

12. Confined Space Entry

Overview

This section discusses the following topics:

- Confined Space Entry Program Overview
- Hazards of Confined Spaces
- Identification of Confined Spaces
- Confined Space Procedures
- Confined Space Entry Training Overview

References

OSHA 29CFR1910.146 (Confined Space)

Confined Space Entry Program Overview

Purpose

Fairpoint Communications, Inc. recognizes the need to protect employees from potential safety hazards that may be encountered during entry into a confined space and developed a Confined Space Entry Program. This program ensures:

- All workers required to enter a confined space are properly trained and supervised
- Maximum protection is provided to employees required to enter and work in confined spaces
- Procedures are in place to prevent employee exposure to hazardous atmospheres and conditions

This program includes employee training, hazard identification, and hazard control. Supervisors authorized by their departments ensure the procedures are followed and employees entering confined spaces are properly trained and equipped to perform their duties safely.

Responsibilities

The **supervisor** is responsible for ensuring all employees understand confined space entry procedures and ensuring procedures are enforced.

Employees who work in confined spaces are responsible for obtaining and fully understanding instructions from his/her supervisor, and posting the Confined Space Entry Permit to alert all other employees.

All employees working in a confined space area must be trained in hazard recognition, personal protective equipment, safety equipment and monitoring equipment, rescue procedures, and must notify their supervisor of any questions or concerns.

Confined Space Definition

A **confined space** is any space having the following characteristics:

- Large enough for an individual to enter and perform assigned work
- Limited or restricted means of entry and exit
- Not designed for continuous employee occupancy

Confined spaces may include:

Boilers	Manholes
Pits	Vaults
Tunnels	Sewers
Furnaces	Diked Areas
Silos	Septic Tanks
Storage Bins	Hoppers
Vessels	Process Vessels
Digesters	Pumping Stations
Tank Cars	Wells
Cisterns	

Hazards of Confined Spaces

Hazards of confined spaces include the following:

- Hazardous atmospheres
 - Oxygen deficiency or oxygen enrichment
 - Combustible/flammable/explosive gases and vapors
 - Toxic gases or vapors
 - Combustible dust
- Engulfment hazards
- Entrapment or configuration hazards
- Mechanical hazards
- Other hazards
 - Corrosive chemicals
 - Electrical
 - Ladder access
 - Lighting (poor visibility)
 - Temperature extremes
 - Falling/tripping/insecure footing
 - Falling objects
 - Weather conditions

Confined space hazards occur as a result of both natural and man-made sources. Sources of confined space hazards include:

- Chemicals
- Oxidation/reduction reactions (i.e., rusting of metals)

- Decomposition of organic matter
- Cleaning reagents (solvents, acids)
- Welding, spray painting, grinding, brazing, sandblasting
- Inerting with non-flammable gases
- Fire and explosion hazards from organic hydrocarbon based substances
- Ignition sources from static electricity, hot work operations, electrical equipment
- Lack of proper training
- Loose materials stored in tank (grain, sawdust, etc.)
- Pyrophoric chemicals

Identification of Confined Spaces

The identification of confined spaces for existing facilities and new construction is discussed below.

Existing Facilities

The following guidelines apply to the identification of confined spaces in existing facilities:

1. If contractor-provided crews perform work in an existing facility, the owner is responsible for identifying confined spaces within the facility. Prior to beginning work, the supervisor must contact the owner to determine the location of all confined spaces within the work area.
2. If confined spaces are present in the facility, the owner must inform the contractor of any known hazards and precautions instituted by the owner to protect employees. Specific hazards associated with each space are addressed.
3. If it is necessary for contractor employees and the owner to work simultaneously in a space, the owner is responsible for the development and implementation of procedures to coordinate entry operations. Contractor

employees follow the owner procedures for entry operations if both parties have personnel working in the space.

4. The owner should provide to the contractor all information pertaining to confined spaces in writing.
5. At the conclusion of activities within a confined space, personnel should be prepared to brief the owner on any hazards encountered or created while working in the confined space.

New Construction

The following guidelines apply to the identification of confined spaces in new construction:

1. The supervisor at the jobsite is responsible for identifying confined spaces.
2. Spaces that fall within the definition of a confined space are treated as such and operations follow the entry procedures described below.

Confined Space Procedures

The following confined space procedures are discussed:

- Entry Procedure
- Monitoring Procedure
- Welding Within a Confined Space Procedure
- Emergency Rescue Procedure
- Multi-Employer Procedure

Entry Procedure

No person should enter a confined space without first being informed of the hazards involved, necessary precautions to take, and the use of required protective emergency equipment. The following entry procedure must be followed to ensure the safety of all personnel working within a confined space.

The entry procedure consists of the following:

1. Authorization
2. Atmospheric Testing
3. Completion of Entry Permit and Entry Procedure

1. Authorization

All persons entering a confined space must obtain authorization from their supervisor and then complete the Confined Space Entry Permit Form. Refer to the Confined Space Entry Permit in the Forms Appendix. A permit is required if the confined space has one or more of the following characteristics:

- Contains or has a 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

2. Atmospheric Testing

The atmosphere in the confined space must be tested prior to entry and continuously monitored while the confined space is occupied. Biological processes, decomposition of natural materials, oxidation, percolation of vapors, and structural leaks can cause the production and accumulation of toxic gases and/or flammable gases. Available oxygen levels may become seriously depleted or displaced by these processes.

When the atmosphere becomes contaminated with harmful gases or lacks oxygen, the worker may not immediately feel the effects. A false feeling of euphoria or well-being is a common side effect. Many of the gases have no odor or color detectable by the body's senses. The most important rule when working in a confined space is: **Never trust your senses**. Only by using appropriate monitoring instruments capable of analyzing gases in the parts-per-million range can employees be certain that the atmosphere is safe to enter.

Only personnel trained in the use of air-monitoring equipment and its limitations are permitted to perform pre-entry testing. Follow the procedure below to test the atmosphere of a confined space:

1. Calibrate air-monitoring equipment prior to each use unless otherwise specified by its manufacturer. The monitor should be calibrated daily or before every usage to ensure worker safety. Consult your equipments **owner's manual** for recommended calibration.
2. Test the atmosphere. The atmosphere must test within the acceptable ranges outlined below. Due to the intrinsic limitations of air-monitoring devices, perform testing in the order listed below.

Order	Substance	Acceptable Level
1	Oxygen	19.5% - 23.5%
2	Explosive gas or vapor	<10% LFL
3	Explosive dust	<LFL (5ft. visibility)
4	Carbon monoxide (CO)	50ppm
5	Hydrogen sulfide	10ppm

3. Record all readings on the Confined Space Entry Permit.
4. Take appropriate corrective actions if any values fall outside the acceptable range. Use appropriate equipment to purge and ventilate the space. If readings cannot be brought into acceptable levels and entry is absolutely necessary, use a Self-Contained Breathing Apparatus (SCBA).
5. If additional substances exist, use appropriate testing equipment to ensure airborne concentrations are within the acceptable range. This range, referred to as the PEL or TWA, is usually found on the Material Safety Data Sheet for the substance.
6. If the audible alarm or flashing lights on the monitor are activated, the entrant must exit the confined space immediately. An exception to this rule is if the person is wearing an SCBA.

Note: If a flammable atmosphere is present in the confined space, employees must use spark-proof hand tools and explosion-proof equipment.

3. Completion of Entry Permit and Entry Procedure

Upon completion of atmospheric testing, complete the remainder of the Confined Space Entry Permit. Complete all items on the permit. Make all observations necessary to complete the entry permit from outside the confined space if possible.

Then, complete the following entry procedure:

1. Flange off all incoming and outgoing pipes, and lockout all valves and electrical equipment before working in a confined space. Lockout and tag all valves in accordance with the lockout/tagging procedure.
2. Tag and/or block all mechanical equipment to prevent accidental startup of equipment.
3. Guard all entrance openings after removing covers by using a railing, temporary cover, temporary fence, or other temporary barrier to prevent individuals from falling into a space and to protect the entrant from falling materials.
4. Establish a means of communication between the entrant and attendant. Communication may be by voice, radio, visual or rope.
5. Select appropriate personal protective equipment to protect the entrant from any hazards inside the space.
6. Provide appropriate rescue equipment for use in emergency situations.
7. Provide names and numbers of emergency response services.
8. Provide an adequate lighting source appropriate for conditions inside the space.
9. Provide at least one 20-lb. ABC multi-purpose fire extinguisher for instant use in a confined space containing flammable gases or vapors.

Monitoring Procedure

An attendant, who is trained in first aid and CPR, is stationed outside of a confined space at all times during confined space operations to monitor activities inside and outside the space. The attendant must order evacuation of the space if he/she:

- Detects a prohibited condition
- Detects behavioral changes in an authorized entrant manifested from exposure to atmospheric hazards

- Detects a condition outside the space that could endanger an authorized entrant
- Cannot effectively and safely perform all required duties of an attendant

Note: Smoking is prohibited inside and within twenty (20) feet outside the confined space.

Welding Within a Confined Space Procedure

Follow the procedure below when welding in a confined space:

1. Remove welding electrodes from their holders during suspension of work (e.g., during lunch or overnight). Disconnect the welding machine from its power source.
2. Provide mechanical ventilation.
3. Leave compressed gas cylinders and welding machines outside the confined space.
4. Secure portable equipment on wheels to prevent accidental movement.
5. Inspect and test gas welding and cutting equipment, such as hoses, connections, and torches to ensure their integrity.
6. Provide a means for the quick removal of a welder in an emergency. Use a full body harness whenever its use facilitates rescue.
7. Station an attendant with a pre-planned rescue procedure outside the space.
8. Close torch valves and shut off the fuel gas and oxygen supply outside the space when the torch is not used for a substantial amount of time. Also, remove the torch and hose from the confined space if practicable.
9. Post warning signs after welding is complete to warn of hot metal.
10. Provide appropriate respiratory protection to welders and helpers when ventilation controls are insufficient.
11. Never use oxygen to ventilate a confined space.

12. Remove all residuals, including dry scale or sediment, if welding is performed in confined spaces that did or do contain combustibles. If it is not possible to remove all combustible materials, a non-combustible blanket must cover them.

Emergency Rescue Procedure

Under no circumstances are personnel expected to enter a confined space if hazards are not eliminated or effectively controlled. Unexpected situations might arise, however, that prevent entrants from self-rescue. The contractor decides whether or not to utilize off-site entry rescue services if self-rescue is not possible. Non-entry rescue is the first and primary option for emergency rescue.

At no time should a person enter a confined space for rescue purposes without:

- Another person stationed outside
- An approved respirator appropriate for the hazards that may be encountered
- A lifeline
- A safety harness

Multi-Employer Procedure

If employees of a contractor and those of another employer are required to work simultaneously within a confined space, efforts must be made to cooperate with the operations of other employers so no employees are endangered.

Confined Space Entry Training Overview

Every individual involved in confined space entry receives initial and annual refresher training. The training is specific to the duties the employee performs and the procedures and practices necessary for protection from confined space dangers.

Authorized entrants are trained to:

1. Know the hazards associated with a confined space and the effects
2. Properly use the equipment required for entry

3. Maintain continuous communication with the attendant
4. Alert the attendant of an emergency
5. Evacuate the space if an emergency occurs

Attendants are trained to:

1. Know the hazards associated with a confined space and the effects
2. Maintain an accurate account of the authorized entrants
3. Remain in their assigned station until relieved by another attendant or until the confined space entry is complete
4. Monitor conditions in and around the permit space
5. Summon rescue and applicable medical services in an emergency
6. Perform non-entry rescue procedures
7. Perform appropriate measures to prevent unauthorized personnel from entering the confined space

Supervisors are trained to:

1. Know the hazards associated with a confined space and the effects
2. Verify the safeguards required by the permit
3. Verify rescue services are available and verify means for summoning them are operable
4. Cancel the written permit and terminate the confined space entry if required
5. Remove personnel who are not authorized to enter the confined space during operations
6. Periodically monitor the confined space operation to ensure it is performed in a manner consistent with the requirements of the confined space entry procedures and acceptable conditions are maintained

All personnel involved in confined space entry receive training on the following:

1. Types of confined space hazards
2. Components of the confined space entry program
3. Components of the Confined Space Entry Permit
4. Safe confined space welding practices
5. Need for proper guarding of the entrance opening
6. Atmospheric testing equipment including its use, calibration, and maintenance
7. Atmospheric testing protocol:
 - a. Oxygen, combustibles, toxics
 - b. Pre-entry, frequent, and continuous testing
 - c. Monitoring of all levels within the space
8. Methods for the control or elimination of atmospheric hazards
 - a. Draining and rinsing
 - b. Purging and cleaning
 - c. Continuous forced air ventilation
9. Procedure to follow if a hazard is detected
10. Evaluation process for re-entry if hazards are detected
11. Entry equipment training

12. Personal protective equipment as required:

- a. Full body harness
- b. Respiratory protection
- c. Eye and face equipment
- d. Protective clothing