

**Training and Education Material**  
**FY 2019**

**Confined Space Entry Curriculum**

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## INTRODUCTION TO CURRICULUM

### General materials

- Nametags for each student (optional)
- Paper and pens for each participant
- Laptop with compatible projector, speaker and screen
- Session 1 PowerPoint files and site-specific photos for hazard recognition
- Copies of handouts for each classroom activities
- Equipment: Gas meter, tripod system, fall harness and ventilation unit

# Confined Space Entry Training

## UNIT 1 – TRAINING INTRODUCTION

### Purpose

- Establish goals and methods of training
- Class understanding of OSHA and AKOSH standards
- Class understanding of the key elements of the confined space entry program

### Resources

**Time:** 30 minutes

**Materials:** Session, projector, computer, speaker, PPP, paper and pencils

**Hand-outs:** course outline and OSHA Susan Harwood sign-in sheet

## DETAILED FACILITATOR NOTES

### Activity 1:

Introduction of training

- **Distribute agenda (1 minute)**
  - Explain to the class the schedule for the day to include subject materials to be covered.
- **Introduce training staff and facilitator (2 minutes)**
  - Introduce yourself and give your background, experience and how long you have been working with your company. Introduce other facilitators that may be present or allow them to introduce themselves.
- **Introduce trainees (20 minutes)**
  - Have each trainee introduce themselves-who they work for and how long they have been employed and their favorite hobby. Allow as much time as the trainees need to introduce themselves.
- **OSHA Susan Harwood Sign-in sheets (1 minute)**
  - Explain to the class that sign-in sheets should be filled out legibly with name, position/job title, employer/school, years of experience and contact information to include email and/or phone number.
- **Introduce OSHA Susan Harwood Disclaimer (slide 2) (1 minute)**
  - Explain to the class about OSHA's disclaimer.
- **Classroom participation and breaks. (slide 3, 4) (2 minutes)**
  - Explain to the class the schedule for the day to include subject materials to be covered.

- **Discuss course evaluation. (slide 5) (1 minutes)**
  - Explain to the class by the end of the day, trainees will be asked to participate in course evaluation. The purpose of the evaluation is to gather feedback from the class to improve the training.

#### **Activity 2**

- **Briefly summarize confined space standards. (slide 8) (1 minute)**
  - Explain to the class that regulations are just the starting point to understanding what is required to work safely in confined spaces. Using safe work practices reduces the chance of serious injury when working in confined spaces.
- **Key elements of a confined space entry program. (slide 9) (1 minute)**
  - Explain to the class the key elements of a confined space program included identify confined space and hazard identification, hazard control, permit system, specialized equipment, designations of employees, testing and monitoring, emergency response, training and program review

# Confined Space Entry Training

## UNIT 2 –OSHA Confined Space and Permit-Required Confined Space Characteristics

### Purpose

- Class understanding of confined space characteristics

### Resources

**Time:** 20 minutes

**Materials:** projector, speaker, computer, PPP, paper and pencils

**Hand-outs:** None

### DETAILED FACILITATOR NOTES

#### Activity 3:

Introduction to confined space characteristics

- **Discuss OSHA Confined space characteristics. (slide 10) (5 minute)**
  - Ask the class what characteristics they think make a space classified as a confined space. Explain to the class that confined spaces must have THREE characteristics 1) are large enough to enter and 2) has limited or restricted means for entry or exit and are 3) not designed for continuous occupancy (explain what this means: permanent egress/entry, lighting, ventilation and adequate work space). Remember this concept to design out confined space characteristics, can you design a lift station so that it is not a confined space?
  - Stress the importance that because confined spaces are enclosed though not always entirely, can cause serious injuries from hazardous conditions or substances within the space.
- **Discuss OSHA permit required confined space characteristics. (slide 11) (5 minute)**
  - Explain to the class that a permit required confined space not only includes the characteristics previously mentioned, but also includes hazardous atmospheres that displace oxygen such as hydrogen sulfide gas, carbon monoxide gas, fumes emitted from hot work, vapors emitted from paint, unguarded machinery, electrical hazards, chemical treatment processes and fires. Confined spaces also include engulfment hazard such as flooding.

#### Activity 4:

Introduction to classroom activity

- **Classroom activity (slides 12-17) (5 minutes)**
  - Slides 12-17 are warm up exercises for classroom activity for unit 3.
  - For each slide ask the class to examine each image and determine if each image has confined space characteristics
  - The purpose of this exercise is to get each trainee thinking about characteristics that make a confined space including limited entry and exit, large enough to enter, designed for continuous occupancy
  - Also begin recognizing the characteristics of permit required confined spaces including: hazardous substances, physical hazards and whether or not its labeled as confined space.

**Break (10 minutes)**

# Confined Space Entry Training

## UNIT 3 – Confined Space Hazard Identification and Controls

### Purpose

- Class understanding of how to use the hierarchy of controls
- Class understanding of identifying, assessing and controlling hazards in confined spaces.

### Resources

**Time:** 30 minutes

**Materials:** Projector, speaker, computer, PPP, paper and pencils

### DETAILED FACILITATOR NOTES

**Hand-outs:** Classroom activity 1 water storage tank, activity 2 sewage lift-station, activity 3 trenching

#### Activity 5:

Classroom activity

- **Discuss confined space physical hazards and the hierarchy of controls. (slide 18) (2 minutes)**
  - Explain to the class that when choosing the most appropriate control measure, the hierarchy of controls must be considered: eliminate the risk e.g. carry out the work from outside the *space*. substitute the risk, isolate the risk or apply engineering *controls* e.g. consider the nature of a confined space and the internal atmosphere. When we begin the classroom activities apply the hierarchy of control for each hazard you identify.
- **Introduction to classroom activity involving a water storage tank, sewage lift station and trench (25 minutes)**
  - This exercise is designed to allow critical thinking and problem solving hazards for confined spaces.
- **Classroom activity.**
  - Divide the classroom into groups of 2-3 people
  - Distribute classroom activity hand-out for each group labeled as group 1 and 2 etc.
  - Explain to the class that each group will identify and evaluate the hazards for each photo image and identify which controls need to be in place to eliminate or reduce the hazards. Allow each group 15 minutes.
  - Have each group choose a representative to present their findings before the class. Allow each representative to present their findings (13 minutes)



Group 1 presents answers for image 1 water storage tank hazards and controls. (slide 20)

Possible answers include:

Hazards	Controls
Fall from climbing ladder	Ensure 3 points of contact while climbing
Fall from opening the hatch	Stay clear of the opening unless a guard rail can be in place
Fall from water storage tank	Stay within the guard rail system
Slips trips and falls	Break up and remove ice in immediate work area
Damaged ladder	Do not climb ladder. Consider other options such as the use of a mobile lift
Fall from improper use of equipment to access ladder well	Use step ladder that is high enough to allow 3 points of contact to access ladder well.



Group 1 presents answers for image 2 water storage tank hazards and controls. (slide 21)

Possible answers include:

Hazards	Controls
Atmospheric Hazards	Ventilate and monitor with a gas meter
Equipment hazards such as struck against or crushing injuries	Ensure equipment is on level ground or secured. Wear appropriate PPE such as hard hat, safety glasses, safety toe shoes and gloves
Slips trips and falls	Ensure adequate lighting in place to illuminate all areas. Place guarding over protruding objects such as a bucket. Use good housekeeping practices.
Damaged or improper use of ladders	Replace damaged ladders. Ensure ladder has good level footing and is used following manufacturer's recommendations 4:1 ratio and 3 points of contact when climbing and descending.
Flooding or engulfment hazard	Ensure all upstream sources are locked and tagged out.





● Group 1 presents answers for image 3 water storage tank hazards and controls. (slide 22)

Possible answers include:

Hazards	Controls
Improper storage of chemicals	Store all chemicals in proper hazmat storage for safe handling and storage
Burns to the eyes, respiratory system and skin	Use appropriate PPE such as full length clothing, rubber clothes, goggles, and respirator



● Group 1 presents answers for image 4 gas powered generator hazards and controls. (slide 23)

Possible answers include:

Hazards	Controls
Slips trips and falls	Be aware of wet environments use good housekeeping practices
Electric shock	Proper use of GFCI protection
CO Poisoning	Ensure generator is positioned on the leeward side away from entrance into confined space opening
Musculoskeletal injury	Use safe ergonomics when moving or lifting equipment



**Group 1 presents answers for image 5 water gas powered pressure washer hazards and controls (slide 23)**

**Possible answers include:**

Hazards	Controls
Slips trips and falls	Use good housekeeping practices
CO Poisoning	Ensure pressure washer is positioned on the leeward side away from entrance into confined space opening
Eye or hand injuries	Wear appropriate PPE such as goggles, gloves, and safety toe shoes



**Group 1 presents answers for image 6 water storage tank electrical control panel hazards and controls. (slide 23)**

**Possible answers include:**

Hazards	Controls
Electric shock	Follow proper lock-out tag-out safety procedures. Wear appropriate PPE. Inform all work parties of lock-out tag-out procedures.



**Group 2 presents answers for image 1 sewage lift station hazards and controls. (slide 24)**

**Possible answers include:**

<b>Hazards</b>	<b>Controls</b>
Fall from climbing ladder	Ensure 3 points of contact while climbing down ladder
Fall from opening the hatch	Stay clear of the opening unless a guard rail can be in place
Atmospheric hazards	Ventilate and monitor with a gas meter
Slips trips and falls	Beware of your surrounds and avoid contact with loose wires and other materials
Damaged ladder	Do not climb down ladder unless fall protection can be used such as a harness connected to a tripod or use a different ladder.
Engulfment hazard (flooding)	Ensure all upstream valves and electrical switches are locked and tagged out. Note: Almost all lift stations cannot be valve out, hence the permit-required condition. This requires upstream monitoring, and provision of rescue (tripod/harness)
Poor lighting	Provide adequate lighting
Fire and explosion hazard.	Ventilate and monitor with a gas meter
Exposure to raw sewage	PPE, appropriate outerwear clothing, goggles, gloves



**Group 2 presents answers for image 2 sewage lift station hazards and controls. (slide 25)**

**Possible answers include:**

<b>Hazards</b>	<b>Controls</b>
Fall from ladder	Use 3 points of contact. Ensure ladder is 4:1 ratio.
Fall from fixed ladder	Use 3 points of contact
Atmospheric hazards from exposure to carbon monoxide gas	Do not introduce hazards such as propane. Ventilation and gas meter testing is required when entering a confined space.



**Group 2 presents answers for image 3 sewage lift station electrical control panel hazards and controls. (slide 26)**

**Possible answers include:**

<b>Hazards</b>	<b>Controls</b>
Electric shock	Follow proper lock-out tag-out safety procedures. Wear appropriate PPE. Inform all work parties of lock-out tag-out procedures.



**Group 2 presents answers for image 4 sewage wet-well hazards and controls. (slide 27)**

**Possible answers include:**

<b>Hazards</b>	<b>Controls</b>
Slips trips and falls	Ensure good housekeeping practices, guard all openings and secure hatch.
Equipment	Set up and inspect all equipment. Ensure tripod system is properly assembled and inspected. Ensure ventilation system is properly assembled and inspected and placed in and effective position to ventilate space.
Untrained workers	Ensure all workers are trained to recognize the characteristics and hazards of a confined space. Comply with industry safety standards and communicate hazards.



**Group 3 presents answers for image 1 excavation work hazards and controls. (slide 28)**

**Possible answers include:**

<b>Hazard</b>	<b>Controls</b>
Slips trips and falls hazard	Guardrails or fall protection
Ladder	Three points of contact
Crushing, struck against injuries	Spotter, never work under suspended loads
Atmospheric hazard	Monitor for CO and use ventilation when necessary
Heat or cold injuries	PPE
Engulfment-flooding	Dewatering pump or redirect water



**Group 3 presents answers for image 2 excavation work hazards and controls. (slide 29)**

**Possible answers include:**

<b>Hazard</b>	<b>Controls</b>
Slips trips and falls hazard	Good house-keeping practices, be aware of your surroundings
Ladder	Three points of contact
Crushing, struck against injuries	Spotter, never work under suspended loads
Atmospheric hazard	Monitor for CO and use ventilation when necessary
Heat or cold injuries	PPE
Vibration and cold injury	PPE and rotate position

# Confined Space Entry Training

## UNIT 4 –Recognizing Atmospheric Hazards

### Purpose

- Class understanding of atmospheric hazards.
- Enable trainees to properly identify, evaluate and control atmospheric hazards.

### Resources

**Time:** 27 minutes

**Materials:** Projector, computer, speaker, PPP, paper and pencils.

**Hand-outs:** Classroom activity 4 CSE Fatality

### DETAILED FACILITATOR NOTES

#### Activity 6:

Introduction to atmospheric hazards

- **Discuss immediately dangerous to life and health (IDLH) environments. (Slide 30) (1 minute)**
  - Explain to the class-that IDLH has defined by NIOSH as exposure to airborne contaminants that is likely to cause death or immediate delayed permanent adverse health effects. Examples are poisonous gases or smoke.
- **Discuss the obvious hazards (slide 31) (1 minute)**
  - It is obvious we can see the physical hazards here in this slide. There is enough there to kill several hundred people. of course unless you are a professional snake wrangler. Now let's discuss some of the hazards we cannot see or smell. In addition, atmospheric hazards are not the only hazards that we can't see or smell.
- **Discuss confined space atmospheric hazards (slide 32) (1 minute)**
  - Some of these hazards include oxygen deficiency, oxygen enrichment, fire and explosion hazards and exposure to toxic substances.
- **Discuss oxygen deficiency (slide 33) (1 minute)**
  - Oxygen deficiency poses the greatest hazard in that it affects our judgement, our senses become unreliable, its swift, irreversible and often fatal.
  - Normal air contains 20.9% oxygen. When that number fall below 20.9% the effects are impaired judgement, fatigue and disorientation and eventually unconsciousness.
- **Discuss the effects of oxygen deficiency (slide 34) (3minutes)**
  - There are other causes of oxygen displacement such as oxidation, combustion or inappropriate use of other gases or chemicals. Other causes could be the use of gases to inert a space to prevent ignition.
  - Oxygen enriched atmospheres occur when normally safe materials are saturated with oxygen causing it to become highly flammable or explosive. Or miss-use or leaking oxygen tanks can contribute to highly flammable atmospheres.
  - Other examples of atmospheric hazards are exposure to [hydrogen sulfide](#) and carbon monoxide gas which are chemical asphyxiate that interfere with the body's ability to absorb O<sub>2</sub>. For example, the hemoglobin protein found in the red blood cells are responsible for transporting oxygen throughout the body. The hemoglobin protein has an affinity to O<sub>2</sub> to make that process work. However, Hemoglobin has an even higher affinity to CO which makes it difficult to distribute O<sub>2</sub> throughout the body. People can smell the "rotten egg" odor of hydrogen sulfide at low concentrations in

air. However, with continuous low-level exposure, or at high concentrations, a person loses his/her ability to smell the gas even though it is still present (olfactory fatigue). This can happen very rapidly and at high concentrations, the ability to smell the gas can be lost instantaneously

- Another example would be chlorine compounds that cause severe burns to our upper respiratory system and burn our lungs when inhaled.

#### **Activity 7:**

Introduction to operator fatality

- **Classroom activity 4 Confined Space Entry fatality. (slide 38) (10 minutes)**
  - Divide the classroom into groups of 2-3 trainees.
  - Distribute classroom activity hand-out
  - Have the class read the story and identify the hazards that contributed to the fatality and come up with controls that would have prevented it.
  - Have each group present their findings to the class **(10 minutes)**

**Break 10 minutes**



# Confined Space Entry Training

## UNIT 5 – Fire and Explosion Hazards

### Purpose

- Class understanding of fire and explosion hazards.
- Enable trainees to properly identify, evaluate and control fire and explosion hazards.

### Resources

**Time:** 10 minutes

**Materials:** Projector, computer, speaker, PPP, paper and pencils

**Hand-out:** None

### DETAILED FACILITATOR NOTES

#### Activity 8:

Introduction to fire and explosion hazard

- **Discuss Fire and explosion hazards. (Slide 39) (1 minute)**
  - Explain to the class that the fire triangle was replaced with the fire tetrahedron with a fourth element called chemical reaction. The chemical reaction causes certain chemicals to burn within specific ranges. Examples of flammable would be gasoline. Flammable ranges are called the lower explosive limit (LEL) or upper explosive limit (UEL).
- **Discuss explosive limits and safe entry (40-41) (2 minute)**
  - As an example of the ranges, benzene has an explosive range from 1.3% to 7.9%, meaning a may occur between these concentrations. If the benzene concentration is below the lower explosive level (LEL) 1.3% it may be too lean to ignite or explode. If the benzene concentration is above the upper explosive level (UEL) 7.9%, it may be too rich to ignite or explode.
  - In order for safe entry into a permit confined space testing and monitoring the readings must be 10% of the (LEL). We will cover this for testing and monitoring with gas meters.
- **Discuss explosive substances. (slide 42) (2 minute)**
  - Explain to the class that there are other explosive substances which can be encountered in a confined space such as fuel vapors, paint, cleaning solvents, hydrogen sulfide, dust and even fertilizers.
  - Most of these substances can be introduced by the worker through any work process such as hot work-welding or cutting
- **Discuss vapor density (Slide 43) (3 minutes)**
  - Explain to the class that vapor density means that the relative weight of a gas or vapor compared to air, which has an arbitrary value of one. If a gas has a vapor density of less than one, it will generally rise in air. If the vapor density is greater than one the gas will generally sink in air
  - Ask the class if they think hydrogen sulfide gas is heavier or lighter than air by 1. The answer should be heavier than air. Hydrogen Sulfide gas weighs about 1.36 Ask the class they think carbon monoxide gas is heavier or lighter than air. The answer should be lighter. carbon monoxide gas wt. is .196.
  - Explain to the class that by understanding chemical behavior and how it interacts within our work environment can help us ensure we put the right controls in place to avoid

these hazards. As we learned earlier such controls are ventilation to remove harmful gases and vapors that can pose a threat to our safety.

# Confined Space Entry Training

## UNIT 6 – Testing Hazardous Atmospheres

### Purpose

- Class understanding on how to safely conduct monitoring for hazardous atmospheres.

### Resources

**Time:** 36 minutes

### DETAILED FACILITATOR NOTES

**Materials:** Projector, computer, speaker, PPP, paper and pencils, gas meter

#### Activity 9:

Introduction to monitoring for hazardous atmospheres (**slides 44-47**) (2 minutes)

**Hand-out:** Confined space entry permit form, classroom activity sheet for gas meters

- **Monitoring for hazardous atmospheres.**
  - Pick up a gas meter and show it to the class.
  - Explain to the class that there are steps that need to be followed before we can even begin monitoring for hazardous atmospheres.
  - First, we need to ensure the gas meter is currently calibrated. I will demonstrate that procedure once the classroom exercise begins.
  - Gas meters are calibrated every 180 days or as frequently the instrument is used
  - It should also be bump tested before atmospheric testing begins.
- **Divide the classroom into groups of 2-3 people (2 minutes)**
  - Explain to the class that everyone will have an opportunity to power up the gas meters and go through the procedures for operating it.
- **Distribute gas meters to each group (20 minutes)**
  - Explain to the class to not operate the gas meters until instructed to do so.
  - Instructor demonstrates the startup procedures for the gas meter
  - Explain to the class that if the meter fails to calibrate or bump test in the field, another gas meter will need to be acquired before any monitoring can begin. It's always best to have more than one gas meter on hand in case one fails.
  - Instructor should allow as much time needed for trainees to become familiar with the gas meters start up procedure.
  - Following the end of the gas meter activity, have all the gas meters placed in one location.
- **Distribute confined space entry permit form (2 minutes)**
  - Explain to the class that this will be the form they document all their findings for confined space during the exercise at the end of class.
- **Distribute classroom activity for gas meters (10 minutes)**
  - Explain to the class that each person will read the classroom activity and complete the review questions.
  - Upon completion of the review questions the instructor will ask each group will present their answers to the class.

## Confined Space Entry Training

### UNIT 7 – Introduction to non-permit, permit, and alternate entry requirements

#### Purpose

- Class understanding of non-permit, permit, and alternate entry requirements for confined space.
- Class understanding for the requirements and procedures to enter a confined space

#### Resources

**Time:** 15 minutes

**Materials:** Projector, computer, speaker, PPP, paper and pencil

**Hand-outs:** None

#### DETAILED FACILITATOR NOTES

#### Activity 10:

Introduction to non-permit, permit and alternate entry requirements

- **Discuss non-permit confined space requirements (slide 48) (2 minutes)**
  - Explain to the class that when declassifying a permit to a non-permit confined space, all the criteria must be met to ensure all hazards are eliminated including atmospheric and physical hazards from outside the space.
  - Hazards outside a confined space include, operating equipment emitting carbon monoxide gas to locking and tagging out equipment to prevent flooding or engulfment.
- **Discuss permit confined space requirements (slide 49-50) (3 minutes)**
  - Explain to the class that permit confined space entry requires a program, trained workers that can identify, assess and control hazards.
  - Further explain that a rescue plan must be in place before entry. That requires notifying the nearest emergency services as well as identifying self-rescue plans.
  - All this information will be documented on the confined space entry form.
- **Discuss equipment for permit required confined space (slide 51) (2 minutes)**
  - Explain to the class the need for the right equipment to work safely in confined space includes a functional gas meter that is calibrated, adequate lighting to avoid struck against injuries and slips trips and falls, barrier to prevent unauthorized access, rescue and emergency equipment and use of communications.
- **Discuss alternate entry procedure requirements (slide 52) (2 minutes)**
  - Explain to the class alternate entry procedures do not require a written program only if hazardous atmospheres exist and can be controlled through force air ventilation and tested periodically.
  - If at any point the conditions change where hazardous atmospheric conditions cannot be controlled, then the permit should be canceled and a permit entry procedure implemented before re-entry.

**Break 10 minutes**

# Confined Space Entry Training

## UNIT 8 – Duties and responsibilities of the supervisor, attendant and entrant

### Purpose

- Class understanding the duties and responsibilities of the supervisor, attendant and entrant.

### Resources

**Time:** 15 minutes

### DETAILED FACILITATOR NOTES

**Materials:** Projector, computer, speaker, PPP, paper and pencil.

#### Activity 11:

Introduction to the duties and responsibilities of the supervisor, attendant and entrant

**Hand-outs:** None

- **Discuss duties and responsibilities of the supervisor (slide 53-54) (4 minutes)**
  - Explain to the class that the supervisor has the overall responsibility of the confined space entry work. He or she is trained to identify and assess hazards and determine what procedures will be followed for confined space operations, such as the decision to use permit vs non-permit entry procedures. Their job is to ensure the attendant and entrant are trained and that they follow all the safety procedures for each task.
  - The supervisor must also verify rescue services and remove unauthorized persons from the worksite.
  - The supervisor must also determine that when transferring responsibility of the permit space operation, that the scope of work remains consistent with the terms of the permit conditions.
- **Discuss duties and responsibilities of the attendant (slide 56) (3 minutes)**
  - Explain to the class that the attendant must be trained in confined space hazards and understand their responsibilities monitoring the space while maintaining an accurate account of all entrants. The attendant must remain outside until properly relieved by another attendant. Even if the attendant perceives a danger should order the entrant out until the space can be re-evaluated.
  - The attendant should maintain communication with the entrant and monitors activities inside and outside the confined space.
  - The attendant should be trained to perform non-entry rescue procedures.
  - Further explain to the class the AKOSH standard: Attendants may not be assigned to monitor more than one permit space. Attendants may be stationed at any location outside the permit space to be monitored as long as the duties described in 29 C.F.R. 1910.146(c)(5)(I) can be effectively performed. The attendant must be in direct and constant communication with the entrants.

- **Discuss duties and responsibilities of the entrant (slide 57-59) (3 minutes)**
  - Explain to the class that the entrant must be trained in confined space hazards and follow all the safety procedures. follow the authorized confined space permit work.
  - The entrant also knows when to evacuate immediately-when the attendant or supervisor orders them to evacuate or even if there is a perceived danger.
- **Rescue operations (slide 60) (3 minutes)**
  - Explain to the class that permit confined spaces emergencies can threaten worker's health and safety. Therefore, there are some questions we need to ask before conducting any confined space work. 1. Do we have the equipment to affect a rescue such as the use of a tripod, SCBA and fall harness? 2. Can we summons a rescue agency that is close by or have our own trained rescue team ready?
  - Explain to the class employee training is necessary in case we need our own employees need to conduct a rescue and/or summons help.
- **Program review (slide 61) (2 minutes)**
  - Explain to the class that a program review is necessary to determine if its working or not and especially following an incident or injury.

**Lunch 1 hour**

# Confined Space Entry Training

## UNIT 9 – PPE and confined space entry equipment

### Purpose

- Class understanding of PPE requirements
- Enable trainees on how to inspect and don fall harness
- Enable trainees to safety set up a tripod and winch system and ventilation unit.
- Enable trainees to safety operate a gas meter
- Enable trainees to document their air monitoring results on the confined space entry form. m,

### Resources

**Time:** 2-3 hours

**Materials:** Projector, PPP, speaker, computer, paper, pencil and tripod  
Fall harness, gas meters and ventilation unit.

**Hand-outs:** Classroom activity CSE equipment, fatal gram exercise

## DETAILED FACILITATOR NOTES

### Activity 12:

Introduction to confined space entry equipment (2-3 hours)

- **Discuss PPE requirements (slide 62) (5 minutes)**
  - Explain to the class that proper selection of PPE can save our lives and reduce the chance of injuries. For example, when conducting work in a lift station, we may encounter such hazards as falling objects from above, slips trips and falls from heights, crushing, struck against or impalement injuries as well as atmospheric hazards. Take the time to ensure you have all the required PPE before conducting any confined space entry work.
  - Introduce vender for PPE exercise
- **Introduction of vender on PPE (20 minutes)**
  - Vender will display and demonstrate use of safety equipment
- **Discuss specialized equipment inventory (slide 62) (5 minutes)**
  - Explain to the class that all specialized equipment should be available and inspected before conducting confined space activities.
- **Distribute classroom activities (5 minutes)**
  - Divide the classroom into groups of 3 trainees for role playing.
  - Explain to the class that each trainee will be role playing supervisor, attendant and entrant.
  - Explain to the class for those waiting in line to set up a tripod and ventilation system will be rotating through 4 activities.
- **Introduction to activity Stations-Station 1-Fall harnesses, Station 2-Confined space form/gas meters, Station 3-confined space form, Station 4-confined space fatality (40 minutes)**
  - **Fall harnesses**-a group of 3 trainees will participate in this activity. Explain to the group that each trainee will complete inspections using a checklist on two harnesses for deficiencies and record their findings on a fall harness inspection form. The group will determine which harness to remove from service and which one to don. Then following the exercise each trainee will don a fall harness using the buddy system. After the group has had an opportunity to complete the task will move to the next station.

- **Confined space entry form/gas meters**-a group of 3 trainees will participate in this activity. Explain to the group that each trainee will begin by identifying and assessing hazards for this



activity (image 1 sewage lift station).

- Encourage them to record all the hazards they identify and determine what controls will be in place on the confined space entry form. Encourage each trainee to interact with each other and ask questions if they need clarification on the process. Then have each trainee follow the startup procedures for the gas meter and record their findings on the confined space entry form. After the group has had an opportunity to complete the task will move to the next station.
- **Confined space fatal gram**-a group of 3 trainees will participate in this activity. The group will read the fatal gram investigation involving a confined space fatality. The group will identify and assess the hazards encountered that caused the fatality. Then make recommendations for implementing correct safety procedures to avoid situations like this from occurring again.
- **Discuss setting up tripod and winch system for confined space entry use (20 minutes)**
  - Each group will be responsible for set up and take down of tripod and winch system
  - Each group will be responsible for inspecting the tripod and winch system for deficiencies and ensure it will properly operate.
  - Further explain to the class that inspections involve a check of the braking mechanism, the cable, the device housing, labels, load indicator, and hardware like the snap hook. The device's instruction manual will give details on what to inspect and how to inspect it.
  - If the inspection of the winch or self-retracting lifeline reveals any problems (details for these would be in the manual) the device is to be taken out of service. Recertification will be required before the device can be put back into service.
  - *Direct the trainees to set up and inspect the tripod and winch system.*
- **Discuss setting up ventilation unit (20 minutes)**
  - Each group will be responsible for setting up the ventilation unit.
  - Explain to the class that ventilation controls the atmospheric hazards of a confined space by replacing unsafe air with clean, breathable air. There are several methods for ventilating a confined space. The method and equipment used depend on the following factors-size of the confined space, atmospheric hazards and source of the make-up air.
  - Explain to the class the method we will be using today is general ventilation designed to capture possible contaminants spread over a large area.
  - Explain to the class that the blower unit should be inspected for loose parts that may injure the worker. Ensure electric blowers are grounded.
  - Ensure operators are properly trained to use a ventilation unit.
  - If there is a fire and explosion hazard to use an intrinsically safe blower unit.
  - Assemble the blower unit according to manufacturer's instructions
  - *Direct the trainees to set up and inspect the ventilation unit.*



- **Discuss role playing supervisor, attendant and entrant (30 minutes)**

- Guide each group to select who will be the supervisor, attendant and entrant.
- Guide the supervisor and his or her team to begin reviewing the classroom activity (image 1



sewage lift station). Encourage them to review all the hazards they identified and what controls they have in place on the confined space entry form. Encourage each trainee to interact with each other and ask questions if they need clarification on the process. Guide the supervisor to begin recording atmospheric results and proceed when he or she knows that all the safety procedures have been followed before entry.

- Following the class exercise secure all equipment.
- Encourage trainees to ask question on how they felt about the effectiveness of training and whether they have more confidence in applying what they learned.

### **Activity 13**

- **Evaluation surveys (10 minutes)**

- Explain to the class that our survey contains two parts. First, level one based on the facility, instructor and materials presented. Second, is about what you learned and how you will apply what you learned in class.
- For each category circle whether you strongly agree, agree, neutral, somewhat disagree or strongly disagree.
- In two months I will make contact with you and asked five questions to see how well you applied what you learned in class.

**Course completed**