



Safety/Confined Space

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Presenters



Paul Keller Jr., ASCS




David Monson, ASCS



Disclaimer


This presentation is not intended to be a comprehensive program covering all aspects of this topic. All technicians are encouraged to read and follow all applicable standards, codes and regulations related to this topic.

- ✓ It is the responsibility of each individual contractor to follow local building codes and licensing requirements and to work safely in accordance with OSHA guidelines.
- ✓ It is the contractor's responsibility to take proper precautions on each project to prevent cross contamination. Always take the health and safety of the building occupants into consideration before you conduct any cleaning procedures.
- ✓ All of the following tips are only general tips. They do not cover every situation and it is your responsibility to adapt these tips to the individual system you are working on.
- ✓ The Instructor is not responsible in any way for the work you perform after viewing this slide show. You are responsible for your own work.
- ✓ The views and opinions following are the instructors opinions and not necessarily the official position of the National Air Duct Cleaners Association.



What We'll Learn

- How OSHA Works
- Definition of Confined Space
- Permit Required Confined Space
- Rescue from PRCS'




Title of Presentation

Presentation Content

- OSHA
- What is a confined space
- Rescue from permit required confined spaces

How does OSHA Work?



General Duty Clause: Section 5(a)(1) of the Occupational Safety and Health Act (OSHA) of 1970, employers are required to provide their employees with a place of employment that "is free from recognizable hazards that are causing or likely to cause death or serious harm to employees."

OSHA wants you to operate in the safest way possible. It is acceptable to deviate from their guidelines if the alternate method is safer, but it requires documentation of why and how.

IMPORTANT to understand

Training need to be specific to the employees job and the potential hazards they may face.

OSHA 10 & 30 - Required in some states but not by OSHA Provides a good overview and orientation to OSHA's requirements.

"Competent Person" is **determined by the employer** as one who possesses the skills, knowledge, experience, and judgment to perform assigned tasks or activities satisfactorily.

Do I follow the General Industry or Construction rules?

- OSHA has two sets of regulations regarding work in Confined Spaces:
 - 1910.146 Confined Spaces for General Industry
 - 1926.1200 Confined Spaces in Construction
- Both standard are very similar but there are some key differences which will be explained in this class.
- 1926.1200 (subpart AA) is the more current and more restrictive standard. If you follow the rules in 1926.1200 you will be covered for 1910.146

What is a Confined Space?

A Confined Space has:

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

Examples include sewers, pits, crawl spaces, attics, boilers, duct work, and many more.



What is "Limited means of entry and/or exit"

A space has a **limited or restricted means of exit** if a person could not readily escape from the space in an emergency. Any of the following factors indicate that a work space has a limited or restricted means of exit:

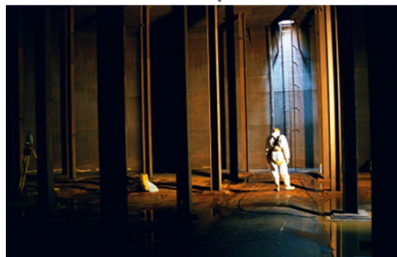
- The need to use a ladder or movable stairs, or stairs that are narrow or twisted;
- A door that is difficult to open or a doorway that is too small to exit while walking upright;
- Obstructions such as pipes, conduits, ducts, or materials that a worker would need to crawl over or under or squeeze around;
- The need to travel a long distance to a point of safety.

What is "continuous occupancy"


▪ A space is **not designed for continuous employee occupancy** if it is not designed with features such as ventilation, lighting, and sufficient room to work and move about that are needed if people are to occupy it continuously.



Examples




Examples



A photograph of a construction site showing a deep trench. Two workers wearing hard hats are visible at the bottom of the trench. A blue ladder is leaning against the left wall. The walls are lined with vertical wooden studs. Safety cones and markers are placed around the perimeter of the trench.

Examples



A photograph of a large, calm pond or reservoir. The water is clear and reflects the surrounding green grassy embankment and trees. The sky is blue with some light clouds.

Examples



A photograph of an industrial facility, likely a water treatment plant. It shows a long, narrow channel with a series of vertical pipes or structures along one side. The lighting is dim, and the overall scene is industrial and somewhat dark.

Examples





What is a Permit Required Confined Space (PRCS)

The distinction between *confined spaces* and *permit spaces* is crucial to understanding what the standard requires. A *permit-required confined space (permit space)* is a confined space that:

- 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; or
- **Contains any other recognized serious safety or health hazard.**

Employers must evaluate all **confined spaces** to determine whether they are **permit spaces** but must take steps to protect workers only if a space is classified as a **permit space**.



Define 'hazard'

A Hazard is anything that could impair the entrant's ability to escape unaided or could cause harm or death



Also in this letter OSHA explains that "any...recognized safety or health hazard" could include "biological hazards such as molds, mildews and spores frequently found in dark damp spaces can irritate the respiratory system. Bacteria and viruses found in sewage treatment exposes the entrant to a variety of illnesses. In addition, rodents, snakes, spiders and other insects as well as birds and animals"






Common hazards

- Atmospheric ^{OSHA}
 - O₂, CO, H₂S, NH₃, LEL
- Mechanical
 - Crushing, Mixing
 - Stored Energy
- Process materials
 - Steam
 - Sewage
 - Glycol
- Engulfment
 - Water
 - Grain
 - Soil





Slide 21

GS1 George Simmons, 8/29/2019

Common hazards

- Electrical
 - Arc Flash
 - Energized Parts
- Chemical Exposure
 - Toxic Fumes
 - Corrosives
- Environmental Exposure
 - Too Hot or Cold
- Flammables & Combustibles
 - Methane
 - Hydrogen
 - Acetylene
 - Propane
 - Gasoline Fumes



Hierarchy of Hazard Control

1. **Elimination:** To completely remove the hazard from the work area.
 - Example is to move the work to the ground to avoid a fall hazard
2. **Substitution:** To replace the hazard with a non-hazard alt.
 - Example is purging a fuel line and replace it with an inert gas
3. **Engineering Controls:** Does not eliminate the hazard but isolates it from the workers.
 - Example is using a Lock Out/Tag Out (LOTO) process
4. **Administrative Controls:** Controlling how people go about their tasks.
 - Hazards are not eliminated but with training, procedures, signage and labels exposure is limited.
5. **Personal Protective Equipment (PPE):** The hazard cannot be eliminated so we protect the workers with PPE
 - Example is a welder's helmet

Re-classifying a PRCS

- A Permit Required Confined Space (PRCS) may be reclassified as a Non-permit CS if the competent person determines (and documents) that:
 1. The space contains no actual or potential atmospheric hazards.
 2. All actual or potential hazards are eliminated or isolated without making entry to the space.
 3. Inspection and testing is performed during entry to demonstrate that the hazards are isolated from the space.
 4. The basis for reclassification is documented with the date, location and signature of the person making the determination.

Forced air ventilation does not constitute elimination or isolation of atmospheric hazards.

Important acronyms

- **IDLH** - Immediate Danger to Life or Health. Pretty self explanatory.
- **PEL** - Permissible Exposure Limit. The maximum limit set by OSHA that worker can be exposed to a substance.
- **PPM** or Part Per Million
 OSHA's PEL for H₂S is 10PPM which is only .001%
 - H₂S at 50-100 PPM leads to eye damage.
 - H₂S is lethal above 300PPM or .03%
 Oxygen is measured in %

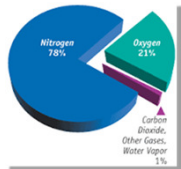
Atmospheric hazards

- We monitor the atmosphere in a CS looking keep the right balance
 - Oxygen (O₂) 19.5% to 23.5%
 - Carbon Monoxide (CO) under 50ppm
 - Hydrogen Sulfide (H₂S) under 20ppm
 - Lower Explosive Limit (LEL) under 10%
 - Ammonia (NH₃) under 50ppm
 common in Power Generation and Food Processing industries
- Other than Oxygen you want all other readings at 0

What is air?

The **air** you breathe is **made up of** lots of other things besides oxygen!

Oxygen only makes up **20.8%** of air.



78.1% of the **air** you breathe is **made up of nitrogen**

the remaining amount split up between argon, carbon dioxide, methane and water vapor.

CO vs CO2

Carbon Monoxide (CO)

- Byproduct of burning fossil fuels
- Poisonous at low levels
- OSHA PEL for CO is 35PPM

vs

Carbon Dioxide (CO2)

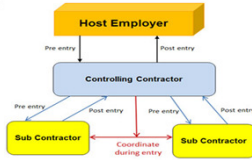
- Gas exhaled with normal breathing
- Poisonous only at very high levels
- OSHA PEL of CO2 is 10,000PPM

Job site roles

Host Employer is the owner of the site.

Controlling Contractor would be the GC or CM who is hire by the Host Employer to perform a scope of work.

Sub Contractors are hire by the Controlling contractor to perform aspect of the over all:



CS Roles - Supervisor

- Supervisor
 - "Owns" the hole
 - Says who is allowed in
 - Fills out and signs the permit
 - Assigns the Attendant roles
 - Determines the emergency procedures
 - CAN be an entrant



Cs roles -attendant

- Attendant
 - Keeps attendance
 - Maintains communication with entrants
 - Monitors and records the air monitor readings
 - Does not allow non-approved people to enter.
 - Summons Emergency services when needed
 - CAN NOT enter the confined Space!!
 - CAN NOT leave the entrance unattended.



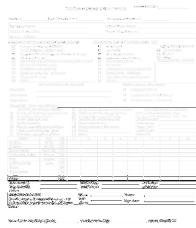
Cs roles - entrant

- Entrant
 - Exits when told to do so
 - Communicates any changes in the space
 - Maintains communication
 - Wears all required PPE
 - Understands the rescue procedures.



Entry permits

- Location
- Scope of work
- Potential Hazards
- Controls
- PPE
- Entrants
- Pre-entry Air reading
- Role assignments
- Emergency Procedures
- Rescue Plan
- Attendants Log
- Air readings log
- Permits must be retained by the employer for at least one year.



Personal Protective Equipment

What (PPE) is applicable?

- Hardhat or Helmet
- Gloves
- Eye protection
- Harness for fall protection or extraction
- Hearing protection
- Arc flash
- Steam/Burn protection
- Respirators
- Supplied Air



Closing vs. Suspending the permit

- In 1910.146 the permit must be closed at the end of a shift and a new permit issued for the next entry.



- In 1926.1200 a permit can be issued for the duration of the work and suspended between entries.
 - The space must be fully reassessed prior to the next entry.

Entry procedures

- Ventilation
 - Continuous?
- Communication
 - Methods, equipment?
- Air Monitoring
 - Continuous or periodic?
 - Where?
- Emergency Procedures
 - Who does what?



Rescue & emergency services

Procedures must be implemented for summoning rescue and emergency services, for rescuing entrants from permit spaces.
Unauthorized personnel must be prevented from attempting a rescue

An employer who designates rescue and emergency services **must evaluate** the rescue team or service relative to:

- The capability to reach the victim(s) **within a time frame that is appropriate** for the hazard(s).
- That **they are equipped for**, and proficient in, performing the needed rescue services;
- **Agrees to notify** the employer immediately in the event that the rescue service becomes unavailable.
- Rescue services are required to practice rescues at least once **every 12 months**

What is a 'timely manner'

In **API v. OSHA**:

In this settlement with the American Petroleum Institute, OSHA explains that "timely" must be determined by the employers "reasonable judgment" relating to the potential hazards the worker could be exposed to.

Self rescue & non-entry rescue

Self Rescue is the ability to exit under your own power.

- How far is it to safety?
- What obstructions are in the way




Non-Entry Rescue is the ability for others to extricate a victim with entering the space.

- What equipment do you have?
- What training do you have?
- Is the victim obstructed?
- Can you provide 1st Aid?




3rd party vs 911

- **Response time:**
On site vs. On call
- **Training:** Specific Technical Rescue Training
- **Equipment:**
Highly specialized rescue equipment
 - Understanding the site and CS configuration.
 - Understanding the potential or realized hazards.



Failure

- **F**ailure to understand the environment
- **A**dditional medical issues not considered
- **I**nadequate rescue skills
- **L**ack of teamwork or training and experience
- **U**nderestimating the logistics of the incident
- **R**escue verse recovery mode not considered
- **E**quipment not mastered




Title of Presentation

Conclusion

- **What is the Confined Space Definition**
- **Preplanning is essential**
- **Rescue**

Title of Presentation

Q&A
you have Questions
We have Answers



Title of Presentation

Presenter Contact Information

- Paul Keller Jr.
• pkeller2@service-techcorp.com
• (727) 539-7000
- David Monson
• operations@ahpv.com
• 603-627-7016

Thank you for Participating!

