

# Confined Space Safety in Construction

Understanding the Requirements of Permit  
Required Confined Spaces

29 CFR 1926.1200-1213 – Confined Spaces in  
Construction

# Objectives

- Describe a permit required confined space.
- Understand the requirements of OSHA regulations.
- Understand the safe work practices for working in an around confined spaces.



# What is a Confined Space?

- A Confined Space is one where:
  1. It has a restricted opening making entry and exit difficult.
  2. It is large enough for a whole person to enter.
  3. It is not designed to be occupied.



Is a walk in freezer a confined space?

Yes

No

# Permit Required Confined Spaces

- A confined space requires an entry permit when it has **any one** of the following:
  1. An atmospheric hazard. (Real or potential)
  2. The potential for entrapment or engulfment.
  3. It is in a hazardous configuration.
  4. It contains any other serious safety or health hazard.



This space has an atmospheric hazard, and the potential for engulfment, which makes it a **permit required confined space**.

**These hazards must be dealt with prior to entry!**

# Atmospheric Hazard

- The OSHA definition:

1. Flammable gas, vapor, or mist in excess of 10 percent of its lower flammable limit. (LFL)
2. Airborne concentration of dust that meets or exceeds the LFL.
3. Oxygen concentration below 19.5% or above 23.5%
4. Atmospheric concentration of any substance above permissible exposure limit of OSHA Toxic and Hazardous Substance list.
5. Any other atmospheric condition immediately hazardous to life or health.

Substance	Permissible Exposure Limit (PPM)
Carbon Dioxide	5,000
Carbon Monoxide	50
Hydrogen Sulfide	20
Methane	1,000
Nitric Oxide	25
Oxygen difluoride	0.05
Phosgene (carbonyl chloride)	0.1
Sulfur Dioxide	5
Stoddard Solvent	200

Permissible Exposure Limits of some atmospheric contaminants

What atmospheric hazards are at your facility?

# Atmospheric Hazard – Silent Killer

- Valero Refinery
  - November 5, 2005 – Two workers at Valero Refinery died after entering a permit required confined space filled with nitrogen.
- Atmospheric hazards are the most common causes of death in confined spaces.
- You can't see it, touch it, or feel it, but it can be deadly.



Deaths caused by hazardous atmospheres are the most common causes of fatalities in confined spaces.

# Hazardous Configuration

- The OSHA definition:
  - "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"



A wind turbine hub, which provides access to the long blades, is an example of a hazardous configuration.

What other examples can you think of for hazardous configurations?

## Posting of Permit Required Confined Spaces

- The employer must evaluate the workplace to determine if there are any permit required confined spaces.
- If the work place has permit required confined spaces, the employer must inform employees by posting danger signs.
- "Danger –Permit Required Confined Space, DO NOT ENTER!"



Signs must be sturdy, and located to warn employees of the hazardous space.



# Alternative Procedures

- Alternative procedures allow employees to enter a confined space with an atmospheric hazard without a permit system provided that:

- Verification is made that using continuous forced air ventilation is safe.
- Inspection data supports that the atmosphere is the only hazard and forced air ventilation is effective.
- Information is documented and provided to entrants.



## Required Conditions:

1. Safety is ensured before removing cover.
2. Continuous atmospheric monitoring.
3. Periodic atmospheric testing.
4. Evacuate immediately if necessary.
5. Verify procedures were followed with written certification.

## PRCS Entry Team – Attendant

- Is aware of effects of possible hazards on attendants behavior.
- Familiar with the hazards and procedures of the space.
- Monitors and maintains count of entrants.
- Monitors activities and hazards in and around the confined space.
- Communicates with entrants.



What is missing from this confined space access point?

# Attendant Evacuation Order

- The attendant will order an evacuation of the space if:
  - A prohibited condition is detected.
  - Entrants exhibit behavior that is symptomatic of hazard exposure.
  - There is a condition outside the space that could affect the safety of the entrants.
  - The attendant can no longer perform their duties.



What could cause an attendant to order an evacuation?

## PRCS Entry Team – Authorized Entrant

- Knows the hazards of the work.
- Can use equipment properly.
- Communicates with attendant.
- Alerts attendant if hazards change or new hazards develop.
- Exits the space if new hazards arise.



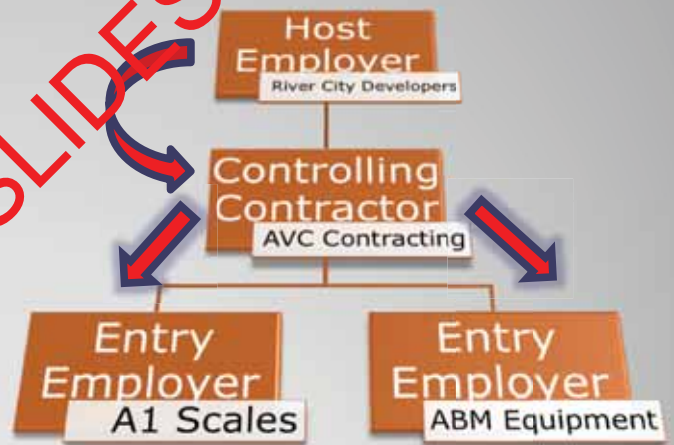
# Employee Provided Rescue

- Employees must be provided with and trained on PPE required to conduct rescues.
- Must be trained to perform rescue, including training on confined space entry.
- Must have current certifications on CPR and First Aid.
- Must practice rescue at least once a year.
- Rescue practices must be similar to actual spaces where rescue may be required.



## Distributing Hazard Information

- The controlling contractor will then:
  1. Obtain the host employers permit space information.
  2. Distribute the information to the entry employers, including any additional permit space info they have.
  3. Provide information on safety precautions in place to protect permit space entry workers.



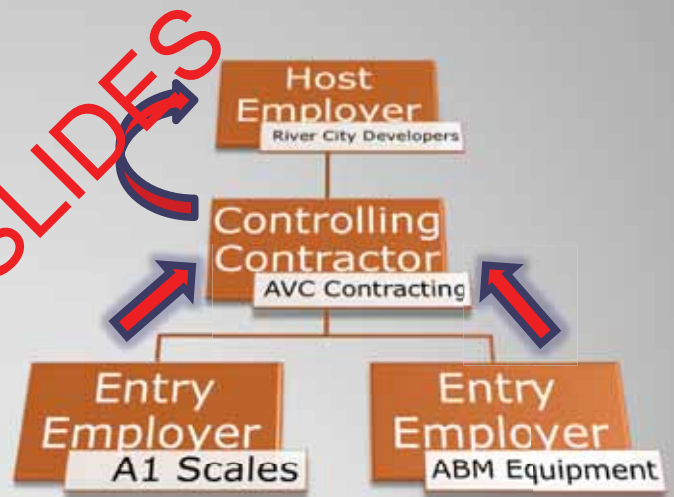
## Coordinating Work

- The controlling contractor and the entry employers must coordinate operations when more than one entity performs permit space entry.
- Coordination must also occur if work is being done that may introduce a hazard into the confined space.



## After Entry Operations

- The entry employer and the controlling contractor must review the entry operation, and note the permit entry program followed, and the hazards confronted or created during the work.
- The controlling contractor must provide this information to the host employer.





## Isolating The Space

- The space must be isolated from all hazards.
- This can be accomplished by:
  - Closing valves.
  - Installing blank flanges.
  - Draining the space.
  - Using lockout tag out equipment.



The space must be isolated and secured in accordance with the entry permit.

# Testing The Atmosphere

- Be sure to test the atmosphere at different levels in the space.
- Good air near the opening of the space does not mean that there is good air at the bottom.



## Confined Space Ventilation

- Continuous forced air ventilation must be used to eliminate an atmospheric hazard. Employees are not allowed in spaces with hazardous atmospheres.
- It must:
  - Eliminate the hazard.
  - Be directed to the immediate work space of the entrant.
  - Be from a clean source and not increase the hazard in the space.
- There should be a system for monitoring atmospheric hazards that can alert employees when ventilation is not working.



Proper ventilation technique is important.

# Performing Work In The Space

- Continuously monitor the space for a change in hazards.
- Do not perform work that was not briefed.
- If new work needs to be performed, exit the space, open a new permit, and re-brief the evolution.
- Always use the proper tools for the job.
- If you start to feel tired or ill, exit the space immediately.



Workers who initiate work that was not briefed risk introducing new hazards to the space.

# Evacuating The Space

- If new hazards arise, evacuate the space immediately!
- Use the designated evacuation and rescue plan.
- Do not attempt an unplanned rescue, this is where most confined space fatalities occur.
- The space must be evaluated to determine how the hazard developed, and measures must be implemented to protect employees before re-entry is allowed.



Do not deviate from your emergency plan!