.

Cave-in - The separation of a mass of soil or rock material from the side of an excavation, or the loss of soil from under a trench shield or support system, and its sudden movement into the excavation, either by falling or sliding, in sufficient quantity so that it could entrap, bury, or otherwise injure and immobilize a person.

Competent Person - One who can identify existing and predictable hazards in the surroundings, or working conditions that are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them. All Competent Persons must complete the trenching and shoring class, successfully pass the exam, and be certified for successful completion of the class. A Competent Person should have and be able to demonstrate the following:

- A thorough, working knowledge of soil analysis, use of protective systems, and requirements of 29 CFR, Subpart P.

- The ability to detect conditions that could result in collapse of the excavation, failures in protective systems, hazardous atmospheres, and other hazards including those associated with confined spaces.
- The authority to take prompt corrective measures to eliminate existing and predictable hazards and to stop the work when required.

Excavation - Any man-made cut, cavity, trench, or depression in an earth surface, formed by earth removal.

Registered Professional Engineer - A person who is registered as a professional engineer.

Shield (shield system) - A structure that can withstand the forces imposed on it by a cave-in and thereby protects employees within the structure. Shields can be permanent or portable and moved along as work progresses. Also known as trench box or trench shield.

Shoring (shoring system) - A structure such as a metal hydraulic, mechanical or timber shoring system that supports the sides of an excavation and which is designed to prevent cave-ins.

Sloping (sloping system) - A method of protecting employees from cave-ins by excavating to form sides of an excavation that are inclined away from the excavation so as to prevent cave-ins. The angle of incline varies with differences in such factors as the soil type, environmental conditions of exposure, and application of surcharge loads.

Trench (trench excavation) - A narrow excavation (in relation to its length) made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench is not greater than 15 feet. If forms or other structures are installed or constructed in an excavation as to reduce the dimension measured from the forms or structure to the side of the excavation to 15 feet or less, the excavation is also considered to be a trench.

General Requirements

All excavations will be made in accordance with the rules, regulations, requirements, and guidelines set forth in 29 CFR 1926.650, .651, and .652; OSHA's standard on excavations, except where otherwise noted below.

Procedures

- A Competent Person will be placed in charge of all excavations.
- Underground utilities must be located and marked before excavation begins.
- Employees are not allowed in the excavation while heavy equipment is digging.

Inspections will be conducted by the Competent Person:

- Daily and before the start of each shift.
- As dictated by the work being done in the trench.
- After every rain or moisture creating event such as snow, flood, thaw, etc.
- After other events that could increase hazards such as earthquake, etc.
- When fissures, tension cracks, sloughing, undercutting, water seepage, bulging at the bottom, or other similar conditions occur.

- When there is a change in the size, location, or placement of the spoil pile.
- When there is any indication of change or movement in adjacent structures.

For excavations 4 feet or greater an Excavation Inspection and Entry Authorization Form will be filled out for each inspection.

Soil Types

Type A - Most stable: clay, silty clay, and hardpan (resists penetration). No soil is Type A if it is fissured, is subject to vibration of any type, has previously been disturbed, or has seeping water.

Type B - Medium stability: silt, sandy loam, medium clay and unstable dry rock; previously disturbed soils unless otherwise classified as Type C; soils that meet the requirements of Type A soil but are fissured or subject to vibration.

Type C - Least stable: gravel, loamy sand, soft clay, submerged soil or dense, heavy unstable rock, and soil from which water is freely seeping.

Layered geological strata (where soils are configured in layers) - The soil must be classified on the basis of the soil classification of the weakest soil layer. Each layer may be classified individually if a more stable layer lies below a less stable layer, i.e. where a Type C soil rests on top of stable rock.

Many excavations will be conducted in order to repair and/or replace existing pipelines or equipment (i.e. the soil has been previously disturbed). These excavations will be made to meet the requirements for Type B or Type C soils only, as appropriate.

Testing Methods

The Competent Person in charge of the excavation will be responsible for determining whether the soil is Type B or C. If the Competent Person wants to classify the soil as Type C, they do not need to do any tests. However, tests must be conducted to determine if the soil can be classified as Type B. To do this, the Competent Person will use a visual test coupled with one or more manual tests.

<u>Visual Test</u>

In addition to checking the items on the trench inspection form, the Competent Person should perform a visual test to evaluate the conditions around the site. In a visual test, the entire excavation site is observed, including the soil adjacent to the site and the soil being excavated. The Competent Person also checks for any signs of vibration.

During the visual test, the Competent Person should check for crack-line openings along the failure zone that would indicate tension cracks, look for existing utilities that indicate that the soil has been previously disturbed, and, if so, what sort of backfill was used, and observe the open side of the excavation for indications of layered geologic structuring.

This person should also look for signs of bulging, boiling, or sloughing, as well as for signs of surface water seeping from the sides of the excavation or from the water table.

In addition, the area adjacent to the excavation should be checked for signs of foundations or

other intrusions into the failure zone, and the evaluator should check for surcharging and the spoil distance from the edge of the excavation.

Thumb Penetration Test

Attempt to press the thumb firmly into the soil in question. If the thumb penetrates no further than the length of the nail, it is probably Type B soil. If the thumb penetrates the full length of the thumb, it is Type C. It should be noted that the thumb penetration test is the least accurate testing method.

Dry Strength Test

Take a sample of dry soil. If it crumbles freely or with moderate pressure into individual grains it is considered granular (Type C). Dry soil that falls into clumps that subsequently break into smaller clumps (and the smaller clumps can only be broken with difficulty) it is probably clay in combination with gravel, sand, or silt (Type B).

Plasticity or Wet Thread Test

Take a moist sample of the soil. Mold it into a ball and then attempt to roll it into a thin thread approximately 1/8 inch in diameter by two inches in length. If the soil sample does not break when held by one end, it may be considered Type B.

Spoil

A pocket penetrometer, shearvane, or torvane may also be used to determine the unconfined compression strength of soils.

Temporary spoil will be placed no closer than 2 feet from the surface edge of the excavation, measured from the nearest base of the spoil to the cut. This distance should not be measured from the crown of the spoil deposit. This distance requirement ensures that loose rock or soil from the temporary spoil will not fall on employees in the trench. Spoil should be placed so that it channels rainwater and other run-off water away from the excavation. Spoil should be placed so that it cannot accidentally run, slide, or fall back into the excavation.

Permanent spoil should be placed some distance from the excavation.

Controls

Surface Crossing of Trenches

Surface crossing of trenches should not be made unless necessary. However, if necessary, they are only permitted under the following conditions:

- Vehicle crossings must be designed by and installed under the supervision of a registered professional engineer.
- Walkways or bridges must:
  - Have a minimum clear width of 20 inches,
  - Be fitted with standard rails, and
  - Extend a minimum of 24 inches past the surface edge of the trench.

Ingress and Egress

- Trenches 4 feet or more in depth will be provided with a fixed means of egress.
- Spacing between ladders or other means of egress must be such that a worker will not have to travel more than 25 feet laterally to the nearest means of egress.
- Ladders must be secured and extend a minimum of 36 inches above the landing.
- Metal ladders should not be used when electric utilities are present.

Exposure to Vehicles

- Employees exposed to vehicular traffic will be provided with and required to wear reflective vests or other suitable garments marked with or made of reflectorized or high-visibility materials.
- Trained flag persons, signs, signals, and barricades will be used when necessary.

Exposure to Falling Loads

- All employees on an excavation site must wear hard hats.
- Employees are not allowed to work under raised loads.
- Employees are not allowed to work under loads being lifted or moved by heavy equipment used for digging or lifting.
- Employees are required to stand away from equipment that is being loaded or unloaded to avoid being struck by falling materials or spillage.
- Equipment operators or truck drivers may remain in their equipment during loading and unloading if the equipment is properly equipped with a cab shield or adequate canopy.

Warning Systems for Mobile Equipment

The following steps should be taken to prevent vehicles from accidentally falling into the trench:

- Barricades must be installed where necessary,
- Hand or mechanical signals must be used as required,
- Trenches left open overnight will be fenced and barricaded.

Hazardous Atmospheres and Confined Spaces

Employees will not be permitted to work in hazardous and/or toxic atmospheres. Such atmospheres include those with:

- Less than 19.5% oxygen,
- A combustible gas concentration greater than 20% of the lower flammable limit, and,
- Concentrations of hazardous substance that exceed those specified in the Threshold Limit Values for airborne contaminants established by the ACGIH.

All operations involving such atmospheres must be conducted in accordance with OSHA requirements for occupational health and environmental controls for personal protective equipment and for lifesaving equipment. Engineering controls (such as ventilation) and respiratory equipment may be required.

Testing for Atmospheric Contaminants

If there is any possibility that the trench or excavation could contain a hazardous atmosphere, atmospheric testing must be conducted prior to entry. Conditions that might warrant atmospheric testing would be if the excavation was made in a landfill area or if the excavation was crossed by, was adjacent to, or contained pipelines containing a hazardous material (for example, natural gas lines).

Testing should be conducted before employees enter the trench and should be done regularly to ensure that the trench remains safe. The frequency of testing should be increased if equipment is operating in the trench.

Atmospheric testing must be documented.

Employees required to wear respiratory protection must be trained, fit-tested, and enrolled in a respiratory protection program.

Some trenches qualify as confined spaces. When this occurs, compliance with Civil Works Contracting's Confined Space Program is also required.

Standing Water and Water Accumulation

Methods for controlling standing water and water accumulation must be provided and should consist of the following if employees must work in the excavation:

- Use of special support or shield systems approved by a registered professional engineer.
- Water removal equipment, such as pumps, used and monitored by a Competent Person.
- Employees removed from the trench during rainstorms
- Trenches carefully inspected by a Competent Person after each rain and before employees are permitted to re-enter the trench.

Benching, Sloping, Shoring and Shielding Requirements

All excavations or trenches 4 feet or greater in depth will be appropriately benched, shored, or sloped according to the procedures and requirements set forth in OSHA's Excavation standard, 29 CFR 1926.650, .651, and .652.

Excavations or trenches 20 feet deep or greater must have a protective system designed by a registered professional engineer.

Excavations under the footing base of a foundation or wall require a support system designed by a registered professional engineer.

Sidewalks and pavement will not be undermined unless a support system or another method of protection is provided to protect employees from their possible collapse.

Benching

There are two basic types of benching, single and multiple, which can be used in conjunction with sloping.

In Type B soil, the vertical height of the benches must not exceed 4 feet. Benches must be below the maximum allowable slope for that soil type. In other words, a 10-foot deep trench in Type B soil must be benched back 10 feet in each direction, with the maximum of a 45-degree angle. Benching is not allowed in Type C soil.

Sloping

Maximum allowable slopes for excavations less than 20' based on soil type and angle to the horizontal are as follows:

Soil Type	Height / Depth Ratio	Slope Angel
A	**¾ to 1**	**53 degrees**
B	**1 to 1**	**45 degrees**
C	**1 ½ to 1**	**34 degrees**

A 10-foot-deep trench in Type B soil would have to be sloped to a 45-degree angle or sloped 10 feet back in both directions. Total distance across a 10-foot-deep trench would be 20 feet, plus the width of the bottom of the trench itself. In Type C soil, the trench would be sloped at a 34-degree angle, or 15 feet back in both directions for at least 30 feet across, plus the width of the bottom of the trench itself.

Shoring or shielding is used when the location or depth of the cut makes sloping back to the maximum allowable slope impractical. There are two basic types of shoring, timber and aluminum hydraulic.

Hydraulic shoring provides a critical safety advantage over timber shoring because workers do not have to enter the trench to install them. They are also light enough to be installed by one worker; they are gauge-regulated to ensure even distribution of pressure along the trench line; and they can be adapted easily to various trench depths and widths.

However, if timber shoring is used, it must meet the requirements of 29 CFR 1926.650, .651, and .652. All shoring will be installed from the top down and removed from the bottom up.

Hydraulic shoring will be checked at least once per shift for leaking hoses and/or cylinders, broken connections, cracked nipples, bent bases, and any other damaged or defective parts.

The top cylinder of hydraulic shoring will be no more than 18 inches below the top of the excavation.

The bottom of the cylinder will be no higher than four feet from the bottom of the excavation. (Two feet of trench wall may be exposed beneath the bottom of the rail or plywood sheeting, if used.)

Three vertical shores, evenly spaced, must be used to form a system.

Wales are installed no more than two feet from the top and no more than four feet from the bottom.

Shielding

Trench boxes are different from shoring because, instead of shoring up or otherwise supporting the trench face, they are intended primarily to protect workers from cave-ins and similar incidents.

The excavated area between the outside of the trench box and the face of the trench should be as small as possible. The space between the trench box and the excavation side must be backfilled to prevent lateral movement of the box. Shields may not be subjected to loads exceeding those that the system was designed to withstand.

Trench boxes are generally used in open areas, but they also may be used in combination with sloping and benching.

The box must extend at least 18 inches above the surrounding area if there is sloping toward the excavation. This can be accomplished by providing a benched area adjacent to the box.

The manufacturer must approve any modifications to the shields.

Shields may ride two feet above the bottom of an excavation, provided they are calculated to support the full depth of the excavation and there is no caving under or behind the shield.

Workers must enter and leave the shield in a protected manner, such as by a ladder or ramp. Workers may not remain in the shield while it is being moved.

10.28 Vacuum Trucks

Purpose

During vacuum truck operations, workers are at risk of being exposed to toxic gases, flammable materials, and other various hazards. This procedure will address proper and safe vacuum truck operations.

Scope

When work is performed on a non-owned or operated site, the operator's program shall take precedence, however, this document covers Civil Works employees and contractors and shall be used on owned premises, or when an operator's program doesn't exist or is less stringent. Employees will be aware of provisions of site-specific contingency/emergency plans by either Civil Works or of a facility owner.

SAFE WORK PROCEDURES

Safe work procedures for vacuum truck operations must address the potential for chemical reactions and the potential release of toxic gas or fumes. They must also take into account the variety of fluids or substances that vacuum trucks typically carry. Before starting any vacuum truck operations Civil Works shall make sure that vacuum truck owners and operators, as well as facility personnel are aware of the following hazards of vacuum truck operations and associated controls:

- The numerous potential hazards associated with vacuum truck operations in petroleum facilities including but not limited to:
    - sources of ignition, flammable atmospheres, potential hazards associated with the surrounding area, toxic vapors and their PEL's and STEL's.
    - additional hazards such as slips and falls, spills and releases, fires and explosions and accidents within the facility or on the highway.

- Ensure that air quality monitoring at the work site is continuous at such locations as the discharge area of the vacuum truck venting hose.
- Ensure that first aid is readily available on site in the event of exposure to toxic gas.
- Consult the manufacturer's instructions to confirm that the vacuum equipment is designed for the particular transfer operation.
- Ensure that all equipment including tank and vacuum trucks and pumping equipment is in safe working condition.
- Ensure that the tank interior, filter baghouse and cyclone separators are clean and free of any substances that may react with the liquids to be vacuumed or transferred.
- Civil Works has inspection requirements that shall be done before beginning operations. Before beginning operations, vacuum truck operators shall obtain any required permits and inspect vacuum trucks, equipment and loading/off-loading sites to assure safe operations.
- Drivers are to be aware of high discharge temperatures associated with vacuum pumps and blowers. Under normal conditions, the absence of oxygen minimizes the risk of ignition in a vacuum truck. However, operating rotary lobe blowers and vacuum pumps at high speeds creates high air movement and high vacuum levels, resulting in high discharge air temperatures and high discharge vapor concentrations that can present potentially ignitable conditions.

Atmospheric Testing and When It Should Be Conducted

The areas where vacuum trucks will operate must be free of hydrocarbon vapors in the flammable range.

The areas where the vacuum truck operator and others work without respirators must also be at or below air contaminant PEL's/STEL's. If there is any question whether the area is vapor or toxic gas free, atmospheric testing shall be performed by a qualified person using properly calibrated and adjusted detectors.

Testing shall be conducted prior to starting any operations, and if necessary, during operations, including but not limited to the following:

- when operations in the area are subject to change such as automatic pump start-up or product receipt into, or transfer out of, a tank located in the vicinity of the transfer operations
- when off-loading
- when atmospheric conditions change such as wind direction
- when an emergency situation, such as product release, occurs in within the facility that may affect atmospheric conditions in the transfer area

To prevent exposure to toxic gases during transfer operations:

- never transfer fluids from one truck to another unless it has been established that no chemical reaction will occur
- position trucks to minimize exposure to any discharged gases and fumes
- ensure that discharge lines are long enough and large enough for safe operation
- position vent lines away from workers and workstations, including control panels, valve handles, gauges, shut-offs, and hose attachment points - if possible, use a vertical exhaust stack to divert exhaust gases away from workers and ignition sources.
- check air monitoring equipment during operations to confirm that venting is proceeding safely
- monitor the following:
    - tank level indicators to avoid overfilling
    - tank pressure gauges to avoid over-pressurizing receiving tanks or creating excessive vacuum in supply tanks
    - tank temperature gauges to help identify possible chemical reactions
- minimize the air introduced into the system when pressure loading or unloading - submerge the suction line in liquid, or reduce the vacuum pump speed when skimming or nearing the end of a load
- maintain a log of transported fluids and any potential residue
- use gravity loading and unloading whenever possible
- use a vapor recovery system — when available — to avoid venting tanks directly to the atmosphere

Conductive Hoses and Qualities of Conductive Hoses That Must Be Used

Vacuum hose constructed of conductive material or thick-walled hose with imbedded conductive wiring shall be used when transferring flammable and combustible liquids when the potential for a flammable atmosphere exists in the area of operations.

Conductive hose shall provide suitable electrical conductance less than or equal to 1 mega ohm per 100 feet (as determined by the hose manufacturer). Thin-walled metallic spiral-wound conductive hoses should not be used because of the potential for electrical discharge through the thin plastic that covers the metal spiral.

Bonding and Grounding

The complete vacuum transfer system needs to be bonded so that there is a continuous conductive path from the vacuum truck through the hose and nozzle to the tank or source container and grounded to dissipate stray currents to earth (ground).

Prior to starting transfer operations, vacuum truck needs to be grounded directly to the earth or bonded to another object that is inherently grounded (due to proper contact with the earth) such as a large storage tank or underground piping. A safe and proper ground to earth may be achieved by connecting to any properly grounded object including but not limited to any one or more of the following examples:

- a metal frame of a building, tank, or equipment that is grounded

- an existing facility grounding system such as that installed at a loading rack
- Fire hydrants metal light posts, or underground metal piping with at least 10' of contact with earth
- a corrosion free metal ground rod of suitable length and diameter (approximately 9' long and 5/8-in. diameter), driven 8' into the earth (or to the water table, if less)

Vacuum Exhaust Venting

Several methods can be used by vacuum truck operators to safely vent vacuum pump exhaust vapors, including but not limited to the following:

- operators can prevent dieseling by locating the vacuum truck upwind of vapor sources and by extending the vacuum pump discharge away from the diesel engine air intake,
- vapors may be returned to the source container using conductive and closed connections,
- vapors may be vented into the atmosphere to a safe location using a safety venture,
- vacuum truck operators may provide vertical exhaust stacks extending approximately 12' above the vacuum truck (or higher if necessary) to dissipate the vapors before they reach ignition sources or other potential hazards and personnel, and
- vacuum truck operators may attach a length of exhaust hose to the vacuum exhaust that is long enough to reach an area that is free from potential hazards, sources of ignition, and personnel - the hose should be preferably extended 50' downwind of the truck and away from the source of the liquids.

TRAINING AND PERSONNEL SAFETY

Civil Works requires the safe operation of vehicles and that only qualified operators shall be allowed to operate the vehicle. Training consists of:

- Vacuum truck operators shall be trained and properly licensed in accordance with applicable regulations.
- Vacuum trucks shall not enter tank dike area until such areas have been checked/monitored and rendered safe.
- Vacuum trucks cargo tanks shall be depressurized.
- Vacuum truck operators must be aware of the effect of speeds, turns and the changing center of gravity.
- Vacuum truck operators shall maintain proper distances when operating vacuum trucks inside facilities with restricted clearances.

Additionally, vacuum truck personnel working in petroleum facilities shall be trained for personnel safety in the following areas:

- In the safe operation of the vacuum equipment.
- To be familiar hazards of the petroleum products, by-products, wastes and materials being transferred.
- To be aware of relevant government and facility safety procedures and

emergency response requirements.

- For the SDS of the substances being vacuumed or transferred.
- Appropriate PPE to be used.
- The requirement that all personnel shall leave the vacuum truck cab during loading and off-loading operations.
- The requirement that when transferring flammable liquids or hazardous materials, vacuum truck operators shall remain positioned between the vacuum truck and the source or receiving tank, vessel, or container and within 25' of the vacuum truck throughout the duration.
- The requirement that vacuum truck operators shall monitor the transfer operation and be ready to quickly close the product valve and stop the pump in the event of a blocked line or release of material through a broken hose or connection.
- The knowledge that smoking, or any other source of ignition, shall not be permitted within at least 100' (depending on local procedures and atmospheric conditions) of the truck, the discharge of the vacuum pump or any other vapor source.

10.29 Vehicle Safety

Purpose

Motor vehicle accidents are the leading cause of death and crippling injury in the United States. Traffic safety laws are important components of vehicle safety, but the most important aspect of vehicle safety is the driver.

Civil Works Contracting employees must always practice vehicle safety. Company drivers are accountable for vehicle safety. Employees are expected to be familiar with this policy and follow it. Failure to do so may result in a loss or suspension of company driving privileges or disciplinary action up to and including termination of employment. Approximately 5% of all motor vehicle accidents are caused by a mechanical defect. The remaining percentages are caused by a poor decision or indecision. A well-maintained vehicle is less likely to cause distractions for the driver, thus allowing the driver to concentrate on the task of driving.

Mandatory Requirements

All Civil Works Contracting employees who operate a motor vehicle for company business (whether a company vehicle, rental vehicle, or personal vehicle) must:

- Possess a valid state driver's license for your vehicle's class.
- Maintain a good driving record. Department of Motor Vehicle records will be checked periodically and driving privileges may be suspended or terminated if your record indicates an unacceptable number of accidents or violations. If your driving record falls within the company’s insurance carrier’s guidelines of an “unacceptable driver,” your employment may be terminated.
- Notify your supervisor of any change in your license status or driving record.
- Obey all traffic laws, signs, and signals.
- Never drink and drive. Driving while under the influence of alcohol or drugs is strictly prohibited.
- Wear safety belts.

- Yield to pedestrians.
- Respond to dangerous driving conditions as appropriate.
- In the event of an accident:
  - Take the necessary steps to protect the lives of yourself and others
  - Comply with police instructions
  - Do not assume or admit fault. Others will determine liability and negligence after a thorough investigation.
  - Report the accident to Civil Works Contracting as soon as possible.

When operating your own vehicle for company business:

- Your personal auto liability insurance is the primary payer. Civil Works Contracting's insurance is in excess of your coverage.
- You should carry at least $100K / $300K / $50K per occurrence of liability coverage. Evidence of insurance coverage must be documented with Civil Works Contracting each year by providing a copy of your policy's declaration page or a Certificate of Insurance (COI).
- Civil Works Contracting is not responsible for any physical damage to your vehicle. You must carry your own collision and comprehensive coverage.
- You are required to report your mileage for expense reimbursement.

Safe Driving Practices

- **Inspect the Vehicle -** Drivers are expected to inspect the vehicle for any safety shortcomings. Repairs should be made prior to operating the vehicle or as soon as possible if not serious.
- **Seat Belts -** All passengers and drivers should be fastened according to State law. All passengers and drivers should remain fastened until the driver has reached the destination. The driver should visually check as well as verbally inform the passengers.
- **Distractions** - There should be no loud music, throwing of objects, or other driver distractions. Drivers whose passengers who are causing distraction should stop the vehicle in a safe place until all distractions have ceased.
- **Cell Phones and Other Electronic Devices** – Unless using a hands-free function, drivers may not use a cell phone or any other electronic device for talking, texting, emailing or any other purpose while the vehicle is moving. If a call or text must be made or answered, drivers are encouraged to stop and secure the vehicle before the cell phone or other device is used.
- **Cargo** - Baggage, tools, equipment and materials should be secured to prevent them from becoming hazardous projectiles in the event of an incident.
- **Signals -** Turn and lane change signals must be used to signal the driver's intentions.
- **Speed bumps and potholes -** The driver must slow down and use caution when driving over speed bumps or potholes. A van should be brought to a complete stop before proceeding over a speed bump. This will avoid damage to vehicles as well as prevent jolts to passengers in the rear of the vehicle where the jolt is five times greater than in the front.
- **Forward/reverse motion -** Most vehicle accidents occur while traveling too close or traveling in reverse. Ensure safe following distances especially in inclement weather or when hauling heavy loads, both of which can cause the need for extra stopping distances.

Avoid backing whenever possible, such as by choosing pull-through parking spaces. When reverse travel is necessary, proceed slowly and use assistance of your passengers. Use a spotter to assist in backing.

- **Weather Conditions -** If it is raining it is recommended that you reduce your driving speed under the posted limit and turn on your headlights. Roads are most slippery at the start of rain. Surface oil and grease form slick films that are not washed away until after 20-30 minutes of hard rain. Strong winds also make steering difficult. In such conditions, speed should be decreased; the driver should have both hands on the steering wheel and be alert for other vehicles swerving into his/her path. The driver may opt to pull over until adverse weather conditions have passed. Trips may be canceled due to adverse weather conditions. Drivers are also expected to not operate vehicle when snow and ice impedes visibility.
- **Passengers -** Picking up hitchhikers is strictly prohibited.
- Each fleet vehicle will be equipped with a first aid kit, a fire extinguisher and accident-warning device in case of a breakdown. Drivers are responsible for checking to ensure all these items are present in the vehicle prior to movement. Consult management if any of these items are not present. Please make a note what needs to be replaced and forward it to the appropriate company representative.
- **Pre- and post-trip Inspections** - Conduct pre- and post-trip inspections daily. All drivers must inspect their vehicles for defects. The driver should also review the previous inspection form to determine if the repairs were completed and signed by the servicing mechanic. Ensure required insurance and registration documents are in the vehicle. These documents include:
    - Current Insurance Card
    - Current Registration
    - Camera
    - Accident Report Forms
- **Following Distance -** A loaded truck is more difficult to stop than an automobile traveling at the same speed. Therefore, you should use a 3-second following rule. Use a 4-second rule in poor weather conditions or when fully loaded.
- **Vehicle Height -** Watch for overhead obstructions such as trees, parking decks, overhead wires, etc. The driver is responsible for knowing the height of his/her load and the clearance to be encountered. Trucks can block the view of passenger cars following you. Drivers may attempt to pass you at an unsafe time or place, and thus, threaten to involve you in an accident. Watch both side mirrors for these maneuvers.
- **Blind Spots -** Trucks have larger blind spots than cars. Adjust your mirrors to reduce these as much as possible.
- The greatest blind spot is to the rear when backing. Your best defense is to back up only when necessary. Avoid backing into traffic. If you must back up, get out and check the area behind you before doing so. Turn on your four-way flashers and back slowly. Use a ground-guide whenever possible and ensure they understand what you are doing. When in a line of stop-and-go traffic, never get so close to the vehicle in front that you lose sight of its stoplight and directional signals.
- **Parking and Loading/Unloading -** Watch for normal hazards, such as low branches, low-hanging overhead wires, fences, walls and hydrants, and choose a spot that will be easy to pull in and out of. It is your responsibility to be aware of potential hazards. It is also essential that you lock any vehicle when it is left unattended.
- **Driver's Responsibilities -** Company drivers are required to do the following:

- Keep safety equipment assigned to the vehicle in good condition and securely mounted.
- Keep the floors and steps of the vehicle free from items that; could cause slips-trips-and falls, could become projectiles in a crash, or obstruct your vision.
- Follow established routes of travel if applicable.
- **Defensive Driving Techniques -** A defensive driver is one who:
- Is careful to commit no driving errors
- Makes allowances for the lack of skill and improper attitude of others.
- Avoids becoming involved in an incident or close call because of weather, road conditions, traffic, or the actions of pedestrians and other drivers.
- Keeps continually alert for incident-producing situations far enough in advance to take defensive action.
- Concedes the right of way to prevent an accident

Defensive Driving

By taking defensive driving courses, employees can promote driving safety and lower their insurance rates. The principles of defensive driving include the following:

- Knowledge: Know your vehicle and know the law.
- Control: Always maintain control of your vehicle. To improve your control, perform routine vehicle maintenance and respond to road conditions as appropriate.
- Attitude: Be willing to obey all laws and be willing to yield to all other vehicles and pedestrians.
- Reaction: Respond to driving conditions appropriately. Do not impede your reaction time by driving when tired or under the influence of alcohol or drugs.
- Observation: Be aware of potential accidents and take preventive measures. Always try to anticipate the actions of other drivers.
- Common Sense: Do not risk your safety to save time. Do not respond to rude or obnoxious drivers by violating traffic laws.

Backing Vehicles

Backing a large vehicle can be very difficult. Try to avoid backing whenever possible. If you must back a vehicle, follow these guidelines:

- Get out of the vehicle and inspect the area you want to back into.
- If possible, have someone outside help guide your vehicle into position.
- Sound the horn once before moving backwards.
- Back slowly and check your mirrors often.

Railroad Crossings

Compared with other types of collisions, train/motor vehicle crashes are 11 times more likely to result in a fatal injury. On the average, there are more train-car fatalities each year than airplane crashes. Unfortunately, driver error is the principal cause of most grade crossing accidents. Many drivers ignore the familiar tracks they cross each day, and some drivers disregard train warning signals and gates.

All public highway-rail grade crossings are marked with one or more of the following warning devices:

- Advance Warning Signs: Advance warning signs indicate that a railroad crossing is ahead. These signs are positioned to allow enough room to stop before the train tracks.
- Pavement Markings: Pavement markings may be painted on the pavement in front of a crossing. Always stay behind the stop line when waiting for a passing train.
- Crossbuck Signs: Railroad crossbuck signs are found at most public crossings. Treat these signs as a yield sign. If there is more than one track, a sign below the crossbuck will indicate the number of tracks at the crossing.
- Flashing Lights and Gates: Flashing lights are commonly used with crossbucks and gates. Stop when the lights begin to flash and the gate starts to lower across your lane. Do not attempt to cross the tracks until the gate is raised and the lights stop flashing.

IMPORTANT:

You must stop at least 15 feet from a train track when: (1) warning lights flash; (2) a crossing gate or flag person signals an approaching train; (3) a train is within 1500 feet of the crossing; or (4) an approaching train is plainly visible and in hazardous proximity.

Follow these guidelines when you encounter a railroad crossing:

- Always expect a train.
- When approaching a crossing, LOOK, LISTEN, and LIVE.
- Be sure all tracks are clear before you proceed. Remember, due to their large size, it is easy to misjudge the speed and distance of an oncoming train. If you have any doubts, stop and wait for the train to pass.
- Watch for vehicles, such as school buses, that must stop before train tracks.
- Never race a train to a crossing.
- Always stop for flashing lights, bells, and gates. Never drive around a gate. (State law requires pedestrians to stop when a railroad-crossing gate is down.)
- Do not allow yourself to be boxed in on a track with cars in front and behind you.
- Never stop on train tracks. If your car stalls on train tracks, call 911 immediately. If a train approaches, abandon the car and run away from the tracks.
- When driving at night, look low to the ground for moving trains. (One third of all train-car collisions occur at night when cars run into moving trains.)
- Watch out for a second oncoming train after the first train has passed.

10.30 Welding, Cutting and Hot Work

Purpose

The purpose of this program is to ensure a safe work environment during the performance of welding, cutting and hot work operations.

Scope

These procedures apply to all employees who are directly involved or assist in welding, cutting and hot work activities. This program covers Civil Works Contracting employees and contractors. Defective equipment or other safety hazards must be reported immediately. Repairs must be made by qualified, authorized personnel only.

If objects to be cut or welded are immovable and if all the present fire hazards cannot be cleared, the object must be removed, or guards must be used to restrain the heat, slag and sparks and to protect the immovable fire hazards.

Definitions

Welding and Hot Work Procedures - Activities that have the potential to cause fires or explosions due to sparks, molten slag, fire or other hot material

Hot Work Examples - Welding, cutting, soldering, brazing, thawing pipes, and using electric tools in hazardous areas

Hazards - Dangerous conditions that include, but are not limited to, the following: skin burns, fires, welding "blindness," explosions, fumes and smoke

Special Hazard Occupancies - Areas where the following potential fire hazards are present: gases, flammable liquids, accumulation of dust, rubber, plastics and paper products

Key Responsibilities

Project Managers and Field Supervisors:

- Establish if the jobsite is safe for cutting and welding operations
- Determine the safe areas for performing cutting and welding operations
- Provide training for all employees and contractors whose job duties include performing operations that produce heat, sparks, or flames, such as welding, grinding or brazing
- Create and implement effective hot work procedures
- Provide appropriate personal protective equipment (PPE) for hot work
- Supply safe, properly working equipment for hot work
- Ensure that all PPE and hot work equipment are in safe working order
- Oversee all hot work operations
- Inspect the hot work area before work begins
- Permit only trained and authorized employees and contractors to conduct hot work
- Ensure that permits are obtained for all hot work performed outside of authorized work areas

Employees:

- Inspect all hot work equipment before use
- Use applicable hot work PPE
- Follow all established hot work procedures

- Report unsafe conditions or defective equipment immediately

General Procedures

Equipment operators must report equipment defects and discontinue use until it has been repaired or replaced.

Written permits must be obtained before hot work is performed. The work area must be inspected, and authorization obtained via written permit before proceeding with cutting or welding operations.

Whenever possible, combustibles should be placed a minimum of 35 feet from the work area. When relocation of combustibles is not practicable, they must be protected via the following means to prevent accidental ignition of the material: flameproof covers, wetting the material, shielding with met, guards or curtains.

Augers conveyor systems and ducts that have the potential to carry sparks to distant combustibles must be protected or turned off.

If welding or cutting is performed near ceilings, walls, partitions or openings in the floor (such as grating and manholes), fire-resistant guards or shields must be used to avoid ignition.

When welding is conducted on metal ceilings, walls, partitions or flooring, care must be taken to prevent the ignition of combustible materials on the other side due to radiation or conduction of heat. When combustibles on the opposite side cannot be moved, a fire watch person will be provided on the opposite side to monitor the work.

Welding on a metal partition, ceiling, wall, or flooring made of combustible sandwich panels is strictly prohibited.

Welding and cutting operations may not be conducted when pipes or other metal to be welded are in contact with combustible walls, floors, partitions, ceilings or roofs closely enough to cause ignition by combustion.

If welding cannot be conducted safely, the welding and cutting shall not be performed. Cutting or welding must not be performed under the following circumstances:

- Unauthorized areas,
- In the presence of flammable or explosive atmospheres,
- In sprinkled buildings where the sprinklers are impaired,
- In areas in close proximity to large quantities of stored combustible materials,
- In locations where the accumulation of dust is more than 1/16th of an inch within a 35 feet perimeter of the area where hot work is to be conducted. All dust accumulation must be cleared before welding or hot work begins.

If welding or cutting is performed in an area where fires might develop, or if any of the conditions listed above cannot be satisfied, a fire watch will be provided.

- The fire watch must be present during welding procedures and for at least 30 minutes (an half hour) after welding is completed,
- The fire watch must be properly trained in the use of fire extinguishers and must have knowledge of the facility's alarm system,

- The fire watch will have the appropriate fire extinguishers at the ready during the procedure,
- Appropriate fire extinguishers will be supplied and available for immediate use,
- Hot work permits must be obtained for all welding or cutting procedures performed outside designated welding areas.

Fire Prevention Measures

Designated welding areas will be established according to the following specifications:

- Fire extinguishers shall be made readily available at all times during welding & cutting operations,
- Floors must be swept and cleared of combustible materials within 35 feet of the work area,
- Flammable and combustible materials must be placed 35 feet or more from the designated work area,
- Adequate ventilation must be provided to supply 20 air changes per hour,
- At least one 10 lb. dry chemical fire extinguisher must be within reach of the 35 feet of the work area,
- Welding curtains, noncombustible walls or other protective dividers will be supplied to confine slag and sparks to the combustible-free area.

Requirements for welding outside the designated area:

- A hot work permit must be obtained prior to beginning welding operations,
- Portable welding curtains or shield must be utilized for the protection of other workers in the welding area,
- Plastic materials must be protected by welding tarps during the welding operations,
- Respiratory protection must be used unless adequate airflow away from the welder and others present in the work area can be set up and maintained,
- A fire watch must be present during all hot work operations.

After the completion of welding operations, the welder must mark the metal as hot or warn other workers of the fact in some way.

Confined Space

- A space that is large enough that an employee can enter full-bodied into the area to perform the assigned work,
- Has limited means for entering and exiting the space (e.g., vessels, coolers, tanks, hoppers, storage bins, vaults and pits), and
- Is not intended for continuous occupancy.

Refer to Civil Works Contracting's Confined Space Program before beginning any cutting, welding or brazing operations that meet the requirements of a confined space.

Adequate ventilation is required to work in a confined space.

When welding or cutting in a confined space, the gas cylinders and welding machines must be left outside the confined space. Prior to beginning work, heavy portable equipment on wheels must be stabilized to prevent accidental movement.

When welding operations are performed in a confined space that must be entered through a manhole or similar opening, a quick means of exit must be provided to protect the welder in case of an emergency.

- When using safety belts for this purpose, the belt must be attached to the welder's body in such a way that it does not get jammed in the opening,
- An attendant will be stationed outside the opening to observe the welder and put the preplanned rescue procedures into effect, if needed.

When arc welding procedures cease for a substantial amount of time (e.g. during lunch or overnight), the electrodes must be removed from the holders. The holders must be carefully placed to avoid accident contact. The machine must be disconnected from its power source.

Improperly closed valves pose a risk of allowing the escape of gas through leaks. In order to eliminate this risk, when gas welding or cuffing ceases for a substantial period of time, torch valves must be closed; the torch's fuel- gas and oxygen supply must be shut off along some point outside the confined area. If possible, remove the torch and hose from the confined space.

When welding must be performed in an area with screens on all sides, the screens must be arranged to avoid restriction of ventilation. Preferably, screens should be mounted approximately two (2) feet above the floor unless the work is performed at a level so low that the screens must be lower in order to protect nearby workers.
Fixed enclosures must have a top and at least two sides to surround the welding or cutting operations. A sufficient airflow must be in place to maintain a velocity away from the welder of 100 linear feet (30 m) per minute or greater.

When welding and cutting in confined spaces, adequate ventilation must be provided to avoid the accumulation of toxic materials and to avoid possible oxygen deficiencies. This is to protect the welder as well as helpers and other employees in the immediate area. When air is withdrawn, it will be replaced with clean air.

When circumstances will not allow for such ventilation, airline respirators or hose masks will be provided. These are approved for this purpose by the National Institute for Occupational Safety and Health (NIOSH). In areas where a threat to life is present, a positive pressure, full-face, self-contained breathing apparatus, or a combination of a full-face piece, positive pressure supplied-air respirator with an auxiliary, self-contained air supply approved by NIOSH must be used.

When welding operations are conducted in confined spaces where it is necessary for welders and their helpers to provide hose masks, hose masks with blowers or self-contained breathing apparatuses, an additional worker will be situated outside the confined space to monitor the safety of those in the confined work area.

Fumes, Gases and Dust

Toxic fumes may be produced during some welding procedures; these fumes may require extraction. An assessment of the work to be conducted must be completed before beginning the work. Fumes usually contain small particles of the material being welded; these fumes can have a severe effect on the respiratory system.

Welding of materials that have the potential to produce dangerous fumes require proper ventilation and/or the use of respiratory protection. This also applies when inert-gas metal-arc

welding or oxygen-cutting stainless steel. These materials include:

- Lead base metals
- Zinc
- Mercury
- Cadmium
- Fluorides
- Beryllium
- Exotic metals or paints not otherwise listed

Employees must refer to Civil Works Contracting's Respiratory Protection Program to evaluate which type of respiratory protection should be used during welding procedures.

Welding and cutting operations must be adequately ventilated to avoid the accumulation of toxic materials for the safety of the welder, helpers, and other personnel in the work area.

Personal Protection

Helmets and hand shields must be made of a material that insulates from heat and electricity. Helmets, goggles, and shields must be capable of withstanding sterilization and should not be easily flammable. Helmets and hand shields must be in place to protect the face, ears and neck from direct radiant energy from the arc.

Helmets must have filter plates and cover plates that allow for easy removal. All parts must be constructed of materials that are not easily susceptible to corrosion and do not discolor the skin.

Goggles must be ventilated so as to avoid fogging of the lenses. All glass for goggle lenses must be tempered, free from scratches, waves, air bubbles and other imperfections. The front and rear surfaces of lenses and windows must be parallel and smooth; lenses used to provide vision corrections are the only exception to this. Lenses are required to have a permanent, distinct marking to easily identify their shade and source.

NOTE:
When high yellow light is produced in gas welding or oxygen cutting procedures, it is preferable to use a filter or lens capable of absorbing the yellow or sodium line in the visible light. All plates and filter lenses must meet the ANSI Z87.1 – 1968 – American National standard for eye and face protection for transmission of radiant energy. Where it is practicable, welders working in these conditions should be enclosed in a booth painted with a low reflectivity finish (such as zinc oxide) and lamp black. Alternately, the welder may be enclosed with noncombustible screens painted in a similar fashion. Both booths and screens must allow air circulation at floor level. Persons near the welding areas must be protected from radiant energy via noncombustible or flameproof shields or screens or will be required to wear protective eyewear.

Appropriate clothing and hand protection must be worn to protect the skin from welding hazards.

Cleaning Compounds

Because cleaning materials are often toxic or flammable, precautions must be taken, and the manufacturer's instructions must be followed.

- Cleaning and degreasing that involves chlorinated hydrocarbons must be performed in locations where no vapors from these processes can reach or be drawn into the atmosphere surrounding the welding operations,
- Trichloroethylene and perchloroethylene must also be kept out of atmospheres that may be penetrated by UV radiation of gas-shielding welding procedures.

Mechanical ventilation must be used when oxygen cutting procedures using a chemical flux, iron powder or gas shielded arc cutting for stainless steel. This ventilation must adequately remove the fumes generated by these procedures.

Cylinders

DOT-approved compressed gas cylinders are clearly marked near the cylinder's shoulder and identifies the chemical or trade name of the gas contained inside.

- Compressed gas cylinders must be ANSI B57.1-1965 compliant,
- Compressed gas cylinders must always be secured in an upright position except when it is not practicable, for short periods of time, when carrying or hoisting the cylinder.

Cylinders must be kept away from heat sources, radiators and piping systems used in grounding. Cylinders and their valves, including couplings and regulators, must be free from oily or greasy residue. Do not handle cylinders with gloves or rags that may contain oil or grease residue.

Stored oxygen cylinders must be located a minimum of 20 feet from fuel gas cylinders and other combustible materials, including grease and oil. Alternately, stored oxygen cylinders may be separated from these hazards by a noncombustible barrier that is at least five (5) feet high and has a fire safety rating of at least 30 minutes. Valves on empty cylinders must be closed. Protective caps should always be placed on valves, hand-tight, except when the cylinder is connected for use.

Cylinders must never be kept in unventilated enclosures such as cupboards and lockers.

Storage of fuel gas cylinders inside buildings is limited to a total capacity of 2000 cubic feet (300 lbs.) of liquefied petroleum gas, except those cylinders in use or attached and ready for use.

Acetylene cylinders should be stored with the valve end up.

Appropriate storage spaces will be provided for cylinders to ensure they are not knocked over, damaged by falling objects or susceptible to tampering by unauthorized persons.

- Protection from back flow will be accomplished via an approved device that prevents fuel from flowing into the oxygen system and oxygen from flowing into the fuel-gas system,
- Flashback protection will be provided via an approved device that prevents flame from entering into the fuel-gas system,
- Backpressure protection will be provided via an approved pressure-relief device set at the recommended pressure.

The transportation of gas cylinders must follow these requirements:

- Valve caps must be installed,
- Cylinders must be secured,
- Cylinders must not be lifted by the valve protection caps. The regulators must be removed,

- Cylinders should not be dropped or otherwise allowed to strike each other,
- Regulators that are removed must be carried in the vehicle's cab,
- Cylinders are not to be tampered with, nor should any person attempt to repair a cylinder,
- Cylinders must be carefully handled at all times. Knocks, falls or rough handling may damage the cylinder, its valve or safety device, resulting in leakage. Safety devices must never be tampered with.

Arc Welding and Cutting

Personnel are required to be qualified or trained prior to operating, maintaining or installing welding equipment.

- All workers instructed to operate or perform maintenance on equipment must be familiar with the following Requirement for Electric Arc Welding Standards:
  - 29 CFR 1910.254
  - 29 CFR 1910.252 (a) (b) (c)
  - American Welding Society Standard A6-1-1966 if gas shield arc welding is performed.
- Electrical welding equipment will be selected for safe operation that comply with the above standards,
- Arc welding equipment must be able to withstand exposure to corrosive fumes, excessive oil vapor and humidity, flammable gases, unusual vibration or shock, excessive dust and seacoast or shipboard conditions,
- Arc welding equipment must be operated at the voltage recommended in the manufacturer's recommendations,
- Leads must be inspected regularly and replaced if splices are unprotected or if insulation is broken,
- Electrical tape cannot be used to repair leads,
- When using an arc welder, all ground connections must be checked to ensure the mechanical strength and electrical capabilities are adequate for the required current.

A disconnecting switch or controller and an overcurrent protection will be provided near each welding machine.

Direct current machines are required to be connected with the same polarity. Alternating current machines must be connected to the same phase and polarity of the supply circuit.

- Electrode holders must be located to avoid contact with persons, conducting objects or fuel from compressed gas tanks,
- Cables with splices within 10 feet of the holder must not be used.

If objects to be cut or welded are immovable and if all the present fire hazards cannot be cleared, guards must be used to restrain the heat, slag and sparks, and to protect the immovable fire hazards.

Resistance Welding

Only personnel trained in the operation, maintenance and installation of welding equipment may do so.

- Shields, guarding, grounding, voltage and interlocks must conform to the manufacturer's recommendations,

- Protective measures such as ventilation, shields and flash guarding must be provided to control metal fumes, flashes and toxic elements.
- If the object to be welded or cut is immovable, all fire hazards should be moved.

Oxygen Fuel Gas Welding and Cutting

Only approved implements such as regulators, torches, setting generators, pressure-reducing valves and manifolds will be used:

- Mixtures of oxygen or air and fuel gases may be explosive and should be avoided whenever possible,
- Hoses and their connections must adhere to the applicable standards of the Compressed Gas Association and Rubber Manufacturer's Association,
- Workers overseeing the oxygen or fuel-gas supply equipment and generators must be trained and deemed competent before left in a supervisory position. If the object to be welded is immovable, all fire hazards must be removed from the work area.

Fire Watch Requirements

A fire watch will be provided under the following conditions when welding, soldering, cutting or brazing is conducted near combustible materials or locations where fire hazards may develop:

- Areas where fires that are not minor may develop,
- Combustible materials are within 35 feet or less to the area where hot work is conducted,
- Combustibles are 35 feet or more from the work area, but are easily set aflame,
- Wall or floor openings are present within 35 feet or less of exposed combustible materials,
- Combustible materials are next to the opposite side of metal roofs, ceilings or partitions.

Fire watch personnel must stay at least 30 minutes after welding or cutting operations have ceased. All fire watchers must have fire extinguishers at the ready.

First Aid Equipment

First aid equipment will be provided and available at all times. Injuries must be reported as soon possible in order to seek medical attention. First aid will be performed until medical attention can be provided.

Training

Specialized training for welders, supervisors and fire watch must include:

- Responsibilities of the employee's position,
- Safe operation of the equipment to be used in performance of their job duties,
- Fire watch responsibilities to include:
  - Knowing that fire watching is the ONLY duty of the fire watch,
  - When the watch may be terminated,
  - How to use fire extinguishers,
  - Familiarity with the facilities and how to activate the fire alarm, if needed,
  - Contractor responsibilities,
  - Operator responsibilities,
  - Requirements for documentation,
  - Requirements for the use of respiratory equipment.

10.31 Work Area Protection – Signs, Signals & Barricades

Minimum Requirements

All work areas must be sufficiently barricaded to prevent unauthorized access and limit exposure of the public to work area hazards. All areas where caution is to be taken must be provided with properly marked warning signs. Signs, barricades and caution tapes must be visible and easy to read at all times. Caution tape, snow fence, pennants and similar materials must never be used as a guardrail for fall hazards. Warning and caution signs are considered to be hazard "controls" of last resort. Hazards should be eliminated (engineered/positively guarded) whenever possible.

Posted Signage

Signage should be posted at the jobsite for the following:

- List of Required PPE
- Electrical Hazards
- Emergency Contacts / Site Address
- Emergency Procedures
- Danger – Entering Safety Zone
- Visitors Must Sign in at the Office

Danger and Warning Signs

Danger signs will be used only where an immediate hazard exists. The danger sign will be predominately red for the upper panel; black outline on the border, with a white lower panel for additional sign wording.

Caution signs will be used only to warn against potential hazards or to caution against unsafe acts. The caution sign will be predominately yellow with black upper panel and borders, yellow lettering of caution on the black panel and the lower yellow panel for additional sign wording.

Exit signs will be posted at all Civil Works Contracting project sites. The exit sign will be lettered in legible green letters that are not less than six (6) inches high on a white background and the stroke of the letters must be three-fourths (3/4) inch thick.

Safety instruction signs will be predominately green lettering with a white background. These signs must hang near safety showers/eye wash stations, first aid kits, and first aid lockers.

Traffic signs will be posted at all facilities in accordance with the ANSI D6.1-1988 manual on Uniform Traffic Control Devices for streets and highways.

Personnel protective signs may vary in color and will be posted as necessary where PPE is to be worn. The following are examples:

<u>Accident Prevention Tags</u>

When accident prevention tags are necessary, they are to be used as a temporary means of warning employees of existing hazards such as defective tools or equipment.

Barricades

Barricades are to be used whenever there is a potential for danger from vehicles, potentially dangerous obstructions, overhead work, holes in decks, etc. The proper barricade tape must be selected and strung so that it is clearly visible and does not cause potential hazards in itself. Barricades will be set at least six feet back from hazards or a standard guardrail will be installed.

Flashing warning lights must be placed on barriers during hours of darkness, no less than 30 feet apart.

Caution, Warning and construction information traffic signs must be displayed, as appropriate.

The arrangement of traffic control devices must be inspected periodically to ensure their effectiveness.

Barricades must be weighted or supported to prevent their displacement.

Workers responsible for placing traffic control devices must be trained in the use and placement of these devices.

Work Zone Safety

The primary function of traffic control procedures is to move traffic safely through or around work areas. This should be done in a courteous manner not only to receive better cooperation from the public, but also to maintain a safe working environment.

Traffic Safety

All employees exposed to traffic hazards are required be protected under flagging and wear orange flagging garments (shirts, vests, jackets) at all times.

When possible, construction vehicles will be placed between the employees and traffic to prevent vehicles from entering the work area and hitting members of the crew.

All traffic controls will be established in accordance with the Manual of Traffic Controls for Construction and Maintenance Work Zones.

Traffic controls will be properly maintained throughout the workday. Signs and cones must be kept upright, visible and in their proper position at all times.

Flaggers and Flagger Training

Since flaggers are responsible for human safety and make the greatest number of public contacts of all construction personnel, it is important that qualified personnel be selected. A flagger should possess the following minimum requirements. Only qualified/competent and trained flaggers will be used:

- Good physical condition, including sight and hearing
- Mental alertness
- Courteous, but firm manner
- Sense of responsibility for public safety and the crew

A reflective vest will be worn by flaggers and each flagger will possess an orange flag. All employees exposed to traffic hazards are required be protected by the use of ANSI class II or greater reflective safety garments (shirts, vests, jackets) that must be worn at all times. Flaggers are provided at work sites to stop traffic occasionally as necessitated by work progress or to maintain continuous traffic past a work site at reduced speeds to help protect the work crew. For both of these functions, the flagger must, at all times, be clearly visible to approaching traffic for a distance sufficient to permit proper response by motorists to the flagging instructions and to permit traffic to reduce speed before entering the work site.

When operations are such that signs, signals, and barricades do not provide the necessary protection on or adjacent to a highway or street, flaggers or other appropriate traffic controls must be provided.

Flaggers must be used to control traffic in addition to signs, signals and barricades and at least 2 flaggers will always be present to move across public sidewalks

Flaggers and workers working near traffic or public sidewalks must wear a reflective orange vest approved by the U.S. Department of Transportation Manual and have flags or “Stop” and “Slow” paddles readily available.

Only appropriately trained personnel may serve as flaggers.

10.32 Working Alone Safety

PURPOSE

Civil Works will provide a safe work environment for its employees. In doing so, Civil Works will take all reasonable and practical measures to eliminate or minimize injury or incident risks associated with the nature of the work performed when employees work alone.

Civil Works shall establish site specific procedures for employees working alone.

OBJECTIVES

To minimize risk to employees who may work alone, and assistance is not readily available Civil Works will:

Conduct written hazard assessments to identify existing or potential working alone hazards.

Take measures to eliminate or control the hazards of working alone at Civil Works worksites.

Ensure that affected employees are informed of the hazards and methods used to control or eliminate them.

Provide an effective system for communication between any employee who work alone and persons capable of assisting the employee.

Ensure all incidents (working related or otherwise) are reported, investigated and documented.

Review the Working Alone Plan at least annually or more frequently if there is a change

in work arrangements which could adversely affect an employee's well-being or a report that the system is not working effectively.

KEY RESPONSIBILITIES

Civil Works Safety Manager

Conducts a hazard assessment to identify existing or potential hazards related to the nature of the work or the work environment given the circumstances of the work when working alone

Responsible for the review, implementation and maintenance of the local worksite Working Alone Plan.

Communicate this policy and its procedures to employees who work alone

Annually review the effectiveness of the hazard controls and procedures and make improvements as required

Worksite Project Manager

Responsible for the implementation and maintenance of the Working Alone Plan for their project and ensuring all assets are made available for compliance with the procedure.

Take all reasonable and practical steps to minimize or eliminate identified working alone risks.

Review the hazard assessment results and provide recommendations to management to minimize or eliminate identified working alone risks.

Review annually the effectiveness of the policy and guidelines and make changes as required by consulting with management staff and employee representatives**.**

Respond to employee concerns related to working alone and communicate these to management.

Report all incidents of work site incidents immediately.

Participate in work site hazard assessments and the implementing of procedures to eliminate or control hazards of working alone.

Safe Work Procedures

This procedure applies if an employee is working alone at a work site where assistance is not readily available if there is an emergency or the employee is ill or injured.

Worksite Assessment

A hazard assessment for working alone will anticipate work and travel time, weather, communication, type of work, employee medical conditions and training. The hazard assessment shall address hazards and identify control measures in order to minimize risk associated with working alone.

The hazard assessment will be conducted on a project by project or site basis as

circumstances vary between locations and conditions. To assess this hazard Civil Works should review records, past incidents and identify measures or actions needed to correct any hazards. The assessment should involve:

Participation by employees through methods such as one-on-one interviews, kick off safety meetings, etc.

The assessment should utilize information from employees about their experiences working alone, their current concerns and their suggestions for improvement.

Consideration for the time interval between checks and the procedure to follow in case the employee cannot be contacted, including provisions for emergency rescue.

Plan

Civil Works must develop and implement a written procedure for checking the well-being of a worker assigned to work alone or in isolation under conditions which present a risk of disabling injury, if the worker might not be able to secure assistance in the event of injury or other misfortune.

Procedures to be Followed in the Event That a Worker Working Alone Does Not Respond

Considerations such as length of time missing, weather conditions, physical fitness, etc. must be factored into the site-specific working alone program. The program must specify procedures for emergency response including provisions for contacting appropriate local officials. The program shall identify specific criteria to determine when an employee search is necessary. The minimum requirements include:

If the working alone employee fails to respond at the scheduled contact time repeated contact efforts will be made for 1 hour.

If the employee working alone is not contacted with 1 hour of the scheduled contact a designated individual will be dispatched for a search to the working location if within close proximity. If the working alone employee is not found, then the closest police (city) or governmental search and rescue authority shall be notified to conduct a search

If the employee working alone is not within close proximity and does not respond to repeated contact efforts, then the closest police (city) or governmental search and rescue authority shall be notified to conduct a search.

Communication and Regular Contact Person System

Workers must carry a cellular phone or electronic monitoring device at all times while working alone. The use of a radio, cellular/satellite phone, electronic monitoring device or another form of direct, reliable correspondence shall be used to establish an effective means of communication is established between the lone employee and designated check person.

Each site-specific Working Alone Plan shall address having an established contact person. A check-in/check-out process where employees are monitored or contacted at regular intervals will be established. Individuals must be monitored at regular intervals, or the individual contacts Civil Works at pre-determined intervals based on determinations

made in the risk assessment.

Individual(s) by job function responsible for establishing contact with the affected employee, as well as a back-up form of communication will be established for each site-specific plan. The Safety Manager, Project Manager or designee is responsible for check-in with the lone employee at regular intervals.

Backup and Documentation

Backup form of communication in the event primary communication (cell phone or land line) is unavailable will be via satellite phone or if electronic communication is not practicable or readily available at the worksite, Civil Works must ensure that a representative of Civil Works or another competent employee visits the employee at regular intervals. Civil Works shall document communication employee status at the check in intervals.

These visits or contacts shall be at intervals of time appropriate to the nature of the hazards associated with the employee's work.

Limitations on or Prohibitions of Specified Activities

No heavy equipment will be operated if a worker is alone.

No hot work will occur if a worker is alone.

No working at heights will occur if a work is alone and requiring a personal fall arrest system.

Other limitations will be placed based on the site-specific hazard assessment

Minimum Training or Experience

All employees will be trained (if working alone is a hazard at that location) in:

Any revision to the written local Working Alone Plan and safe work practices.

Being informed of working alone hazards at the Civil Works worksite and the methods used to control or eliminate them.

The methods for identification, hazard reduction and prevention when working alone and dealing with situations or individuals that presents a potential risk.

A worker required to work alone and any person assigned to check on the worker must be trained in the written procedure for checking the worker's well-being.

All training shall be documented.

Provisions of PPE

Cold weather clothing shall be worn when appropriate if a worker is alone

Additional PPE for workers working alone will be identified in the site-specific hazard and

PPE assessment process

Safe Work Practices

Controls implemented at Civil Works worksites shall, as a minimum:

- Restricted building access to buildings - card keys or regular keys after regular working hours.
- Office doors are to be locked when working alone after hours.
- Have employees check road reports and weather forecast before traveling and NOT allow travel if road conditions are dangerous.
- Develop a travel plan that includes rest breaks, a procedure for tracking overdue employees and emergency contact information.
- Ensure all Civil Works vehicles are to be equipped with cell phones or radios and first aid kits.
- Advise employees to travel with another employee when possible.
- Advise employees to park close to the building in the evening.
- Post signage, emergency contact information, and develop a communication system.
- Report suspicious activity to security or a supervisor.

Provision of Emergency Supplies

All vehicles shall contain the appropriate emergency supplies including flares, marking devices, food, water, warm clothing during winter and other supplies as determined by the hazard assessment.

Workers working alone shall have spare batteries for communication devices in case of power failure, a radio for local weather conditions and other equipment as determined by the hazard assessment.

If an employee requires personal medication, they must ensure they have sufficient supplies available.

Review & Updating Working Alone Plan

The hazard assessment and Working Alone Plan at each Civil Works worksite must be reviewed at least on an annual basis or more frequently if there is a change in work processes or arrangements which could adversely affect an employee's well-being are introduced or changed.

The local Working Alone Plan shall also be revised if there is any indication or report that the plan is not working effectively or needs changing.

10.33 Working Over or Near Water

Purpose

Civil Works Contracting has established safe work practices that must be put into place prior to working over or near water. All personnel must acknowledge these safe work practices so that hazards associated with working near or over water is properly identified and mitigated.

Scope

The following Safe Work Practices discuss general procedures for working over, in or near water. This safe work practice provides guidelines for all Civil Works Contracting employees and subcontractors who work, in or near bodies of water three or more feet deep, if depth is unknown, or swiftly moving water.

General Safe Work Practices

All employees and team members must wear a personal flotation device (PFD) when working on or withing 15 feet of any open water body three (3) or more feet deep or swiftly moving water. (lakes, oceans, ditches, and rivers).

When fall protection is used and will prevent persons from falling into water, personal flotation device is not required.

All employees and team members will be provided with U.S. Coast Guard approved life jackets or work vests. The PFD should be a Class V vest which will support the head of an unconscious person above the water.

Life jackets and work vest shall be inspected for defects that would alter its strength before and after each use. Defective PFDs shall not be used.

Ring buoys with at least 90 feet of line shall be provided and readily available for emergency rescue operations. Distance between ring buoys shall not exceed 200 feet.

At least one lifesaving skiff shall be immediately available at locations where workers are working over or adjacent to water and /or the local coast guard shall be notified when working in navigable water ways.

If a team member falls into the water, a ring buoy, paddle, pole or other floating object should be extended to the person in the water. Resist the impulse to dive in. Employees should not attempt a deep-water rescue unless they have been trained in water lifesaving skills. When the worker grabs the extended item, the worker should be pulled toward the shore or boat. If the employee is unconscious, the PFD or clothing should be hooked to pull the person toward the shore or boat. Once the employee has been safely retrieved, necessary emergency medical procedures should be performed by qualified personnel. If none are necessary, the retrieved team member should change into dry clothing as soon as possible after any necessary personal decontamination.

Working on Watercraft / Boats

When in a watercraft, wear U.S. Coast Guard-approved life jackets or work vests. The PFD should be a Class V vest which will support the head of an unconscious person above the water.

Life jackets and work vest shall be inspected for defects that would alter its strength before and after each use. Defective PFDs shall not be used.

Ensure operators have demonstrated skills and/or training to operate watercraft safely.

Ensure all watercraft meets U.S. Coast Guard requirements and watercraft longer than 16 feet are equipped with a Coast Guard-approved throwable personal flotation device.

Prior to getting on or off boats, survey the boat ramp or dock for surface conditions. Look out for slippery surfaces and take precautions as appropriate.

Working on Barges

When working on a barge, wear U.S. Coast Guard-approved life jackets or work vests. The PFD should be a Class V vest which will support the head of an unconscious person above the water. Note: personal flotation devices must be available but are not required to be worn on structural barges with substantial guardrails.

Ensure availability of a Coast Guard-approved 30-inch life ring with 90 feet of line and at least one permanent ladder than will reach the surface of the water from the top of the barge.

When combustible materials are present, ensure fire extinguishers are readily available.

Ensure safe access/egress to and from barge.

Ensure all barge connections are in place before operation (barge-to-barge, spud wells-to-barge and anchorage).

Designate and maintain unobstructed walkways/aisles at all times. Use and maintain anti-skid material on walking/working surfaces.

10.34 Fatigue Risk Management Program

Civil Works Contracting is committed to ensuring the safety of its operations by actively managing risks associated with fatigue. Management recognizes that fatigue is a hazard that can contribute to accidents or incidents and has devoted resources to support the goals and principles of fatigue risk management throughout Civil Works Contracting's operations.

Purpose

The Fatigue Risk Management Policies set forth below serve as the framework of Civil Works Contracting Fatigue Risk Management Program (FRMP). These policies are intended to communicate clearly Civil Works Contracting position on fatigue risk: that it is an occupational and safety hazard that should be measured and mitigated. Every stakeholder in the organization has a role to play in ensuring the safety and wellbeing of employees and the general public.

Statement of Management Commitment

By implementing an FRMP along with the associated systems, procedures, and quality assurance program, Civil Works Contracting management declares a commitment to safe operations.

Statement of Safety Objectives

Civil Works Contracting aspires to achieve the following outcomes as a direct result of operating an FRMP:

- Fatigue risks in operations are proactively managed in accordance with scientific principles and industry best practices
- Through a structured training and education program, personnel have an awareness of fatigue risks and strategies to minimize the impact of fatigue stressors, and are familiar with fatigue reporting procedures and available fatigue countermeasures
- All stakeholders feel well represented in Civil Works Contracting policy development and decision-making with respect to fatigue risk management

Statement of Shared Responsibility

All personnel at Civil Works Contracting have a shared responsibility of managing fatigue risk. The specific responsibilities of each group are set forth below.

Management

- Create a transparent reporting culture devoid of negative repercussions
- Promote safety as a Civil Works Contracting value
- Support Civil Works Contracting fatigue risk management practices
- Stay abreast of new rules or guidance for fatigue risk management in operations published by industry associations and regulatory bodies
- Structure operating schedules to minimize fatigue risk
- Accommodate employee requests to desist from active duty when subjective or objective factors indicate elevated fatigue risk
- Provide periodic training for all relevant personnel, including management
- Allocate adequate resources to enable fatigue risk management policies to be met and associated procedures to be followed

Supervisors

- Understand how fatigue risk is quantified and know the specific thresholds that trigger fatigue mitigation workflows
- Create duty schedules that minimize fatigue risk within operating constraints
- Alert management to situations or patterns of operations that exhibit systematically elevated fatigue risk
- Follow the policies and procedures of this Fatigue Management Policy

- Communicate with workers about fatigue risk issues and be receptive to their concerns

Workers

- Manage off-duty schedule appropriately to set aside adequate time for restorative sleep and rest
- Report for duty sufficiently rested and fit to perform work responsibilities
- Alert management when too fatigued to safely perform duty
- Develop personal fatigue mitigation strategies, including taking advantage of on-duty fatigue countermeasures made available by Civil Works Contracting
- Be alert to fatigue-related safety issues and report them to management
- Attend and contribute to trainings conducted by Civil Works Contracting to better understand fatigue risk exposures

Stakeholder Roles and Responsibilities

Civil Works Contracting formally authorizes all Civil Works Contracting personnel to use their sound judgement to ensure that Civil Works Contracting's mission is achieved to the best of their individual and collective ability. All Civil Works Contracting personnel are expected to demonstrate care for their personal safety and the safety of others by complying with safety policies and procedures, avoiding unsafe acts, and reporting unsafe conditions. Civil Works Contracting has defined clear lines of accountability for reporting unsafe acts; the same applies for reporting observed fatigue hazards.

Managing fatigue risk is a responsibility shared by all Civil Works Contracting stakeholders.

Understanding Fatigue Risk

Understanding the fundamentals of fatigue and how it affects job performance, decision making, and well-being in general will improve the ability of personnel to recognize signs of fatigue and identify fatigue hazards as they appear.

What Is Fatigue?

Broadly defined, fatigue is a state of mind and/or body that impairs a person's ability to perform tasks that are within their competence and training level. Sometimes fatigue is equated to sleepiness—the propensity to fall asleep. While it is true that a lack of sleep or disrupted sleep patterns can result in fatigue, there are other causes of fatigue that are not directly related to sleep.

One way to understand fatigue is to think about its opposite: alertness. When a person is in a reduced state of alertness, he or she can be considered to be fatigued.

Sleep-related Causes of Fatigue

Just like food, water and air, sleep is a basic biological need that is critical for survival. Sleep allows the body to restore itself and the mind to process the sensory stimuli from the most recent period of wakefulness. Studies have shown that humans require approximately 7.5 hours of high-

quality sleep per day to function normally. It is when the quantity or quality of sleep suffers that fatigue risk sets in.

Inadequate Sleep

Carrying a sleep debt contributes to daytime fatigue. Sleep debt happens when the amount of sleep a person gets on a daily basis is less than the sleep that they need. There are many situations in which this can happen, both at work and at home. Some work-related causes of restricted sleep are:

- Early report times for duty
- Short rest periods
- Extended duty days

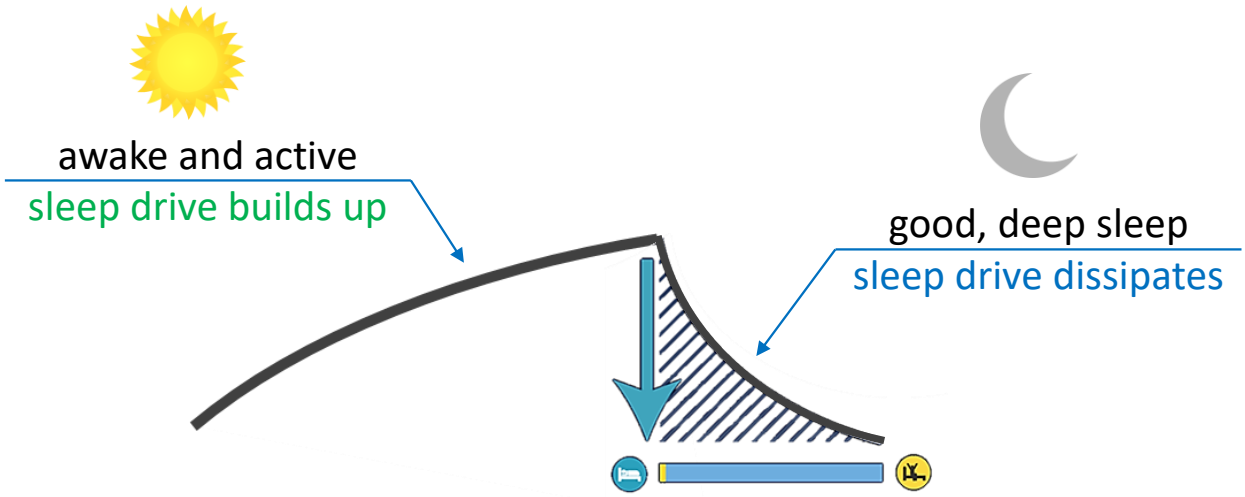
Outside of work, a person may experience inadequate sleep as a result of:

- Choosing to spend time in other ways rather than sleeping
- Personal life issues, such as having a new baby or caring for a sick family member
- Medical conditions such as body pain or sleep apnea that compromise the quantity and/or quality of sleep obtained
- Medications that interfere with the body's natural sleep cycle
- Consuming caffeine in excess or too close to bedtime

Sleep debt can only be "repaid" by getting extended sleep – also known as recovery sleep – for one or more days in succession.

Prolonged Wakefulness

The need to sleep grows the longer a person is awake. This concept is known as sleep drive. When sleep drive is high, alertness is low. The figure below illustrates how sleep drive changes during a normal 24-hour cycle.



A prolonged period of wakefulness can result from:

- Extended duty periods
- Significant family or social obligations following a duty period
- Long commute times to or from work
- Sleep issues such as insomnia

Other Causes of Fatigue

Work-related and personal factors can also be associated with fatigue risk. It is part of the shared responsibility of individual employees, their colleagues and their supervisors to be aware of the potential presence of these factors and to take them into consideration when assessing fatigue risk.

High Workload

Work that is associated with a high degree of stress or that requires significant physical or cognitive effort can contribute to fatigue. Simply working longer hours can be fatiguing. In general, a high workload places demands on personnel that cannot always be avoided, either because of the nature of the work or the context in which it is performed. Fatigue is a natural response of the body to these operational demands. Some examples of situations with high workload are:

- Multiple task assignments during the duty day
- Multiple consecutive duty days
- Time pressure conditions
- Work schedule patterns that do not include adequate rest opportunities

Challenging Working Environment

The surroundings of an individual at work can amplify an existing state of fatigue that was originally triggered by other causes. Some characteristics of the working environment that may have this effect include:

- Poor lighting conditions
- Poor air quality
- Extreme weather conditions
- Engine vibration
- Loud or continuous noise

Personal Factors

Each individual has a unique set of constraints and circumstances in their life outside the workplace. Sometimes these personal factors limit how much restorative sleep can be obtained between duty periods, as discussed above. In other cases, personal factors can exacerbate an existing fatigue stressor. Among Civil Works Contracting's workforce, there is likely to be a wide range of personal factors that have the potential to impact fatigue. Here are just a few examples:

- Financial stress
- Separation or divorce
- Chronic illness
- Death of a family member
- Using tobacco/nicotine products
- Alcohol consumption

While it may not be possible to directly address personal issues in the workplace, Civil Works Contracting has an employer's duty of care for its employees and may be able to offer help; for example, by providing referrals to supporting resources in the community.

Fatigue-related Symptoms

There are many ways in which an employee may appear to be, or act, fatigued. Fatigue-related symptoms fall into three general categories: physical, cognitive, and emotional. Examples of specific symptoms of fatigue within each category are listed below.

Physical Symptoms

- Repeated yawning
- Bodily weakness
- Lack of energy or motivation
- Heavy or drooping eyelids

- Eye-rubbing
- Nodding off or head drooping
- Headaches, nausea, or upset stomach
- Slowed reaction time
- Slowed or slurred speech

Cognitive Symptoms

- Difficulty thinking clearly
- Difficulty concentrating on tasks
- Errors of omission
- Lapses in attention
- Failure to communicate important information
- Failure to anticipate events or actions
- Making mistakes even on well-practiced tasks
- Forgetfulness
- Poor decision making

Emotional Symptoms

- Withdrawn or unenthusiastic mood
- Reduced interest in or emphasis on good performance
- Irritability or heightened emotional sensitivity
- Low morale
- Heightened emotional sensitivity

The recurring presence of fatigue-related symptoms during certain work periods or times of day, especially when exhibited by more than one employee, is an indication that shift scheduling may be an underlying fatigue stressor.

Fatigue Countermeasures

When operational demands or other fatigue stressors cause personnel to exhibit symptoms of fatigue, the immediate priority is to file a fatigue report and identify the most appropriate countermeasures to activate in order to mitigate fatigue risk.

***Note:** If at any time an employee feels unfit for work, he or she will be relieved of duty and given an opportunity to rest or to go home.*

If the employee is experiencing low or moderate levels of fatigue and elects to continue duty, a

number of strategies can be used to reduce the consequences of increased fatigue. These include:

- Restorative sleep
- Supervisor and co-worker monitoring
- Task rotation and reallocation
- Additional breaks and strategic use of caffeine

Each of these fatigue countermeasures is described below.

Restorative Sleep

The most effective fatigue countermeasure is sleep. Personnel are expected to protect opportunities for restorative sleep, especially during off-duty time. Restorative sleep is an extended sleep period of at least 5-7 hours that contributes to increased alertness levels during the waking period that follows.

Supervisor and Co-worker Monitoring

In instances where operational demands require extended hours of work that may result in employees working through higher levels of fatigue than normal, employees and supervisors will be proactive in observing and acting on fatigue-related symptoms that may be manifested. In cases where fatigue symptoms are repeatedly observed in an employee, the supervisor shall be informed and measures will be taken to allow the employee to take a break or use other strategies to improve alertness. For safety-critical work, more attentive supervision may be insufficient, and the employee shall be required to activate additional fatigue countermeasures as required to achieve fitness for duty.

Task Rotation and Task Re-Allocation

Spending an extended period of time on one task, or performing a monotonous task, are known fatigue stressors. Studies have shown that changing tasks in such situations can contribute to a boost in alertness. In order to be most effective, task changes should be limited to not more than 3 – 4 changes per duty period. Any new task assignment should be within the competencies of the employee. Supervisors will rotate work in consultation with concerned employees to ensure that all tasks reassignments meet this requirement.

Additional Breaks

Employees are responsible for monitoring themselves and for requesting or taking breaks when they feel their alertness levels are impaired.

Identifying Fatigue Hazards

The key to effective risk management is identifying hazards. This section provides a definition of fatigue hazards and describes three methods of identifying fatigue hazards in data collected from operations.

What is a Fatigue Hazard?

Fatigue hazards are situations or incidents where a change in operational procedures has occurred as a possible result of fatigue. Not all fatigue hazards compromise safety. Still, given the 24/7 nature of some operations and the potential for accidents, all fatigue hazards must be considered serious and reported promptly.

Below are examples of fatigue hazards that may be observed in operations:

Schedule and Shift hazards

- **Extended shifts**: Working 10-12 hours or more per day
- **Night and rotating shifts**: Working during biological night hours when alertness naturally drops
- **Inadequate rest breaks**: not having enough time between consecutive shifts to recover
- Excessive overtime: logging more than 50 or more hours across 6 or 7 days in a week without a full rest day

Physical and Task-Based Hazards

- **Heavy lifting and manual tasks:** Repetitive movement, awkward postures, and carrying heavy materials.
- **Heavy equipment operation:** Operating equipment while lacking focus, which increases struck-by and crushing risks.
- **Working at heights:** Climbing scaffolding or ladders with reduced muscle strength and poor balance.
- **High-concentration work:** Performing intricate tasks when mental clarity fades, leading to dropped objects or misalignments.

Environmental Hazards

- **Extreme heat and humidity:** Working outdoors in high temperatures, which accelerates physical exhaustion and dehydration.
- **Poor lighting and night work:** Straining eyes during low-visibility night operations or in tight indoor spaces.
- **High noise levels:** Constant loud machinery noise that compounds mental strain and fatigue.

Methods of Identifying Fatigue Hazards

Fatigue hazard identification can be classified into three categories: predictive, proactive, and reactive. Each method is linked to a specific type of operational data, which may be collected before, during, or after the respective duty period.

Predictive Hazard Identification

This method seeks to identify fatigue hazards in future operations by examining planned duty schedules before they are actually worked. This can be accomplished by asking questions about crew members sleep and fatigue based on scheduled duty periods.

Proactive Hazard Identification

Current operations are the focus of proactive hazard identification. In particular, the objective of this method is to quantify fatigue levels exhibited by on-duty personnel through observation.

Reactive Hazard Identification

Retrospective data analysis is at the core of reactive hazard identification. All fatigue related observations will be documented.

Mitigating Fatigue Risks

Once a fatigue hazard has been identified, the next step is to select an appropriate mitigation strategy.

Mitigation Priority

Fatigue hazards that are high and medium priority are serious safety issues. Such fatigue hazards shall be discussed by the project team and supervisors to decide which risk controls to put into action.

Fatigue hazards classified as low priority constitute an acceptable level of risk for Civil Works Contracting. Civil Works Contracting does not require the investment of resources in risk controls or mitigations for low priority fatigue hazards.

Specified Mitigations

Civil Works Contracting will identify appropriate mitigations for risks that are assessed as medium or high priority.

With respect to fatigue risks prioritized for mitigation, specific countermeasures are available to be activated, as listed below. Depending on the severity of the risk, one or more of these fatigue countermeasures may be applied at the same time.

- Temporarily reassign the employee to a less safety sensitive task
- Ask the employee to take a break
- Augment staffing levels
- Send the employee home for restorative rest

When the immediate fatigue risk has been abated, managers should consider implementing strategies to help prevent the recurrence of this risk. These mitigating strategies may include:

- Adjusting scheduling practices, including shift lengths, number of consecutive shifts in a work set, and shift rotation pattern
- Augmenting staffing levels
- Implementing procedural changes

Use of ergonomic friendly equipment

Whenever reasonably practicable, heavy equipment should incorporate ergonomic features designed to minimize physical stress.

Equipment selection should consider the following:

1. Operator Seating

Seats should, where applicable:

- Provide adequate lumbar support.
- Be adjustable to accommodate the operator.
- Provide adequate cushioning.
- Allow adjustment for operator height and reach.
- Reduce transmission of vibration and shock.
- Allow the operator to maintain a neutral seated posture.
- Provide adequate leg and foot clearance.

Seats that are damaged, excessively worn, unstable, or incapable of providing reasonable adjustment shall be repaired or replaced.

2. Controls

Controls should:

- Be positioned within comfortable reach.
- Minimize excessive shoulder elevation and reaching.
- Require reasonable operating force.
- Be clearly identified.
- Allow the operator to maintain a neutral wrist and arm position.
- Minimize repetitive or unnecessary control movements.

Where manufacturer-approved adjustable controls are available, operators shall adjust them before beginning work.

3. Displays and Visibility

Displays, gauges, cameras, mirrors, and other information systems should be positioned so the

operator can view them without excessive:

- Neck rotation
- Neck extension
- Trunk twisting
- Leaning
- Reaching

Operators should not be required to maintain an awkward posture simply to monitor equipment functions.

4. Access and Egress

Equipment should provide safe and reasonably ergonomic access and egress.

Where applicable:

- Steps shall be maintained in good condition.
- Handholds shall be maintained.
- Access surfaces shall be kept reasonably clean.
- Damaged steps or handholds shall be repaired.
- Operators shall use designated access points.
- Employees shall not routinely climb on tires, tracks, buckets, attachments, or other unintended surfaces.

5. VIBRATION CONTROL

Whole-body and hand-arm vibration shall be considered ergonomic hazards.

Where vibration is excessive, the Company shall evaluate feasible methods of reducing exposure, including:

- Suspension seats
- Proper seat adjustment
- Proper tire inflation
- Proper track tension
- Proper equipment maintenance

- Vibration-dampening components
- Maintaining smooth travel routes where practicable
- Reducing excessive equipment speed
- Correcting rough or deteriorated operating surfaces
- Proper selection and maintenance of attachments
- Limiting unnecessary exposure duration
- Replacing equipment that cannot reasonably be operated without excessive vibration

Operators shall report unusual vibration, excessive shock, damaged suspension components, or other conditions that significantly increase physical stress.

EQUIPMENT MAINTENANCE AND ERGONOMICS

Proper equipment maintenance is an important component of ergonomic injury prevention.

Maintenance personnel shall consider ergonomic hazards when inspecting and repairing equipment.

Particular attention shall be given to:

- Seats and suspension systems
- Control levers and joysticks
- Steering systems
- Pedals
- Access steps
- Handholds
- Doors and latches
- Windows and mirrors
- Cameras and displays
- Hydraulic controls
- Attachments
- Tires and tracks
- Suspension components

- Cab mounts
- Vibration-dampening components

Equipment requiring excessive force to operate shall be evaluated and repaired when practicable.

Employees shall not be expected to repeatedly overcome excessive mechanical resistance when a reasonably feasible repair or engineering control is available.

OPERATOR WORK PRACTICES

Operators shall:

1. Adjust the seat before beginning work.
2. Adjust mirrors, cameras, controls, and displays as necessary.
3. Maintain a neutral and supported posture whenever practical.
4. Avoid prolonged twisting of the torso.
5. Avoid excessive reaching for controls.
6. Avoid resting limbs against hard or vibrating surfaces.
7. Use available suspension and vibration-control features.
8. Report abnormal vibration or shock.
9. Take reasonable opportunities to change position during extended operations.
10. Follow equipment manufacturer operating procedures.

Training Program

Civil Works Contracting has a structured fatigue risk education and training program encompassing all personnel. It includes an array of training methods and content chosen to meet the training needs of each stakeholder group. Training requirements are controlled and documented.

Initial Training

All new employees shall receive initial training in conjunction with the training they normally receive as part of the onboarding process. As part of this initial training, new personnel shall become acquainted with Civil Works Contracting's commitment to fatigue risk management and the risk controls that are in place to mitigate fatigue risk and promote safety in operations.

Recurring Training

Existing employees shall receive recurring fatigue risk education and training on an annual basis. In addition, existing employees shall receive appropriate training when:

- Their work functions are affected
- They assume a new position or work responsibilities

The requirement for recurring training shall apply to the following Learning Objectives:

- Fatigue Risk: Key Concepts
- Fatigue Hazard Reporting
- Assessing Fatigue Risk, Root Cause Analysis

Training Methods

The following training methods are currently in use by Civil Works Contracting:

- Classroom instruction
- Toolbox talks
- Morning huddles

10.35 Job-Site Security

Purpose

The purpose of this program is to ensure the protection of the worksite, equipment and all field office trailers and their contents, from theft, vandalism and unauthorized entry and to prevent jobsite security related incidents.

Scope

This program applies to all Civil Works operations and job locations.

Civil Works Contracting Shall

Initiate a site security system and program which consists of site-specific rules and procedures for prevention of fire, theft, damage or destruction of property/equipment, and prevent injury to personnel

Encourage security awareness and establish a security culture among all workers

Conduct risk assessment to evaluate and mitigate potential job-site security incidents

Assign supervisory security responsibilities

The security program shall include but is not limited to:

- Submit daily security reports to the site supervisor;
- Be responsible for monitoring and recording time on the jobsite by employees
    - Provide for a perimeter fence with locked gate for access to the worksite, inspect fence regularly
    - Assure perimeter lighting is spaced at intervals to provide adequate illumination of the worksite
    - Post conspicuous NO TRESPASSING and/or warning signage
    - Ensure the trailer/trailer areas are designed in a manner capable of being secured with locks
    - Always be responsible for security of the storage areas and for all material, equipment and tools, as well as for those belonging to subcontractors, perform regular asses and inventory checks
    - Provide the Construction Manager with a list of 24-hour emergency phone numbers, local police and fire departments prior to commencement of work on the site
    - Submit to the Construction Manager an updated inventory of materials, equipment and tools when received at the job site
    - Maintain the security program throughout the duration of the contract

Entry Control

- In addition, the project manager shall restrict entry of unauthorized personnel and vehicles onto the project site
- Maintain copies of vehicle insurance cards or other proof of insurance for vehicles permitted on site
- Allow entry only to authorized persons with proper identification
- Maintain an Employee/Visitor Log and make the log available to the site supervisor upon request. The log will also be submitted to the site supervisor every week as necessary

Incidents, Reporting and Investigation

- Any jobsite security incidents must be reported by employees to their immediate Supervisor. If their immediate supervisor is not available, the employee is then to immediately notify the project manager.
- Incident investigation shall be initiated within 48 hours

10.36 Rigging/Lifting Devices

PURPOSE

Civil Works Contracting (CWC) is committed to protecting employees from hazards associated with rigging, hoisting, and material-handling operations.

The purpose of this program is to establish minimum requirements for the selection, inspection, use, storage, maintenance, documentation, and removal from service of rigging and lifting devices used by CWC employees.

No production schedule, lift, or operational requirement takes priority over the safe condition and proper use of rigging equipment. Employees have the authority and responsibility to stop any lifting operation when an unsafe condition exists.

SCOPE

This program applies to all CWC employees, projects, shops, yards, and operations where rigging or lifting devices are used.

This program applies to, but is not limited to:

- Alloy steel chain slings
- Wire rope slings
- Synthetic web slings
- Synthetic round slings
- Natural and synthetic fiber rope slings
- Metal mesh slings
- Shackles
- Hooks
- Eyebolts
- Swivel hoist rings
- Turnbuckles
- Rigging plates and master links
- Lifting beams and spreader beams
- Beam clamps
- Manhole lifting devices and lifting eyes
- Pipe lifting devices
- Pipe cable slings
- Four-way and multi-leg chain assemblies
- Below-the-hook lifting devices
- Specialized lifting attachments
- Other rigging hardware or lifting accessories used to connect, secure, support, or control a load

This program shall be used in conjunction with applicable OSHA requirements, manufacturer instructions, project-specific requirements, and other applicable CWC safety procedures.

REFERENCES

Applicable requirements include, but are not limited to:

- OSHA 29 CFR 1926.251 – Rigging Equipment for Material Handling

- OSHA 29 CFR 1926 Subpart CC – Cranes and Derricks in Construction
- Applicable manufacturer requirements and recommendations
- Applicable ASME standards and industry-recognized practices
- CWC Safety & Health Manual
- Project-specific safety requirements, including applicable federal requirements

Where requirements differ, the more protective requirement shall be followed unless otherwise directed by applicable regulation or contract requirements.

RESPONSIBILITIES

Management

CWC Management shall provide the resources necessary to implement this program and ensure that employees performing rigging activities receive appropriate training, equipment, and supervision.

Safety Department

The CWC Safety Department shall:

- Maintain and periodically review this program.
- Develop and maintain rigging inspection forms within HCSS HeavyJob.
- Provide or coordinate applicable rigging training.
- Assist supervisors in evaluating questionable or damaged equipment.
- Periodically audit jobsites for compliance with this program.
- Assist in determining whether failed equipment must be repaired, replaced, or permanently removed from service.
- Evaluate trends and deficiencies identified through inspections.

Project Managers, Superintendents, Foremen, and Supervisors

Project supervision shall:

- Ensure this program is implemented on their project.
- Ensure active rigging and lifting devices are included in the CWC inspection process.
- Ensure monthly documented inspections are completed in HeavyJob.
- Ensure employees perform required pre-use inspections.
- Ensure defective equipment is immediately removed from service.
- Prevent employees from using equipment that has not been properly inspected or cannot be positively identified and rated.
- Notify the Safety Department of failed equipment when repair or replacement is required.
- Ensure rigging is properly stored and protected when not in use.

Competent Persons

Employees designated to perform CWC's documented rigging inspections shall possess the knowledge and experience necessary to identify existing and predictable hazards associated with the equipment being inspected and have authority to take prompt corrective action.

The person completing the monthly inspection shall physically inspect the actual equipment. Inspection forms shall never be completed solely from an inventory list, previous inspection, photograph, or assumption that equipment remains acceptable.

Employees/Rigging Users

Employees using rigging equipment shall:

- Inspect equipment before use.
- Use only equipment they have been trained and authorized to use.
- Understand the equipment's Working Load Limit (WLL).
- Never exceed the WLL of any component.
- Use equipment only for its intended purpose and configuration.
- Protect rigging from sharp edges and other damaging conditions.
- Immediately stop using equipment when damage or questionable conditions are discovered.
- Tag defective equipment **"DO NOT USE"** and notify supervision.
- Never modify, repair, weld, heat, bend, or otherwise alter rigging equipment unless specifically authorized.

GENERAL RIGGING REQUIREMENTS

All rigging and lifting devices shall be selected, used, and maintained in accordance with manufacturer requirements and applicable regulations.

At a minimum:

- Rigging equipment shall have permanently affixed and legible identification and/or markings as required for that equipment.
- The Working Load Limit shall be known before the equipment is used.
- Equipment shall never be loaded beyond its rated capacity.
- The capacity of the entire rigging system shall be limited by the **lowest-rated component** in the system.
- Employees shall consider sling configuration, hitch type, sling angle, load distribution, center of gravity, and other conditions that can affect capacity.
- Shock loading is prohibited.
- Makeshift rigging devices or field-fabricated modifications are prohibited unless specifically designed, rated, tested, and approved as required.
- Slings shall not be shortened using knots, bolts, makeshift devices, or other unauthorized methods.
- Rigging shall be protected from sharp edges, abrasive surfaces, excessive heat, chemicals, and other conditions capable of damaging the equipment.

- Rigging shall not be dragged across the ground or intentionally run over by vehicles or equipment.
- Employees shall not place hands or other body parts between a sling and the load while the sling is being tensioned.
- Loads shall be properly balanced and secured against unintentional displacement.
- Employees shall not stand or work beneath suspended loads.
- Unnecessary employees shall remain outside the fall zone.
- Taglines shall be used when necessary to safely control loads and prevent employees from placing themselves in hazardous positions.
- Rigging equipment shall not be used for purposes other than those intended by the manufacturer.
- Rigging equipment shall be removed from the immediate work area when not in use when leaving it in place could create a hazard.

WORKING LOAD LIMITS AND LOAD CONTROL

Before performing a lift, the employee(s) responsible for the rigging operation shall know or determine the approximate weight of the load.

The rigging configuration shall have sufficient capacity for the load being lifted.

Employees shall consider:

- Load weight
- Center of gravity
- Number of sling legs
- Sling angle
- Hitch configuration
- Rated capacity of each component
- Load distribution between sling legs
- Attachment points
- Environmental conditions
- Potential for load shifting
- Sharp edges
- Manufacturer limitations

Employees shall never assume the weight of an unfamiliar load when the weight could reasonably exceed the capacity of the lifting equipment or rigging configuration.

When the load weight or required rigging capacity cannot be determined, the lift shall not proceed until the necessary information is obtained.

INSPECTION REQUIREMENTS

CWC utilizes a two-level inspection process for active rigging and lifting devices.

Pre-Use/Shift Inspection

Rigging equipment shall be visually inspected **before use each shift and as necessary during use.**

The user shall inspect the equipment for conditions including, but not limited to:

- Missing or illegible identification
- Missing or illegible WLL/rated capacity
- Cuts
- Tears
- Abrasion
- Excessive wear
- Broken stitching
- Broken wires
- Kinks
- Crushing
- Bird-caging
- Corrosion
- Cracks
- Gouges
- Nicks
- Bends
- Stretching
- Twisting
- Heat damage
- Chemical damage
- Weld damage
- Distorted components
- Damaged hooks or latches
- Excessive hook throat opening
- Damaged shackles or pins
- Damaged attachment points
- Unauthorized repairs or modifications
- Any other condition that creates doubt regarding safe continued use

If the employee cannot determine that the equipment is safe, the equipment **shall not be used.**

Monthly Documented Inspection – CWC Requirement

In addition to required pre-use inspections, CWC requires **all active rigging and lifting devices to receive a formal documented inspection at least once per month.**

Monthly inspections shall be documented in **HCSS HeavyJob** using the applicable CWC inspection form.

The monthly inspection is not simply a documentation exercise. The inspector shall physically handle and thoroughly examine each piece of equipment assigned to the project or work location.

The inspection shall verify, as applicable:

- Equipment type
- Manufacturer
- Serial number or unique identification
- WLL/rated capacity
- Identification/tag condition
- Overall physical condition
- Condition of sling body or chain
- Condition of end fittings
- Condition of hooks
- Condition of shackles
- Condition of attachment points
- Evidence of stretching or deformation
- Evidence of cracks, cuts, abrasion, corrosion, heat, or chemical damage
- Evidence of side loading
- Unauthorized repairs or modifications
- Other manufacturer-specific removal criteria
- Inspection status
- Corrective action required

Equipment shall be identified with the applicable project/job number or otherwise tracked so CWC can determine where the equipment is assigned.

EQUIPMENT-SPECIFIC INSPECTION CRITERIA

Synthetic Web Slings

Synthetic web slings shall be removed from service when conditions include:

- Missing or illegible identification
- Acid or caustic burns
- Melting or charring
- Cuts, tears, punctures, or snags
- Excessive abrasion
- Broken or worn stitching
- Knots
- Distorted fittings
- Heat damage
- Chemical damage
- Any other damage affecting the integrity of the sling

Synthetic slings shall be protected from sharp edges.

Synthetic Round Slings

Round slings shall be inspected for:

- Missing or illegible identification
- Cuts, tears, holes, or punctures in the cover
- Exposed load-bearing yarn
- Broken or damaged load-bearing fibers
- Heat or chemical damage
- Knots
- Excessive abrasion
- Weld splatter
- Damaged fittings
- Other conditions that create doubt regarding continued safe use

Alloy Steel Chain Slings

Chain slings shall be inspected for:

- Missing or illegible identification
- Excessive wear
- Stretching
- Bent, twisted, or distorted links
- Cracks
- Nicks or gouges
- Corrosion or pitting
- Heat damage
- Damaged welds
- Damaged master links or coupling links
- Damaged hooks
- Unauthorized repairs
- Evidence of overloading

Particular attention shall be given to **chain stretch**, which may indicate overloading.

Chain sling repairs shall only be performed by the manufacturer or another properly qualified/authorized entity as permitted by applicable requirements.

Wire Rope Slings

Wire rope slings shall be inspected for:

- Broken wires
- Kinking
- Crushing
- Bird-caging
- Corrosion
- Abrasion
- Heat damage
- Reduction in rope diameter
- Damaged end fittings
- Damaged sleeves
- Distortion
- Missing or illegible identification

- Other deterioration affecting safe use

Hooks

Hooks shall be inspected for:

- Cracks
- Nicks
- Gouges
- Wear
- Bending or twisting
- Increased throat opening
- Side-loading damage
- Heat damage
- Damaged or missing safety latch where required
- Unauthorized welding or repair
- Missing or illegible identification when required

Hooks shall not be side loaded, tip loaded, or back loaded unless specifically designed and rated by the manufacturer for that use.

Shackles

Shackles shall be inspected for:

- Missing or illegible manufacturer/WLL markings
- Bent or distorted bodies
- Bent pins
- Damaged threads
- Excessive wear
- Cracks
- Gouges
- Corrosion
- Heat damage
- Evidence of side loading
- Improper or substituted pins
- Unauthorized modifications

Bolts, rods, or other makeshift components shall never be substituted for the manufacturer's shackle pin.

Lifting Devices and Accessories

Lifting beams, spreader beams, lifting eyes, hoist rings, beam clamps, manhole lifting devices, pipe lifting devices, and similar accessories shall be inspected for:

- Identification and rated capacity
- Cracks
- Deformation

- Bent components
- Damaged welds
- Excessive wear
- Corrosion
- Damaged attachment points
- Loose or missing components
- Unauthorized modifications
- Evidence of overloading
- Other manufacturer-specific rejection criteria

REMOVAL FROM SERVICE

Any rigging or lifting device that fails an inspection or cannot be positively confirmed as safe shall be **immediately removed from service.**

The equipment shall:

- Be removed from the active work area.
- Be clearly tagged **"DO NOT USE."**
- Be secured or segregated to prevent accidental reuse.
- Be reported to project supervision.
- Be evaluated for repair, replacement, or disposal.

Employees shall **not return equipment to service simply because the damage appears minor.**

When there is uncertainty regarding whether a condition meets removal criteria:

WHEN IN DOUBT — TAKE IT OUT.

REPAIR AND RETURN TO SERVICE

Employees shall not perform unauthorized field repairs on rigging or lifting devices.

Welding, heating, bending, grinding, drilling, stitching, splicing, or otherwise modifying damaged equipment is prohibited unless specifically permitted by the manufacturer and performed by an appropriately qualified or authorized entity.

Where required, repaired equipment shall be inspected, proof tested, certified, or otherwise evaluated before being returned to service.

Documentation associated with applicable repairs or testing shall be retained.

Equipment that cannot be safely repaired shall be permanently destroyed or otherwise rendered unusable before disposal when necessary to prevent inadvertent reuse.

STORAGE AND PROTECTION

Rigging equipment shall be stored in a manner that protects it from damage.

When practical, rigging shall be:

- Stored off the ground
- Kept clean and dry
- Protected from weather
- Protected from chemicals
- Protected from welding operations and sparks
- Protected from excessive heat
- Protected from sharp edges
- Organized to prevent tangling or physical damage
- Stored where it will not be struck or run over by vehicles or equipment

Defective equipment shall never be stored together with serviceable rigging unless clearly segregated and controlled against use.

SAFE RIGGING PRACTICES

Employees performing rigging activities shall:

- Determine the load weight before lifting.
- Verify rigging capacity.
- Select the appropriate sling and hitch.
- Evaluate sling angles.
- Establish the load's center of gravity.
- Use appropriate attachment points.
- Protect slings from sharp edges.
- Avoid shock loading.
- Maintain control of the load.
- Keep personnel outside the fall zone.
- Never place themselves beneath a suspended load.
- Never place body parts between the load and an object where crushing could occur.
- Use taglines when appropriate.
- Establish clear communication between the operator, signal person, and rigger.
- Stop the lift when communication is lost or an unsafe condition develops.

A test lift should be performed when appropriate by raising the load only enough to verify balance, rigging security, brake function, and load control before continuing the lift.

QUALIFIED RIGGERS

Where OSHA or the circumstances of the lift require a Qualified Rigger, the employee performing the rigging shall meet the applicable qualification requirements.

Designation as a Competent Person for inspection purposes does not automatically make an employee a Qualified Rigger for every rigging operation.

CWC shall evaluate riggers based on their training, knowledge, experience, and ability to recognize and control the hazards associated with the rigging work they perform.

CRITICAL, COMPLEX, OR NON-ROUTINE LIFTS

Lifts involving unusual configurations, high-risk conditions, specialized lifting devices, questionable attachment points, unusually heavy loads, multiple pieces of lifting equipment, or other non-routine circumstances shall receive additional planning before work begins.

Supervision and the Safety Department shall be consulted when the lift exceeds the knowledge or experience of the employees performing the work.

A lift shall not proceed until the load, equipment capacities, rigging configuration, hazards, and necessary controls have been adequately evaluated.

TRAINING

Employees who select, inspect, or use rigging equipment shall receive training appropriate to their responsibilities.

Training shall address, as applicable:

- Rigging hazards
- Sling and hardware identification
- Working Load Limits
- Sling configurations and hitches
- Sling angle effects
- Load weight and center of gravity
- Equipment-specific inspection criteria
- Removal-from-service criteria
- Proper use of hooks and shackles
- Sharp-edge protection
- Fall-zone hazards
- Suspended-load hazards
- Tagline use
- Proper storage
- CWC HeavyJob inspection requirements
- Stop Work Authority

CWC may utilize toolbox talks, formal classroom instruction, hands-on demonstrations, third-party Qualified Rigger training, or other appropriate methods.

Retraining shall be provided when:

- An employee demonstrates inadequate knowledge or unsafe practices.
- New equipment or hazards are introduced.
- Inspection findings identify a recurring deficiency.
- An incident or near miss indicates additional training is necessary.
- Management or the Safety Department determines retraining is appropriate.

DOCUMENTATION AND RECORDKEEPING

Monthly rigging inspections shall be documented in HCSS HeavyJob.

Inspection documentation should identify, as applicable:

- Project/job number
- Equipment type
- Equipment ID/serial number
- Manufacturer
- WLL/rated capacity
- Inspection date
- Inspector
- Inspection results
- Deficiencies identified
- Corrective actions
- Equipment removed from service
- Repair or replacement status

Required manufacturer certifications, proof-test documentation, repair records, or other applicable documentation shall be maintained as required.

SUBCONTRACTORS

Subcontractors performing rigging or lifting operations on CWC-controlled projects shall comply with applicable OSHA requirements and project-specific rigging requirements.

CWC reserves the right to stop any subcontractor lifting operation when unsafe rigging, improper practices, unqualified personnel, or other hazardous conditions are observed.

Defective subcontractor-owned rigging shall not be permitted for use on CWC projects.

ENFORCEMENT

Failure to comply with this program may result in removal of equipment from service, suspension of lifting operations, retraining, or other corrective action in accordance with CWC policies.

Employees are expected to immediately report unsafe rigging practices or equipment.

No employee shall be disciplined for stopping a lift in good faith because of a safety concern.

PROGRAM AUDITING AND CONTINUOUS IMPROVEMENT

The CWC Safety Department and project supervision shall periodically review field implementation of this program.

Field observations should include verification that:

- Pre-use inspections are being performed.
- Monthly HeavyJob inspections are current.
- Equipment identification and WLL markings are legible.
- Failed equipment has been removed from service.
- Rigging is properly stored.
- Employees understand basic removal criteria.
- Rigging is being used within its rated capacity.
- Employees understand that inspection requirements are an active safety process rather than a paperwork requirement.

Inspection trends, incidents, near misses, damaged equipment, and field observations shall be used to identify opportunities for additional training and program improvement.

The effectiveness of this program depends on continued follow-up. CWC supervisors and Safety personnel are expected to routinely observe rigging in the field and reinforce these requirements with employees.

Chapter 11 - Contractors Safety Handbook Acknowledgment

This is to acknowledge that I have received my copy of Civil Works Contracting's Safety Rules Handbook. I have read its contents and have been made aware of Civil Works Contracting Project Rules and Policies. I hereby agree to follow all rules and regulations of my job.

DATE _____

CONTRACTOR _____

COMPANY REPRESENTATIVE _____

PROJECT SAFETY REPRESENTATIVE _____

Chapter 12 - Employee Acknowledgment Form

I _____(print), hereby acknowledge that I have received, read, and understand the Safety & Health Manual and the Code of Safe Practices for Civil Works Contracting.

I agree to conform to all Company practices, rules, and regulations relating to safe work performance.

I understand that my failure to follow these safety procedures will result in disciplinary action up to and including discharge.

I further understand that:

a. It is my responsibility to report all unsafe conditions or violations of the Code of Safe Practices to my supervisor or other management personnel in order to minimize the potential of injury to my fellow workers.

b. I am encouraged to inform my immediate supervisor of any hazards at the worksite without fear of reprisal, and that should my assistance create any such action or related intimidation, that I am encouraged to contact his/her supervisor or Safety personnel.

_____ _____

(Signature of Employee) Date

_____ _____

(Signature of Supervisor) Date

CODE OF SAFE PRACTICES

The purpose of the Code of Safe Practices is to assist you in making safety a regular part of your work habits. This is a minimum guide to help identify your responsibility for safety. **Your supervisor** is obligated to hold you responsible for your safety by enforcing these rules and by providing you a safe place to work.

a. I will immediately report to my supervisor all accidents or near misses, and injuries, no matter how slight, that occur on the job.

b. I will cooperate with and assist in the investigation of accidents to identify the causes and to prevent recurrence.

c. I will promptly report to my supervisor all unsafe acts, practices, or conditions that I observe.

d. I will become familiar with and observe safe work procedures during my work activities.

e. I will keep my work areas clean and orderly at all times.

f. I will avoid engaging in any horseplay and avoid distracting others.

g. I will obey all safety rules and follow published work instructions.

h. I will wear personal protective equipment when working in hazardous areas, and/or as required by my supervisor.

i. I will inspect all equipment prior to use and report any unsafe conditions to my immediate supervisor.

j. I will submit any suggestions for accident prevention which may assist in improved working conditions or work practices to my immediate superior.

k. I will smoke in authorized locations only.

l. I will not bring onto the job, have in my possession or in my car, any weapons or ammunition of any kind.

m. I will not have in my possession, use, or introduce any kind of intoxicating liquor or illegal drugs on any Associated Students' property or work area or facility, or I will accept possible discharge for these illegal actions.

n. I will not come to work under the influence of intoxicating liquor or illegal drugs and realize that I will not be allowed to start work and may be immediately discharged for this action.

I HAVE READ AND UNDERSTAND THE ABOVE ITEMS AND REALIZE THAT FAILURE TO FOLLOW THESE RULES MAY BE GROUNDS FOR DISMISSAL.