



## **Confined Space**

Upon successful completion of this session, each participant will be able to:

- **Identify safety requirements for confined space hazards in construction.**
- **Explain the requirements for welding in confined spaces.**
- **Identify general concepts related to confined space work.**
- **Identify atmospheric and physical hazards of confined spaces.**

## Statistics

**NIOSH report:**

**1993 - 1996**

**276 Confined Space incidents**

**Welder Fatality**

**Resulted in 234 deaths**

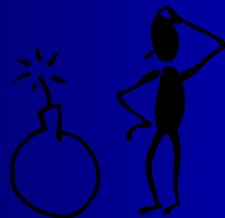
**193 injuries**

**Up to half of those killed in confined spaces were rescuers**



## Overview

**Failure to recognize and control confined space hazards is the leading cause of accidents.**



## Overview



### First Priority - Define the hazards of the space:

- Restricted areas within the confined space
- Voids
- The nature of the contaminants present
- The size of the space
- The type of work to be performed
- The number of people involved

## Confined Space Safety in Construction

Current OSHA Requirements

January 2013



## 1926.21 (b)(6)(i)



- All employees required to enter into confined or enclosed spaces *shall be instructed as to the nature of the hazards involved*, the necessary precautions to be taken, and in the use of protective and emergency equipment required.
- The employer shall comply with any specific regulations that apply to work in dangerous or potentially dangerous areas.

## 1926.21 (b)(6)(ii)

- “Confined or enclosed space” means any space having a limited means of egress, which is subject to the accumulation of toxic



or flammable contaminants or has an oxygen deficient atmosphere.



## 1926.21 (b)(6)(ii)

- **Confined or enclosed spaces include, but are not limited to, storage tanks, process vessels, bins, boilers, ventilation or exhaust ducts, sewers, underground utility vaults, tunnels, pipelines, and open top spaces more than 4 feet in depth such as pits, tubs, vaults, and vessels.**

## Confined Space?



## Confined Space?



## Confined Space?



## Confined Space?



## Confined Space?





## Confined Space?



## Confined Space?



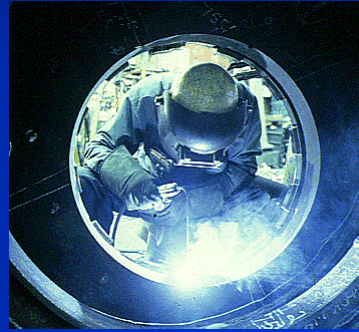




## Welding, Cutting, and Heating in Confined Spaces, 1926.353(b)



- Either general mechanical or local exhaust ventilation meeting the requirements of paragraph (a) of this section shall be provided *whenever welding, cutting, or heating is performed in a confined space.*



## Welding, Cutting, and Heating in Confined Spaces, 1926.353(b)

- When sufficient ventilation cannot be obtained without blocking the means of access, employees in the confined space shall be protected by air line respirators.
- An employee on the outside of such a confined space assigned to maintain communication with those working within it and to aid them in an emergency.



## Welding, Cutting, and Heating in Confined Spaces, 1926.353(b)

- "Lifelines." Where a welder must enter a confined space through a manhole or other small opening, means shall be provided for quickly removing him in case of emergency.



## Welding, Cutting, and Heating in Confined Spaces, 1926.353(b)

- When safety belts and lifelines are used for this purpose they shall be so attached to the welder's body that his body cannot be jammed in a small exit opening.
- An attendant with a pre-planned rescue procedure shall be stationed outside to observe the welder at all times and be capable of putting rescue operations into effect.



## 1926.651(g)(1)

- Where oxygen deficiency (atmospheres containing less than 19.5 percent oxygen) or a hazardous atmosphere exists or could reasonably be expected to exist, such as in excavations in landfill areas or excavations in areas where hazardous substances are stored nearby, the atmospheres in the excavation shall be tested before employees enter excavations greater than 4 feet (1.22 m) in depth.



## Background

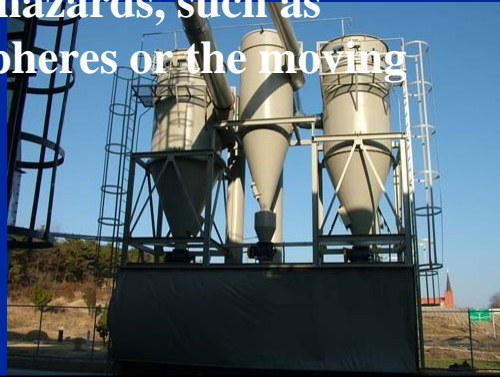
- Many workplaces contain spaces which are "confined".
- Their configurations hinder the activities of any employees who enter, work in, and exit them.
- Employees who work in process vessels must squeeze in and out through narrow openings or perform their tasks while cramped or contorted.





## OSHA Perspective

- In some cases, confinement itself poses entrapment hazards.
- In other cases, confined space work keeps employees closer to hazards, such as asphyxiating atmospheres or the moving parts of machinery.



## OSHA Perspective

- Confined Space  
in Construction  
([Search](#))

[Confined Space](#)  
([OSHA Document](#))



## Confined Spaces in Construction Subpart AA

- Proposed Final Rule: July 2013



## Proposed Final Rule

Regulatory Calendar (Update)



## Introduction, 1926.1201

(a) This standard sets out safety precautions that must be taken when working within or near a confined space that is subject to a hazard.

- Wherever the term "hazard" is used in this standard, it means an existing hazard or a hazard that has a reasonable probability of occurring in or near a confined space.



## Scope, 1926.1202

(a) This standard applies to employers engaged in construction work and who have confined spaces at their job site, unless one of the exceptions in paragraph (b) of this section applies.



## **(b) Exceptions.**

**This standard does not apply to:**

- (1) Construction work regulated by 29 CFR Part 1926 subpart Y (Diving).**
- (2) Non-sewer construction work regulated by 29 CFR part 1926 subpart P (Excavations).**
- (3) Non-sewer construction work regulated by 29 CFR part 1926 subpart S (Underground Construction, Caissons, Cofferdams and Compressed Air).**

## **Confined Space**

**Is a space that has all of the following characteristics:**

- 1. Is large enough and so arranged that an employee can bodily enter it,**
- 2. Has limited or restricted means for entry and exit,**
- 3. Is not designed for continuous employee occupancy.**



## **Construction Confined Space Classifications**

- (i) Continuous System-Permit-Required Confined Space (CS-PRCS).**
- (ii) Permit-Required Confined Space (PRCS).**
- (iii) Controlled-Atmosphere Confined Space (CACS).**
- (iv) Isolated-Hazard Confined Space (IHCS).**

## **Examples of Confined Spaces**

may occur include, but are not limited to, the following:

- Bins; boilers; pits (such as elevator, escalator, pump, valve or other equipment); manholes (such as sewer, storm drain, electrical, communication, or other utility); tanks (such as fuel, chemical, water, or other liquid, solid or gas); boilers; incinerators; scrubbers; concrete pier columns; sewers; transformer vaults; heating,

## Examples, Continued

- ventilation, and air-conditioning (HVAC) ducts; storm drains; water mains; precast concrete and other pre-formed manhole units; drilled shafts; enclosed beams; vessels; digesters; lift stations; cesspools; silos; air receivers; sludge gates; air preheaters; step up transformers; turbines; chillers; bag houses; and/or mixers/reactors.

## Definitions, 1926.1203



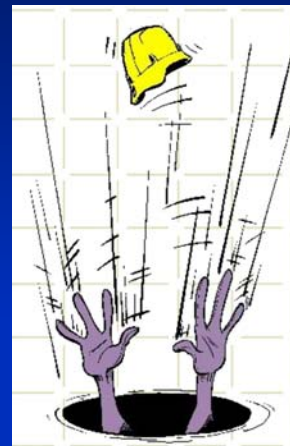
## Confined Space

Is a space that has all of the following characteristics:

1. Is large enough and so arranged that an employee can bodily enter it,
2. Has limited or restricted means for entry and exit,
3. Is not designed for continuous employee occupancy.

## Entry

- Entry occurs when any part of an employee's body breaks the plane of an opening into a confined space.
- Entry (or entry operations) also refers to the period during which an employee occupies a confined space.



## **Continuous System-Permit-Required Confined Space (CS-PRCS)**

Is a Permit-Required Confined Space that has **all** of the following characteristics:

- (1) Is part of, and contiguous with, a larger confined space (for example, sewers).
- (2) The employer cannot isolate it from the larger confined space.
- (3) Is subject to a potential hazard release from the larger confined space that would overwhelm personal protective equipment and/or hazard controls, resulting in a hazard that is immediately dangerous to life and health.

## **Controlled-Atmosphere Confined Space (CACS)**

Is a confined space that has **all** of the following characteristics:

- (1) Contains no physical hazards or only isolated physical hazards.
- (2) Uses ventilation alone to control atmospheric hazards at safe levels.



## Isolated-Hazard Confined Space (IHCS)

- Is a confined space in which the employer has isolated all physical and atmospheric hazards.



## Permit-Required Confined Space (PRCS)

Is a confined space that has any one of the following characteristics:

- (1) A hazardous atmosphere.
- (2) Inwardly converging, sloping, or tapering surfaces that could trap or asphyxiate an employee. For example, a space between walls that narrows towards the base (including, but not limited to, funnels and hoppers).
- (3) An engulfment hazard or other physical hazard.

## Contractor

- An employer who has employees engaged in construction, and is neither a controlling contractor nor a host employer.



## 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.

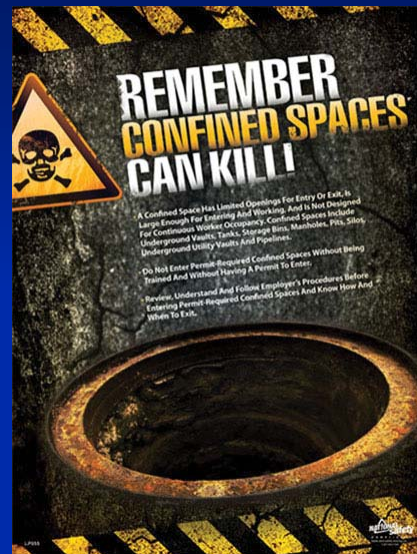
## Host Employer

Owens or manages the property where construction is taking place.

- **Note: If a host employer has overall responsibility for construction at the worksite, then it is both a host employer and controlling contractor.**

## Hazard

Means a physical hazard or hazardous atmosphere.



## Identify a Hazard



- Means determining the type, quantity, and characteristics of a hazard, including the likelihood that a hazard currently absent from a confined space could enter the confined space.

## Hazardous Atmosphere

Hazardous Atmosphere means an existing or potential atmosphere consisting of at least one of the following:

- (1) A flammable gas, vapor, or mist in excess of 10 percent of its lower flammable limit.

10% LEL LEL UEL





## Hazardous Atmosphere

Hazardous Atmosphere means an existing or potential atmosphere consisting of at least one of the following:

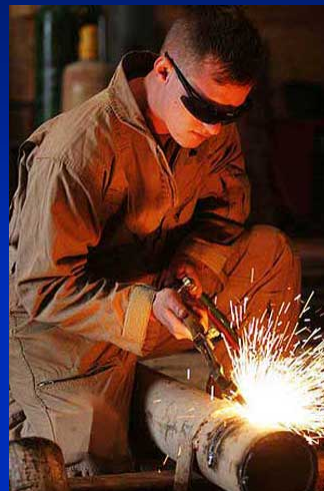
- (2) An airborne combustible dust at a concentration that meets or exceeds its lower explosive limit.



## Hazardous Atmosphere

Hazardous Atmosphere means an existing or potential atmosphere consisting of at least one of the following:

- (3) An atmospheric oxygen concentration below 19.5 percent ("oxygen deficient") or above 23.5 percent ("oxygen enriched").



## Hazardous Atmosphere

Hazardous Atmosphere means an existing or potential atmosphere consisting of at least one of the following:

(4) An airborne concentration of a substance that exceeds the dose or exposure limit specified by an OSHA requirement.



## Hazardous Atmosphere

Hazardous Atmosphere means an existing or potential atmosphere consisting of at least one of the following:

(5) An atmosphere that presents an immediate danger to life or health.



## **Physical Hazard**

Means an existing hazard that can cause death or serious physical harm in or near a confined space, or a hazard that has a reasonable probability of occurring in or near a confined space, and that includes, but is not limited to:

## **Physical Hazard**

- Explosives (as defined by paragraph (n) of Sec. 1926.914, definition of "explosive");
- Energy: mechanical, electrical, hydraulic and pneumatic;
- Radiation;
- Temperature extremes;

## Physical Hazard

- engulfment;
- noise; and
- inwardly converging surfaces.



## Physical Hazard

Physical hazard also refers to chemicals that can cause death or serious physical harm through skin or eye contact (rather than through inhalation).

## **Serious Physical Harm**

**(1) An impairment in which a body part is made functionally useless or is substantially reduced in efficiency.**

## **Serious Physical Harm**

**(1) An impairment in which a body part is made functionally useless or is substantially reduced in efficiency.**

**Such impairment includes, but is not limited to, loss of consciousness or disorientation, and may be permanent or temporary, or chronic or acute. Injuries involving such impairment would usually require treatment by a physician or other licensed health-care professional; or**



## **Serious Physical Harm**

**(2) An illness that could shorten life or substantially reduce physical or mental efficiency by impairing a normal bodily function or body part.**

## **Safe Level**

- **Is an employee exposure to an atmospheric or physical hazard that meets OSHA requirements.**
- **PEL or below**

## **Worksite evaluation, information exchange, and coordination, 1926.1204**

- **Host or Controlling Contractor is not required to determine the following information, but if they know it they are required to provide the Contractor with the information, so they can evaluate the space.**

## **Confined Spaces, Information to Gather**

- (1) The location of each space that the controlling contractor or host employer actually knows is a confined space.

## **Confined Spaces , Information to Gather**

**(2) For each of the spaces identified in paragraph (a)(1) of this section:**

- (i) Any hazards, if known, that affect that space.**
- (ii) The classification of the space, IHCS, CACS, PRCS, or CS-PRCS, if previously classified.**

## **Confined Spaces , Information to Gather**

**(2) For each of the spaces identified in paragraph (a)(1) of this section:**

- (i) Any hazards, if known, that affect that space.**
- (ii) The classification of the space, IHCS, CACS, PRCS, or CS-PRCS, if previously classified.**
- (iii) Any precautions and procedures that the controlling contractor or host employer previously implemented for entering the space.**

## Contractor

**(b) The contractor must determine if there are confined spaces and if these spaces are subject to any hazards, using the following procedures:**

**(1) Without entering the space, the contractor must consider information, if any, from the host employer and controlling contractor, and use inspection**

**information (see paragraph (b)(2) of this section), to:**

- (i) Determine if the space meets the definition of a confined space.**
- (ii) Identify any physical and atmospheric hazards.**

## Contractor

**(c) If the contractor classifies a space as an IHCS, CACS, PRCS, or CS-PRCS, it must:**

**(1) Inform the controlling contractor and host employer of the precautions and procedures the contractor will follow for entry into the space.**

**(2) At the conclusion of entry operations, inform the controlling contractor and host employer about any hazards that were present, or that developed, during entry operations.**

## Contractor



**(d) If more than one employer will have employees in the space at the same time, the controlling contractor shall coordinate entry operations with the contractors.**

## Contractor

**(e) Employee participation and notification.**

The employer must provide its employees who enter a confined space, and their authorized representatives, with an opportunity to observe the evaluations of the space (Sec. 1926.1204(b)), any reassessment conducted pursuant to Sec. 1926.1207, and atmospheric testing and monitoring required by this standard.



