



Electrical Transmission & Distribution Partnership

Continuing Education Training -Confined & Enclosed Spaces

Presenter Guide

-4th Quarter 2017

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Introduction

This Confined & Enclosed spaces Refresher course is a presenter led (supervisor, safety professional) process. The presenter may choose to augment the material with videos, handouts or other media to enhance the learning experience. The presenter may want to incorporate visual aids and/or personal experience to enhance the presentation.

Using this material in combination with practical experience, good presentation skills and knowledge of adult learning techniques, the presenter has a greater opportunity to deliver the information.

Edgar Dale stated that 2 weeks after a learning event, adult learners remember:

- ✓ 10% of what they read
- ✓ 20% of what they hear
- ✓ 30% of what they see
- ✓ 50% of what they see and hear
- ✓ 70% of what they say
- ✓ 90% of what they say while performing a task

Microsoft® PowerPoint® combined with good instructional skills and instructor/student dialogue work strongly in the fifty to seventy percent range. PowerPoint® presents the information to the attendee and the instructor summarizes the content of the slides. It is critical to engage and involve the attendee in the process. Ask open-ended questions that will elicit conversation and discussion, but be cautious to maintain control of the discussion.

Conversation and scenarios are good, but can cause the discussion to run long. If it seems like the group is losing focus during the course, the presenter can direct the group back on track by using comments like “Good discussion, but let’s get back to the subject at hand”.

Another tool is the “Parking Lot” which is simply a newsprint chart or dry erase board or note pad where the presenter records questions/discussion points not answered or addressed during the meeting and that may require more research. It is vital to capture any ongoing discussions or questions on the “Parking Lot” and once known, provide follow-up information.

Deliver this module during the fourth quarter of 2017. Delivery time is approximately 1 hour, in one setting or divided-up into three, 15 to twenty minute settings. The presenter may deliver the topic in a formalized meeting room setting using the PowerPoint slide deck or by using the three, key point sheets (located at the end of each session) as in a tailgate safety talk. Additionally the presenter may use the OSHA Quick Card handout located at the end of the presenter guide. It is critical that the presenter makes him or herself familiar with the material prior to delivery.

Present this module with the Human Performance module or separately.

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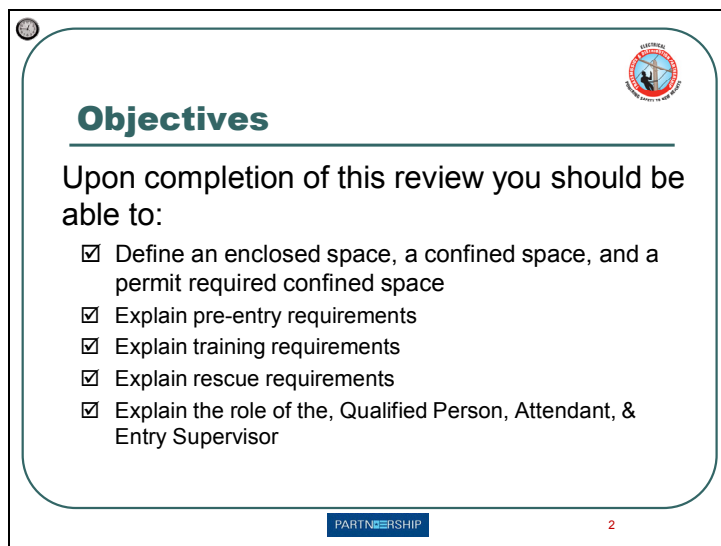
Begin session one

Slide 1-1



Introduce the topic. Explain that in this continuing education topic will discuss the differences and similarities of confined spaces, permit required confined spaces, and enclosed spaces.

Slide 1-2



Explain that at the conclusion of this module, the attendee should be able to describe the differences between an enclosed and permit required space and state the requirements for atmospheric testing. Additionally, the attendee should know the responsibilities for an attendant in enclosed and permit required spaces and the various requirements for emergency response.

Definitions

- A confined space:
 - Large enough and configured that you can bodily enter and perform assigned work
 - Limited or restricted means for entry and exit
 - Not designed for continuous employee occupancy

A photograph showing a worker in a blue jumpsuit and white hard hat inside a confined space, possibly a manhole or tunnel. The worker is using a tool, and a yellow ladder and an orange cone are visible outside the opening.

PARTNERSHIP

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Explain that a confined space is one that is large enough and so configured that you can bodily enter and perform assigned work. The space has limited or restricted means of entry and exit and the space and not designed for continuous employee occupancy.

Definitions

- A non-permit required space is a confined space that:
 - Does not or have the potential to contain any hazard capable of causing death or serious physical harm

A photograph showing two workers in an industrial environment. They are wearing hard hats and high-visibility safety vests. They are standing next to a large, dark, rectangular structure that appears to be a confined space, possibly a tank or a large container. The workers are looking at something on the structure. The background shows other industrial equipment and pipes.

PARTNERSHIP

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Explain that a non-permit confined space is a space, which by configuration, meets the definition of a confined space but which after evaluation is unlikely to have potential hazards, or has the hazards eliminated by engineering controls.



Definitions

- A permit required 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



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Explain that a permit-required confined space is a confined space, which shows after evaluation contains actual or potential hazards. Because of the hazards, the confined space requires written authorization for entry. Some of the hazards may be material that has the potential for engulfing an entrant, has an internal configuration such that can trap or asphyxiate an entrant due to inwardly converging walls or by a floor, which slopes downward and tapers to a smaller cross-section, or contains other recognized serious safety or health hazards.



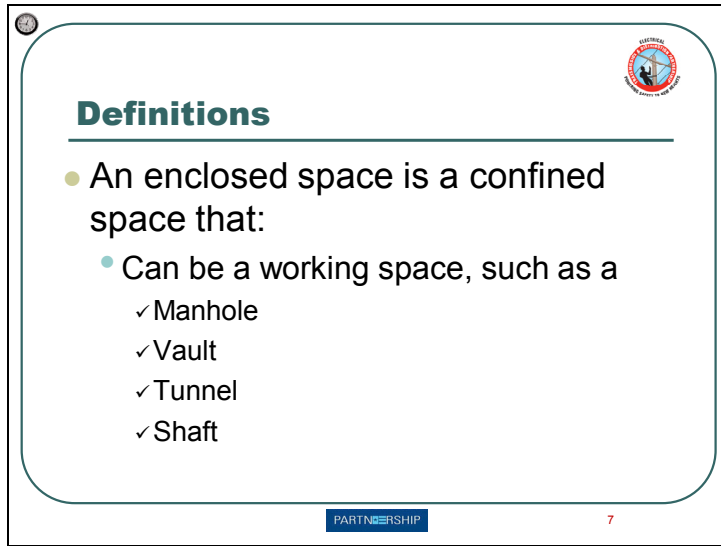
Permit Space (Continued)

- Has an internal configuration such that an entrant could become trapped or asphyxiated
 - By inwardly conveying walls or by a floor which slopes downward and tapers to a smaller cross-section
- Contains any other recognized serious safety or health hazard



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Explain that a in addition, a permit-required confined space is a confined space has the potential for engulfing an entrant, has an internal configuration such that an entrant could become trapped or asphyxiated by inwardly converging walls or by a floor, which slopes downward and tapers to a smaller cross-section, or contains other recognized serious safety or health hazards.



Slide 1-7: Definitions

Definitions

- An enclosed space is a confined space that:
 - Can be a working space, such as a
 - ✓ Manhole
 - ✓ Vault
 - ✓ Tunnel
 - ✓ Shaft

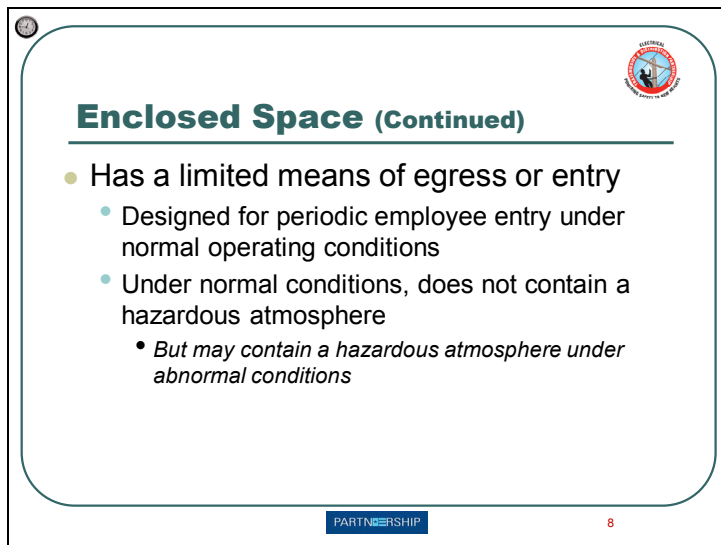
PARTNERSHIP 7

29 CFR §1926.968

Qualified Employee (qualified person)

An employee (person) knowledgeable in the construction and operation of the electric power generation, transmission, and distribution equipment involved, along with the associated hazards.

Explain that an enclosed space is a space that does not contain any atmospheric hazards. The only hazard present is electrical and a “qualified person” will only enter the space. The person must be electrically qualified per 1910 and 1926.



Slide 1-8: Enclosed Space (Continued)

Enclosed Space (Continued)

- Has a limited means of egress or entry
 - Designed for periodic employee entry under normal operating conditions
 - Under normal conditions, does not contain a hazardous atmosphere
 - *But may contain a hazardous atmosphere under abnormal conditions*

PARTNERSHIP 8

The same space entered by an unqualified person would need to do so under the permit-required system. Entry requirements are identical to that of a non-permit space with the following additions. Retrieval equipment will be available and an attendant will be present. The attendant is similar to an attendant under the permit system; however, this person can have other duties and may enter the space to perform routine functions.

Hazardous Atmosphere

- An atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue
 - ✓ Flammable Gas
 - ✓ Airborne Dust
 - ✓ Obscured vision
 - ✓ Toxic substance
 - ✓ IDLH

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Explain that this definition comes from the 1926.968 standard. A hazardous atmosphere may expose employees to the risk of death, incapacitation, and impairment of ability to self-rescue (that is, escape unaided from an enclosed space), injury, or acute illness from one or more of the following causes:

1. Flammable gas, vapor, or mist in excess of 10 percent of its lower flammable limit (LFL)
2. Airborne combustible dust at a concentration that meets or exceeds its LFL

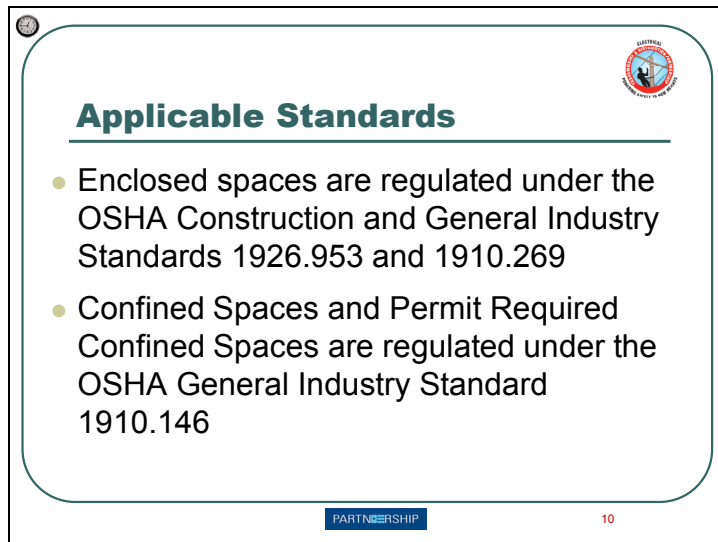
Note to the definition of "hazardous atmosphere": This concentration may be approximated as a condition in which the dust obscures vision at a distance of 1.52 meters (5 feet) or less.

3. Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent;
4. Atmospheric concentration of any substance for which a dose or a permissible exposure limit is published in Subpart D, Occupational Health and Environmental Controls, or in Subpart Z, Toxic and Hazardous Substances, of this part and which could result in employee exposure in excess of its dose or permissible exposure limit;

Note to the definition of "hazardous atmosphere" (4): An atmospheric concentration of any substance that is not capable of causing death, incapacitation, impairment of ability to self-rescue, injury, or acute illness due to its health effects is not covered by this provision.

5. Any other atmospheric condition that is immediately dangerous to life or health.

Note to the definition of "hazardous atmosphere": For air contaminants for which the Occupational Safety and Health Administration has not determined a dose or permissible exposure limit, other sources of information, such as Safety Data Sheets (SDS) that comply with the Hazard Communication Standard, §1926.59, published information, and internal documents can provide guidance in establishing acceptable atmospheric conditions.



The slide is titled "Applicable Standards" in a bold, dark blue font. It contains two bullet points: "Enclosed spaces are regulated under the OSHA Construction and General Industry Standards 1926.953 and 1910.269" and "Confined Spaces and Permit Required Confined Spaces are regulated under the OSHA General Industry Standard 1910.146". The slide features a blue "PARTNERSHIP" logo at the bottom left and a red "10" at the bottom right. There are also small circular logos in the top left and top right corners.

Applicable Standards

- Enclosed spaces are regulated under the OSHA Construction and General Industry Standards 1926.953 and 1910.269
- Confined Spaces and Permit Required Confined Spaces are regulated under the OSHA General Industry Standard 1910.146

PARTNERSHIP 10

Explain that in regards to enclosed spaces, the governing OSHA standard will depend on the type of work being performed. For example, construction work is regulated under the 1926 standard whereas maintenance work is governed by the 1910 standard. Confined spaces and permit required confined spaces are regulated under the general industry 1910.146 standard.

End session one

Key points-Session one

The presenter should have touched on the following items when discussing section one:

1. What is a confined space?
 - a. A space with limited means of access/egress, it can be physically entered, and is not designed for continuous occupancy
2. What is permit required confined space?
 - a. Explain that a permit-required confined space is a confined space, which after evaluation, is found to contain actual or potential hazards.
3. What is an enclosed space?
 - a. Explain that an enclosed space is a space that does not contain any atmospheric hazards. The only hazard present is electrical and the space will only be entered by a "qualified person".
4. What constitutes "oxygen rich" and "oxygen deficient?"
 - a. Rich is greater than 23.5% and deficient is less than 19.5%

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Begin section two

Slide 2-1



Similarity

- Pre-Job Briefing
- Discussion Topics
 - Space type
 - Hazards
 - Testing
 - Cover removal
 - Fall protection
 - Rescue
 - Emergency response



PARTNERSHIP

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Explain that the determination called for may consist of a check of the conditions that might foreseeably be in the enclosed space. For example, the cover could be checked to see if it is hot and, if it is fastened in place, could be loosened gradually to release any residual pressure. An evaluation also needs to be made of whether conditions at the site could cause a hazardous atmosphere, such as an oxygen-deficient or flammable atmosphere, to develop within the space.

Explain that another similarity between the two types of spaces is that before entering either space the person in charge must conduct a pre-job briefing. The subject matter may differ but the requirements are similar. Explain that if, after the employer takes the precautions given in §1910.269(e) or §1926.965(a), (depending on whether the work is construction or maintenance), the hazards remaining in the enclosed space endanger the life of an entrant or could interfere with an entrant's escape from the space, then entry into the enclosed space shall meet the permit-space entry requirements of paragraphs (d) through (k) of §1910.146.

Slide 2-2



Similarity

- All employees required to enter or serve as an attendant
 - Hazards of entry
 - Entry Procedures
 - Rescue Procedures

Training

developing the skills, experience, and knowledge employees need to perform safely, improve their performance, and acquire specific skills, and abilities, specific



PARTNERSHIP

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Explain that training is required for both enclosed space and permit-required confined space. Explain they are very similar but there are some distinct differences. The enclosed space requirement is straightforward and simple where the permit-required confined space is more precise and defined.

Slide 2-3



Explain that the following section discusses permit required confined spaces.

Slide 2-4



Explain that confined space entry procedures should take all of the following into consideration:

- ✓ A permit may or may not be needed.
- ✓ The company confined space checklist must be completed for all entries.
- ✓ Testing is required on all confined space entries.
- ✓ Ventilation is required on all confined space entries.
- ✓ Rescue equipment may need to be readily available depending on the type of entry.
- ✓ Fire protection equipment may be needed depending upon the task involved.
- ✓ An attendant may need to be present.
- ✓ In all cases and emergency plan shall be discussed with all crewmembers.



Employer Responsibilities

- The employer shall verify that the space is safe for entry and that the pre-entry measures have been taken
 - Through a written certification that contains the:
 - ✓ Date
 - ✓ Location of the space
 - ✓ Signature of the person providing the certification.
 - ✓ The certification shall be made before entry
 - ✓ Shall be made available to each employee entering the space or to that employee's authorized representative



PARTNERSHIP

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Explain the responsibility of the employer in regards to entry into the space.



Entry Supervisor

- Responsible for determining if acceptable entry conditions are present when entry is planned
- Verifies rescue is available
- Authorizes entry & removes unauthorized individuals
- Overseeing entry operations and terminating entry as required





PARTNERSHIP

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Explain that the employer shall ensure that each entry supervisor:

- ✓ Knows the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure
- ✓ Verifies, by checking that the appropriate entries have been made on the permit, that all tests specified by the permit have been conducted and that all procedures and equipment specified by the permit are in place before endorsing the permit and allowing entry to begin
- ✓ Terminates the entry and cancels the permit as required by the OSHA standards

- ✓ Verifies that rescue services are available and that the means for summoning them are operable
- ✓ Removes unauthorized individuals who enter or who attempt to enter the permit space during entry operations
- ✓ Determines, whenever responsibility for a permit space entry operation is transferred and at intervals dictated by the hazards and operations performed within the space that entry operations remain consistent with terms of the entry permit and that acceptable entry conditions are maintained.

Slide 2-7




Testing

- If space fails
 - Report to Entry Supervisor
 - Post appropriate warning
 - Ventilate if appropriate
- If space fails while occupied, immediately remove entrants




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Explain that employees cannot enter, or be in a space that contains a hazardous atmosphere. There may be no hazardous atmosphere within the space whenever any employee is inside the space.

Slide 2-8




Hazards

- Oxygen Deficient
 - Less than 19.5%
- Oxygen Enriched
 - Greater than 23.5%
- Flammability
 - Upper Flammable Limit
- Toxic Contaminants
 - Hydrogen Sulfide, Carbon Monoxide
- Physical Hazards
 - Cave-in, Falls, Electrical




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Explain and review the hazards that may be encountered.



Ventilation

- When sufficient ventilation cannot be obtained without blocking the means of egress
 - Employees inside are protected by air line respirators



PARTNERSHIP 19

Explain that during welding, cutting, or heating operations, ventilation shall be available. When sufficient ventilation cannot be obtained without blocking the means of egress, employees must be supplied with airline respirators and 5-minute escape bottles. The attendant shall maintain communication with entrants.



Lighting

- Lighting equipment must enable employees to see well enough to work safely and to exit the space quickly in an emergency
- Meets requirements for hazardous atmospheres where necessary
- 12 volt in wet and/or other conductive locations, or GFCI



PARTNERSHIP 20

Explain that if natural light is not sufficient, lighting shall be provided. Lighting must meet requirements for hazardous atmospheres when necessary. In wet and/or other conductive locations, low voltage lighting and/or the use of GFCI is required.

End session two

Key points-Session two

The presenter should have touched on the following items when discussing section one:

1. What are the required parts of a permit required confined space entry program?
 - a. Permit process
 - b. Testing
 - c. Ventilation
 - d. Equipment
 - e. Fire
 - f. Attendant
 - g. Emergency plan
2. What are some roles of the entry supervisor?
 - a. Responsible for determining if acceptable entry conditions are present when entry is planned
 - b. Verifies rescue is available
 - c. Authorizes entry & removes unauthorized individuals
 - d. Overseeing entry operations and terminating entry as required
3. Other than oxygen deficiency or enrichment, what other hazards may be in a permit required confined space?
 - a. Flammability
 - b. Toxic contaminants
 - c. Physical hazards
4. When may "Air Line" respirators be required?
 - a. When sufficient ventilation cannot be obtained without blocking the means of egress
5. Lighting equipment must enable employees to:
 - a. See well enough to work safely and to exit the space quickly in an emergency

Begin session three

Slide 3-1



Welding & Cutting

- Do not take cylinders containing oxygen, acetylene, or other fuel gas into confined spaces
- Remove hoses immediately when disconnected
- Positively shut off gas supply if the torch is not in use or left unattended
- Remove torch and hose from the space
 - ✓ Shift Change
 - ✓ Overnight



PARTNERSHIP 21

Explain that local exhaust ventilation shall be used to remove welding fumes once the tank or carrier is completed to the point that workers may enter and exit only through a manhole. Welding gas tanks may never be brought into a tank or carrier that is a permit entry confined space.

Slide 3-2



Flammable Liquids

- Stored in approved container
- Quantity necessary for single shift
- Properly rated fire extinguisher immediately available
- Post a fire watch after welding, burning, heating
- No smoking is permitted in space





PARTNERSHIP 22

Explain that when using flammable liquids they shall be stored in approved containers and/or dispensers. Never take more than what you intend to use into the space. Properly rated fire extinguishers shall be immediately available. A fire watch shall be posted after all welding, burning, and heating operations. The entry supervisor will determine the amount of time necessary. Smoking is prohibited in confined spaces and around flammables.



Attendant

- Is Trained in and Knows:
 - ✓ The hazards that may be faced during entry
 - ✓ Signs and symptoms of overexposure
 - ✓ Procedures for summoning rescue or other emergency services
 - ✓ Proper use of equipment used for communication, if necessary
 - ✓ Performance of non-entry rescue
- Maintain an accurate count of entrants
- Remain outside of the PRCS unless relieved of attendant duties
- Monitors activities inside space
- Performs **NO OTHER** duties that may interfere with attendant duties

PARTNERSHIP 23

Explain that the employer shall ensure that each attendant knows the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure. They must be aware of possible behavioral effects of hazard exposure in authorized entrants and continuously maintains an accurate count of authorized entrants in the permit space. They must ensure that the means used to identify authorized entrants identifies who is in the permit space, and remains outside the permit space during entry operations until relieved by another attendant.

NOTE: When the employer's permit entry program allows attendant entry for rescue, attendants may enter a permit space to attempt a rescue if they have been trained and equipped for rescue operations and if they have been relieved by a qualified attendant

They must communicate with authorized entrants as necessary to monitor entrant status and to alert entrants of the need to evacuate the space. They must monitor activities inside and outside the space to determine if it is safe for entrants to remain in the space and orders the authorized entrants to evacuate the permit space immediately under any of the following conditions:

- ✓ If the attendant detects a prohibited condition;
- ✓ If the attendant detects the behavioral effects of hazard exposure in an authorized entrant;
- ✓ If the attendant detects a situation outside the space that could endanger the authorized entrants; or
- ✓ If the attendant cannot effectively and safely perform all their duties
- ✓ Summon rescue and other emergency services as soon as the attendant determines that authorized entrants may need assistance to escape from permit space hazards

Take the following actions when unauthorized persons approach or enter a permit space while entry is underway:

- ✓ Warn the unauthorized persons that they must stay away from the permit space
- ✓ Advise the unauthorized persons that they must exit immediately if they have entered the permit space
- ✓ Inform the authorized entrants and the entry supervisor if unauthorized persons have entered the permit space
- ✓ Performs non-entry rescues as specified by the employer's rescue procedure
- ✓ Performs no duties that might interfere with the attendant's primary duty to monitor and protect the authorized entrants.

Slide 3-4



Emergency Plan

- Emergency plan will specify:
 - Who to notify
 - How to summon other assistance
 - The emergency equipment on hand
 - Procedure for extraction without the attendant(s) entering space
 - First aid and CPR

PARTNERSHIP

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Explain that an emergency action plan is necessary for confined space work. They should be available for all job sites. The plan should cover who is to be notified in the event of an emergency, how will emergency services be summoned, what emergency equipment is on hand, how non-entry rescue will be performed, and who is trained in first aid/CPR.

Slide 3-5



This section covers enclosed spaces that may be entered by employees. It does not apply to vented vaults if the employer makes a determination that the ventilation system is operating to protect employees before they enter the space. This section applies to routine entry into enclosed spaces.

Slide 3-6

Employer Responsibilities

- The employer shall ensure the use of safe work practices for entry into, and work in, enclosed spaces
- And for rescue of employees from such spaces

PARTNERSHIP

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Before any entrance cover to an enclosed space is removed, the employer shall determine whether it is safe to do so by checking for the presence of any atmospheric pressure or temperature differences and by evaluating whether there might be a hazardous atmosphere in the space. Any conditions making it unsafe to remove the cover shall be eliminated before the cover is removed.

Explain the responsibility of the employer in regards to entry into the space. The employer shall ensure the use of safe work practices for entry into, and work in, enclosed spaces and for rescue of employees from such spaces. Employers shall provide equipment to ensure the prompt and safe rescue of employees from the enclosed space.



Attendant

- All employees required to enter or serve as an attendant
 - Hazards of enclosed space entry
 - Entry Procedures
 - Rescue Procedures

Training

developing the skills, experience, and knowledge employees need to perform tasks, improve their performance, and acquire the skills, and abilities, specific to the job.





PARTNERSHIP 27

Explain that each employee who enters an enclosed space or who serves as an attendant shall be trained in the hazards of enclosed-space entry, in enclosed-space entry procedures, and in enclosed-space rescue procedures.



Enclosed Space Testing

- Before entry
- Periodic sampling during work
- Test after breaks and when conditions change
- Continuously monitor for oxygen deficiency during welding or cutting





PARTNERSHIP 28

Explain that before a worker enters an enclosed space, the atmosphere in the enclosed space shall be tested for oxygen deficiency with a direct-reading meter or similar instrument, capable of collection and immediate analysis of data samples without the need for offsite evaluation.



Open Flames

- If open flames are used in enclosed spaces
 - A test for flammable gases and vapors shall be made immediately before the open flame device is used
 - At least once per hour while the device is used in the space





Partnership

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Explain that if open flames are used in enclosed spaces, a test for flammable gases and vapors shall be made immediately before the open flame device is used and at least once per hour while the device is used in the space. Testing shall be conducted more frequently if conditions present in the enclosed space indicate that once per hour is insufficient to detect hazardous accumulations of flammable gases or vapors.



Enclosed Space Ventilation

- If continuous forced-air ventilation is used
 - Shall begin before entry is made
 - Maintained long enough that a safe atmosphere exists before employees are allowed to enter
- The forced-air ventilation shall be so directed
 - Ventilate the immediate area where employees are present within the enclosed space
 - Continue until all employees leave the enclosed space



Partnership

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The forced-air ventilation shall be so directed as to ventilate the immediate area where employees are present within the enclosed space and shall continue until all employees leave the enclosed space.

The air supply for the continuous forced-air ventilation shall be from a clean source and may not increase the hazards in the enclosed space.

If continuous forced-air ventilation is used, it shall begin before entry is made and shall be maintained long enough for the employer to be able to demonstrate that a safe atmosphere exists before employees are allowed to enter the work area.



Review

1. What similar features do enclosed space and a confined space share?
2. Name some of the physical hazards one may encounter in a confined or enclosed space.
3. Flammable liquids must be stored in an _____.
4. Prior to removing a manhole cover one must check to see if the cover is _____.
5. The employer must verify that, prior to entering a confined/enclosed space that _____ is available.

PARTNERSHIP31

1. Limited means of access/egress, May be entered, Not designed for continuous occupancy
2. Cave-in, Falls, Electrical, Entrapment
3. Approved Containers
4. Hot
5. Rescue

End session three

Key points-Session three

The presenter should have touched on the following items when discussing section one:

1. When may welding gas tanks be brought into a tank or carrier that is a permit entry confined space?
 - a. Never
2. What amounts of flammable liquids are allowed in a confined space and in what must they be stored?
 - a. Never take more than what you intend to use into the space.
 - b. An approved container
3. When is smoking allowed in confined space and around flammables?
 - a. Never
4. What are the training requirements for an attendant?
 - a. Hazards of enclosed-space entry
 - b. Enclosed-space entry procedures
 - c. Enclosed-space rescue procedures
5. When must the atmosphere in a confined space be tested?
 - a. Before entry
 - b. Periodic sampling during work
 - c. Test after breaks and when conditions change
 - d. Continuously monitor for oxygen deficiency during welding or cutting