

Confined Spaces in Construction

1. Overview

- a. Identify the characteristics of confined spaces
- b. Identify the characteristics of permit required confined spaces (PRCS)
- c. Discuss definitions relating to confined spaces
- d. Identify the differences between General Industry and Construction confined space
- e. Look at expected injury reduction associated with confined space in construction rule
- f. Identify the key components of a confined space plan
- g. Identify the duties of the entrant, attendant, and supervisor
- h. Identify the hazards in a confined space
- i. Understand eliminating hazards using Lock-out/Tag-out (LOTO)
- j. Understand ventilation practices
- k. Understand rescue preparation
- l. Understand employee rights

2. Characteristics of Confined Spaces

- a. Limited means of entry/exit,
- b. Is large enough for a worker to enter it, and
- c. Is not intended for regular/continuous occupancy.

3. Characteristics of Permit-Required Confined Spaces

- a. Permit-required confined spaces have one or more of these characteristics in addition to meeting the criteria of a confined space:
 - i. Contains or has the potential to contain a hazardous atmosphere;
 - ii. Contains a material with the potential to engulf someone who enters the space;
 - iii. Has an internal configuration that might cause an entrant to be trapped or asphyxiated by inwardly converging walls or by a floor that slopes downward and tapers to a smaller cross section; or
 - iv. Contains any other recognized serious safety or health hazards.

4. Definitions

- a. Barrier: means a physical obstruction that blocks or limits access.
- b. Competent Person: means one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has the authorization to take prompt corrective measures to eliminate them.
- c. Control: means the action taken to reduce the level of any hazard inside a confined space using engineering methods (for example, by ventilation), and then using these methods to maintain the reduced hazard level. Control also refers to the engineering methods used for this purpose. Personal protective equipment is not a control.
- d. Controlling Contractor: is the employer that has overall responsibility for construction at the worksite. Note. If the controlling contractor owns or manages the property, then it is both a controlling employer and a host employer.

- e. Early-Warning: system means the method used to alert authorized entrants and attendants that an engulfment hazard may be developing. Examples of early-warning systems include, but are not limited to: alarms activated by remote sensors; and lookouts with equipment for immediately communicating with the authorized entrants and attendants.
- f. Entry Employer: means any employer who decides that an employee it directs will enter a permit space.
- g. Entry Rescue: occurs when a rescue service enters a permit space to rescue one or more employees.
- h. Host Employer: means the employer that owns or manages the property where the construction work is taking place.
- i. Lock-Out: means the placement of a lockout device on an energy isolating device, in accordance with an established procedure, ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed.
- j. Lower Flammable Limit or Lower Explosive Limit: means the minimum concentration of a substance in air needed for an ignition source to cause a flame or explosion.
- k. Monitor or Monitoring: means the process used to identify and evaluate the hazards after an authorized entrant enters the space.
- l. Non-entry rescue: occurs when a rescue service, usually the attendant, retrieves employees in a permit space without entering the permit space.

5. Differences between General Industry and Construction Confined Spaces

- a. The following are the five key differences (all found in Subpart AA):
 - i. More detailed provisions requiring coordinated activities when there are multiple employers at the worksite.
 - ii. Requiring a competent person to evaluate the work site and identify confined spaces, including permit spaces.
 - iii. Requiring continuous atmospheric monitoring whenever possible.
 - iv. Requiring continuous monitoring of engulfment hazards. For example, when workers are performing work in a storm sewer, a storm upstream from the workers could cause flash flooding.
 - v. Allowing for the suspension of a permit, instead of cancellation, in the event of changes from the entry conditions list on the permit or an unexpected event requiring evacuation of the space. The space must be returned to the entry conditions listed on the permit before re-entry.

6. Injury Reduction Impact on New Ruling

- a. Expected to save 800 construction workers a year from serious injury.

7. Key Components of a Confined Space Plan

- a. Management leadership and employee participation
- b. Hazard identification and assessment
- c. Hazard prevention and control
- d. Information and training

- e. Evaluation of program effectiveness

8. Duties of Attendant, Entrant, and Entry Supervisor

a. Attendant

- i. Remain outside the permit space during entry operations unless relieved by another authorized attendant;
- ii. Perform non-entry rescues when specified by the employer's rescue procedure;
- iii. Know existing and potential hazards, including information on the mode of exposure, signs or symptoms, consequences and physiological effects;
- iv. Maintain communication with and keep an accurate account of those workers entering the permit space;
- v. Order evacuation of the permit space when a prohibited condition exists
- vi. Summon rescue and other services during an emergency;
- vii. Ensure that unauthorized people stay away from permit spaces or exit immediately if they have entered the permit space;
- viii. Inform authorized entrants and the entry supervisor if any unauthorized person enters the permit space; and
- ix. Perform no other duties that interfere with the attendant's primary duties.

b. Entrant

- i. Know space hazards, including information on the means of exposure such as inhalation or dermal absorption, signs of symptoms and consequences of the exposure;
- ii. Use appropriate personal protective equipment properly;
- iii. Maintain communication with attendants as necessary to enable them to monitor the entrant's status and alert the entrant to evacuate when necessary
- iv. Exit from the permit space as soon as possible when:
 - 1. Ordered by the authorized person;
 - 2. He or she recognizes the warning signs or symptoms of exposure;
 - 3. A prohibited condition exists; or
 - 4. An automatic alarm is activated.
- v. Alert the attendant when a prohibited condition exists or when warning signs or symptoms of exposure exist.

c. Entry Supervisor

- i. Know space hazards including information on the mode of exposure, signs or symptoms and consequences;
- ii. Verify emergency plans and specified entry conditions such as permits, tests, procedures and equipment before allowing entry;
- iii. Terminate entry and cancel permits when entry operations are completed or if a new condition exists;
- iv. Verify that rescue services are available and that the means for summoning them are operable, and that employer will be notified as soon as services become unavailable;
- v. Take appropriate measures to remove unauthorized entrants; and

- vi. Ensure that entry operations remain consistent with the entry permit and that acceptable entry conditions are maintained

9. Confined Space Hazards in Construction

- a. Atmospheric
 - i. Oxygen Deficient/enriched
 - ii. Flammable Atmosphere
 - iii. Toxic Atmosphere
- b. Chemical
 - i. Inerting Operations – Carbon Dioxide, Nitrogen
 - ii. Chemical Reactions
 - 1. Manufacturing
 - 2. Cleaning
 - 3. Curing
 - 4. Stored products
- c. Engulfment
 - i. Trapped by a liquid or finely divided solid
- d. Moving Equipment
 - i. Entrapment in the equipment
 - ii. Electrocutation
 - iii. Create engulfment hazard
- e. Other Hazards
 - i. Falls
 - ii. Poor Lighting
 - iii. Noise
 - iv. Electrical
 - v. Thermal

10. Eliminating Hazards Using LOTO

- a. Isolate all types of energy within the confined space such as:
 - i. Electrical
 - ii. Gravitational
 - iii. Water
 - iv. Gas
 - v. Steam
 - vi. Pneumatic
 - vii. Thermal
 - viii. Chemical
 - ix. Many other energy sources

11. Ventilation

- a. First option to correct problems.
- b. Must be aware of hazards you are trying to correct in the confined space.

- c. Air intake in a safe location to draw fresh air only.
- d. Continuous ventilation whenever possible.
- e. Retest the confined space before entry.
- f. Continuous testing of the air during entry.
- g. Identify types of ventilation such as:
 - i. Natural
 - 1. Natural forces pull out the atmosphere and replace it (slow process)
 - ii. Mechanical
 - 1. Use of fans and blowers, can be used to push new air in or pull out existing atmosphere (only limited by size of equipment)

12. Confined Space Rescue

- a. Worker assigned to remain outside the confined space and be in constant contact with the workers inside.
- b. Know emergency rescue procedures.
- c. 60% of workers who die in confined spaces are would-be rescuers.
- d. Trained in use of emergency rescue equipment and PPE.
- e. Identify types of rescue:
 - i. Non-Entry Rescue
 - 1. Rescue is performed outside the space
 - 2. Prior to entry, a retrieval system and a body harness should be in place
 - ii. Self Rescue
 - 1. Entrant is capable to recognizing a hazard is present and is able to exit from the space
 - iii. Entry Rescue
 - 1. Entry rescue is clearly the form of rescue that presents the greatest risk
 - 2. Entry rescues should be avoided whenever possible
 - 3. Entry rescue requires a considerable amount of equipment and trained individuals

13. Outline employee rights

- a. Employee rights and responsibilities
 - i. To assure safe and healthful working conditions for working men and women
 - ii. By authorizing enforcement of the standards developed under the Act
 - iii. By assisting and encouraging the States in their efforts to assure safe and healthful working conditions
 - iv. By providing for research, information, education, and training in the field of occupational safety and health
- b. A right to
 - i. A safe and healthful workplace
 - ii. Know about hazardous chemicals
 - iii. Information about injuries and illnesses in your workplace
 - iv. Complain or request hazard correction from employer
 - v. File a confidential complaint with OSHA to have their workplace inspected.

- vi. Receive information and training about hazards, methods to prevent harm, and the OSHA standards that apply to their workplace. The training must be done in a language and vocabulary workers can understand.
 - vii. Get copies of their workplace medical records.
 - viii. Participate in an OSHA inspection and speak in private with the inspector.
 - ix. File a complaint with OSHA if they have been retaliated or discriminated against by their employer as the result of requesting an inspection or using any of their other rights under the OSH Act.
 - x. File a complaint if punished or discriminated against for acting as a “whistleblower” under the additional 20 federal statutes for which OSHA has jurisdiction.
- c. Whistleblower Protection
- i. OSHA's Whistleblower Protection Program enforces the whistleblower provisions of more than twenty whistleblower statutes protecting employees who report violations of various workplace safety.