

Instructions

To complete this independent study program, view the entire program, advancing through each slide by pressing the “enter” key.

While viewing the slides, complete the accompanying Independent Study Test.

If needed, you can move backwards through slides by pressing the “backspace” key.

Start the program by pressing “enter”.

CONFINED SPACE AWARENESS



Newburgh Fire Department

Confined Space

Confined spaces can be found in many industrial facilities, agricultural facilities, municipal utility systems and construction sites.

OSHA Regulations

Confined space operations are regulated by
OSHA 1910.146.

- Requires employers to provide for Confined Space Rescue in their Confined Space Action Plan.
- Provides two options for Rescue Services:
1) On-site personnel, or 2) Off-site rescue services.

OSHA Regulations

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- Requires employers whose personnel may be called upon to respond to emergencies involving Confined Spaces to be trained to the Awareness Level at initial assignment of duties and each year thereafter.

OSHA Regulations

Confined space operations are regulated by
OSHA 1910.146.

- When engaging in confined space operations, employers shall ensure that at least one standby person at the site is trained and immediately available to perform rescue and emergency services.
- “At the site” and “immediately available” is defined as able to respond to the incident location within 4-6 minutes of notification.

Confined Space

A Confined Space is a space that ...

- Is large enough and so configured that an employee can bodily enter the space and perform work; and
- Has limited or restricted means of entry/exit; and
- Is not designed for continuous employee occupancy

Confined Spaces

- Tanks
- Pipelines
- Wells
- Sewers
- Hoppers
- Vaults
- Boilers
- Storage Tanks
- Pits
- Tank Cars
- Vessels
- Silos
- Bins
- Manholes

Confined Space Hazards



Confined Space Hazards

- Atmospheric Hazards
- Physical Hazards

Atmospheric Hazards

Four Major Atmospheric Hazards (IDLH) associated with Confined Spaces ...

- Oxygen Deficiency
- Oxygen Displacement
- Combustibility / Flammability
- Toxicity

Oxygen Deficiency

- Where the consumption of oxygen takes place during open flame operations such as cutting and welding.
- Can also be present in manholes near garbage dumps, landfills and swampy areas where fermentation has caused consumption of oxygen.

Oxygen Displacement

- Some gases will “push” or displace oxygen from a confined space.
- Nitrogen is often used to purge tanks. Entering the tank before the nitrogen is removed and properly vented can prove fatal in minutes.
- Normal oxygen percentage is 20.9%. Considered oxygen deficient below 19.5%.

Flammable Atmospheres

- Some confined spaces contain solvents, fuel oil, gasoline, kerosene, etc.. which provides fuel for combustion.
- For an atmosphere to become flammable, there must be fuel, oxygen and an ignition source present.
 - Fire Triangle
 - Fire Tetrahedron

Flammable Atmospheres

- Concentrations of gas below the lower explosive limit (LEL) are “too lean” to burn.

DANGER RANGE!

- Concentrations of gas above the upper explosive limit (UEL) are “too rich” to burn.

Toxicity

- Toxic gases can accumulate from:
 - Chemicals used in production process
 - Biological or chemical breakdown of product
 - Maintenance activities (welding)
 - Decomposition

Common Toxic Gases

- Hydrogen Sulfide:
- “Sewer Gas”, colorless, with rotten egg odor
- Causes loss of smell with exposure
- Inhibits exchange of oxygen at cellular level
- Chemical asphyxiant
- Heavier than air, vapor density above 1.0
- Flammable in concentrations of 4.3% 45%

Common Toxic Gases

- Carbon Monoxide:
- Colorless, odorless gas
- Formed by incomplete combustion
- Inhibits bodies ability to transport oxygen
- Combines with blood cells more easily than oxygen, eventually displacing oxygen

Common Toxic Gases

- Methane Gas:
- Odorless gas
- Generated by organic decomposition or natural gas leaks
- Simple asphyxiant, displaces/dilutes oxygen
- Thinner than air, vapor density below 1.0
- Flammable at concentrations of 5% - 10%

Common Toxic Gases

- Solvents:
 - Many produce flammable vapors
 - Many can cause central nervous system damage if inhaled in sufficient quantities
 - Inhalation can cause dizziness, drowsiness, loss of concentration and eventually death

Physical Hazards

- Physical hazards can be considered as hazards that cause the body to become stressed. Unlike atmospheric hazards, physical hazards can be detected through the senses (sight, touch).

Engulfment

- Engulfment and suffocation are a hazard with a loose material stored in a bin or container. Bridging can occur and cause a sudden collapse of material that can engulf workers and rescuers.

Other Hazards

- Other hazards that must be considered are:
 - Moving and/or rotating equipment
 - Electrical energy
 - Hot / Cold conditions
 - Wet / Slick surfaces
 - Excessive noise

Recognizing Confined Spaces



Recognizing Confined Spaces

- In order for a work area to be considered a Confined Space, it *must meet all three* of the following criteria:

- Contain limited openings for entry/exit

- Not intended for continuous human occupancy

- Space is large enough to enter and work inside the space

Limited Entry/Exit Openings

- Confined spaces generally are difficult to enter into and work in. In the event of an emergency, rescue of an incapacitated victim becomes even more challenging.
- Even if there are more than one means of entry or egress, their physical configuration may make the space a “Confined Space”.

Not For Human Occupancy

- Simply put, the space was created or designed to hold something other than human beings.

Large Enough to Work Inside

- If you cannot fit your body inside the space, you cannot become trapped or incapacitated within the space.

Recognizing Confined Spaces

- According to OSHA, if a space does not meet all three of these criteria, then it is not a confined space.

Types of Confined Spaces

Types of Confined Spaces

- Permit Confined Spaces
- Non - Permit Confined Spaces

Permit Confined Spaces

- Permit Confined Spaces are the most dangerous and require those entering to complete a safety checklist, or Permit, prior to entering the space.

Permits

- A Permit is a written safety checklist that is completed before you can enter into the confined space.
- A Permit ensures that all the hazards are removed from the confined space before you enter.

Permits

- Confined Space permits review the following:
 - Purpose of entry
 - Time spent inside confined space
 - Qualified entry team and attendants
 - Atmospheric conditions inside
 - Communications, Safety equipment used
 - Eliminated hazards (LOTO, ventilation)

Permits

- The Permit should be kept outside the confined space with the attendant or a supervisor.
- Once the work is completed, the Permit is cancelled and filed properly.

Permit Required Confined Spaces

- A Permit Required Confined Space is a space that has *one or more* of the following characteristics:

Permit Required Confined Spaces

- Contains, or could contain, a hazardous atmosphere.
- Contains a material that could engulf the person entering the space.
- Has an inwardly converging wall or floor that slopes downward and tapers to a small cross section.
- Contains any other recognized serious safety hazard.

Permit Required Examples

- Gasoline / Oil / Solvent tanks
- Sewers and Manholes
- Grain Bins
- Hoppers

Non - Permit Confined Spaces

- Non - Permit Confined Spaces are the least dangerous and do not require those entering to complete a safety checklist, or Permit, prior to entering the space.

Non - Permit Confined Spaces

- A Non - Permit Confined Space does not (or could not) contain hazards that could cause death or serious harm.

Non - Permit Examples

- Equipment Closets
- Crawl spaces under homes
- Machinery Cabinets
- Ventilated Tunnels
- Drop Ceiling Cavity Spaces

Emergency Rescue Procedures

- Confined space accidents are rare, but are usually fatal when they occur. Two major factors lead to fatalities:

1. Failure to recognize and control the hazards associated with the confined space.
2. Inadequate or incorrect emergency response or rescue attempt.

Emergency Rescue Procedures

- NEVER ENTER A CONFINED SPACE TO RESCUE SOMEONE WITHOUT PROPER EQUIPMENT AND ACTION PLAN.
- Spontaneous rescue attempts in the heat of the moment usually lead to multiple fatalities.

Emergency Rescue Procedures

- Newburgh Fire Department personnel are trained to the Confined Space Awareness Level ONLY.
- NVFD does not possess the proper training or safety equipment to perform Confined Space Rescues.

Emergency Rescue Procedures

- Newburgh Fire Department Standard Operating Procedures require the assistance of a formal Confined Space Rescue Team at emergency responses where a Permit or Non-Permit Confined Space is present or suspected.

Safety Equipment

- Incident Command System
- Safety Officer
- Standard Operating Procedures
- Toxic / Combustible Gas Detector
- Self – Contained Breathing Apparatus

Summary

Confined Space

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- Has limited or restricted means of entry/exit; and
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Confined Space Hazards

- Atmospheric Hazards:

Oxygen Deficiency, Oxygen Displacement, Flammability, Toxicity

Physical Hazards:

Engulfment, Moving Equipment, Electrical Energy, Temperatures, Slick Surfaces, Noise

Recognizing Confined Spaces

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- Contain limited openings for entry/exit

- Not intended for continuous human occupancy

- Space is large enough to enter and work inside the space

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Emergency Rescue Procedures

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Instructions

Answer the test questions and place completed test in Nick Donnan's (1106) box. A passing grade of 70% is required to get credit for this Mandatory Training.

A failure in submitting completed materials will result in not receiving credit for the Mandatory Training.