The
Oregon OSHA
Confined Space Rule
Applicable
to
General Industry
and
Construction

Instructor's Guide

Additional notes for the instructor are found in text boxes with dashed lines. Answers to all activities are found in Appendix F of the student workbooks as well as in the instructor's guide.

Please Note

This material, or any other material used to inform employers of compliance requirements of Oregon OSHA standards through simplification of the regulations should not be considered a substitute for any provisions of the Oregon Safe Employment Act or for any standards issued by Oregon OSHA.

Notes for the instructor for this class are found in text boxes with dashed lines. Answers to all activities are found in Appendix F of the Student Workbooks as well as in the Instructor's Guide.

In addition to this workbook, guidance is available in the form of materials on the Oregon OSHA website www.orosha.org, and through Oregon OSHA Consultation.

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Introduction

The objective of this class is to raise the awareness level of attendees regarding practices intended to protect workers from the hazards of working in a confined space. This will be accomplished through the use of discussion, activities and resources including the Oregon OSHA Confined Space Rule applicable to General Industry and Construction, OAR 437-002-0146.

But what is our real goal? To save lives—maybe a co-worker or an employee, certainly someone's son or daughter. We have all heard of fatalities related to confined space work that included the people who originally entered the space and also the person or persons who tried to rescue them. It is because of this grim reality that Oregon OSHA has developed the Confined Space Rule.

Purpose and Application

What is the purpose of this rule?

The purpose of this rule is to provide requirements to protect employees from the hazards of entering and working in confined spaces.

Who does this rule apply to?

OAR 437-002-146 applies to the state of Oregon. It covers all activities in confined spaces for employers covered by the Oregon OSHA regulations for General Industry (Division 2) and Construction (Division 3).

It is not the Federal OSHA standard 29 CFR 1910.146.

When does this rule go into effect?

The rule amendments are effective as of January 1, 2015 for General Industry, and for Construction on March 1, 2015.

What is Not Covered?

Pipe in Excavation

Activity:
Look at the photos in this section. Are they of exempted activities? Why or why not?

Some work may appear to be covered by the Confined Space Rule, but is actually covered by another rule:

(a) Construction work regulated by Division 3/P Excavations, except for entry into sewer spaces that are large enough to bodily enter.

(b) Construction work regulated by Division 3/S Underground Construction, Caissons, Cofferdams and Compressed Air, except for sewers.

(c) Enclosed spaces regulated by 1910.269 in Division 2/R Electric Power Generation, Transmission And Distribution, except when that standard requires compliance with this standard.

(d) Enclosed spaces regulated by 1926.953 in Division 3/V Electric Power Generation, Transmission And Distribution, except when that standard requires compliance with this standard.

(e) Manholes and vaults regulated by 1910.268(o) in Division 2/R Telecommunications, unless the space cannot be made safe to enter even after following the requirements of 1910.268(o).

Note: Division 3/J, the Construction Welding Standard, also contains language pertaining to confined space work.

Welding During
Tank Construction

Grain Elevator
Headworks

(f) Welding in confined spaces regulated by Division 2/Q Welding, Cutting & Brazing, when the only hazards are related to the welding process.

(g) Grain bins, silos, tanks, and other grain storage structures regulated by 1910.272, Grain Handling Facilities.

(h) Diving operations regulated by Division 2/T, Commercial Diving Operations.

(i) Except for (a) through (h) above, when any other applicable standard addresses work in confined spaces or additional hazards that may be present, you must comply with the provisions of that standard and this standard. Where the requirements of one standard are more restrictive than the other, follow the more stringent requirements.

Note: The intent of subpart (i) is to address conflict between rules, especially in future rulemaking.

437-002-0146 Confined Spaces

(1) Purpose and application. *This rule applies to all activities in confined spaces and provides requirements to protect employees from the hazards of entering and working in confined spaces.*

(2) Exceptions. *This standard does not apply to the following:*

(a) *Construction work regulated by Division 3/P Excavations, except for existing sanitary sewers and new sanitary sewers when connected to an existing sanitary sewer.*

(b) *Construction work regulated by Division 3/S Underground Construction, Caissons,*

**Are there words in the rule with specific definitions? Yes!
They can be found in Section 3 of the rule, which is located in Appendix A of this workbook.**

Tunneling Activities.

(g) *Diving operations regulated by Division 2/T, Commercial Diving Operations.*

(h) *Except for (a) through (g) above, when any other applicable standard addresses work in confined spaces or additional hazards that may be present, you must comply with the provisions of that standard and this standard. Where the requirements of one standard are more restrictive than the other, follow the more stringent requirements.*

(3) Definitions.

Acceptable entry conditions: *The conditions that must exist in a permit-required confined space to allow safe entry and work.*

Alternate entry *– An alternative process for entering a permit space under very specific conditions. The space remains a permit space even when entered using alternate entry.*

Atmospheric hazard *(see the definition of hazardous atmosphere).*

Authorized *– Approved by the employer or controlling contractor.*

Attendant *- An individual stationed outside one or more permit spaces to monitor the authorized entrants and who performs all attendants duties assigned in the employer's permit space program.*

Atmospheric testing *– see "Testing."*

Authorized entrant *- An employee who is authorized by the employer to enter a permit space.*

Barrier *- A physical obstruction that blocks or limits access.*

What is a Confined Space?

It is a space that meets <u>all</u> of the following requirements:

Large enough and shaped so someone can fully enter and do work
AND
Entry and/or exit is limited or restricted
AND
Is not designed for continuous human occupancy

Activity:
Identify the confined spaces in the following photos.

Sport Utility Vehicle

Instructor:

- Confined spaces can be inside, outside, on top of and underneath a building, and can be a piece of machinery, including mobile units. Walk around!
- In Construction, who is responsible for performing this evaluation? This is answered in Section 4 of the Confined Space Rule.

Plastic Tanks

Welding During Tank Construction

Cement Mixer

Cement Mixer Drum

Fermentation Tank

Produce Washer

Manhole in Excavation

Underground Utility Tunnel

What is a Permit-required Confined Space?

It is a confined space with a hazard as explained below:

Have or could have a **hazardous atmosphere**

Contains a material that could **trap or bury**

Is **shaped** so a person could be trapped or asphyxiated

Has **any other recognized serious safety or health hazard**

Hazard Evaluation

In the Confined Space Rule there are two main types of hazards: physical and atmospheric. They may be present or have the potential to be present. Prior to entry, hazards should be anticipated, identified, evaluated, and eliminated if a physical hazard, and controlled or eliminated if an atmospheric hazard.

A **physical hazard** is defined as an existing or potential hazard that can cause:

- Death
- Serious physical harm

It includes but is not limited to:

- Explosives
- Mechanical, electrical, hydraulic and pneumatic energy
- Radiation
- Temperature extremes
- Engulfment
- Noise , if it prevents the ability to communicate or hear warnings
- Inwardly converging surfaces
- Chemicals that can cause death or serious physical harm through skin or eye contact, rather than by inhalation

Note: Consider the work when defining the hazard.

Note: Does the hazard limit the ability to escape without help?.

An **atmospheric hazard** is an existing or potential atmosphere that may expose employees to the risk of:

- Death
- Incapacitation
- Impairment of ability to escape without help
- Injury
- Acute illness

As a result of one or more of the following conditions:

- A flammable gas, vapor, or mist in excess of 10 percent of its lower flammable limit
- An airborne combustible dust
- An atmospheric oxygen concentration below 19.5 percent or above 23.5 percent (oxygen deficiency and oxygen enrichment)
- An airborne concentration of a substance that exceeds the dose or exposure limit specified by an Oregon OSHA requirement (dust that obscures vision at a distance of 5 feet is included)
- An atmosphere that presents an immediate danger to life or health (IDLH)

In other words, any atmosphere that could result in death or serious injury to a worker as caused by oxygen deficiency or enrichment, toxic materials, and flammable or explosive materials. The emphasis is on acute hazards, not chronic.

Note: While welding, noise, falls, asbestos, lead, and silica may be hazards in a confined space, they are all covered under specific rules. For example, if lead is the only hazard, then the Lead Rule applies, not the Confined Space Rule.

To anticipate and identify, check historical information such as accident investigations, OSHA 300 Logs, Workers' Compensation claims, worksite inspections and Safety Data Sheets (SDS). Consider injury and illness data from sources such as the Oregon Occupational Safety and Health Administration (Oregon OSHA), The National Institute of Occupational Safety and Health (NIOSH), the Oregon Institute of Occupational Health Sciences (OIOHS) and trade or professional associations, if available.

To evaluate, measure the hazard with a device, such as a gas meter or other direct-reading instrument. Conform or compare to set standards where acceptable and unacceptable conditions have been determined, such as Oregon OSHA's Division 2/Sub Z Toxic and Hazardous Substances Rule Permissible Exposure Limits (OSHA PELs), National Institute of Occupational Safety and Health Recommended Exposure Limits (NIOSH RELs), the American National Standards Institute (ANSI), or the American Congress of Governmental Industrial Hygienists Threshold Limit Values (ACGIH TLVs).

To eliminate or control, remember that elimination removes the source of the hazard, while a control is a means to prevent or reduce exposure to the hazard. For the purpose of this rule, removal of the source of the hazard and isolation are considered elimination, with lockout being an example. Engineering controls such as mechanical ventilation are considered control measures. Personal protective equipment, such as respirators, are not considered engineering control measures.

Note: For the purpose of this rule, tagout is allowed for a permit entry, but lockout is required for an alternate entry.

Note: In some cases, such as with painting and welding, exhaust ventilation should be used as well as forced-air ventilation to control the hazard.

Activity:
Can this four-gas monitor be used to measure all atmospheric hazards?
Why or why not?
What can it measure?

Activity:
Under what conditions would the confined spaces shown below be permit-required confined spaces?

Manhole in Excavation

Tank

Cement Mixer

Cement Mixer Drum

Identifying Permit-Required Confined Spaces with Signs

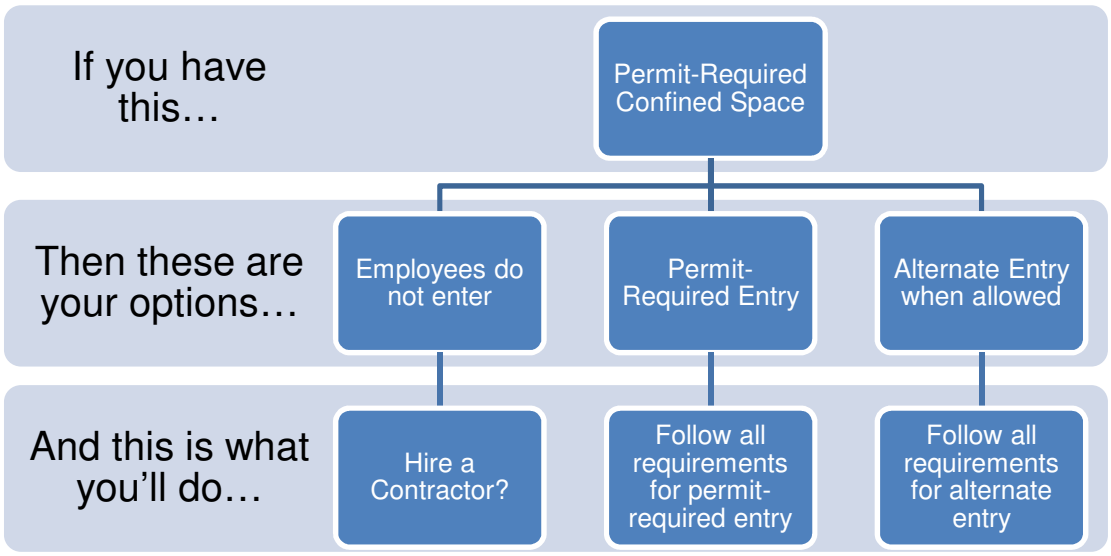
You must have a way for employees to recognize your permit-required confined spaces. In addition to training, you can use signs, labels or tags.

The rule does not require each space to have its own sign—it's acceptable to identify a group of similar spaces, such as manholes, in a general way.

Entering a Permit-Required Confined Space

After you have identified and evaluated your permit-required confined spaces, you'll need to make some decisions about how those spaces will be entered. What are your options for entering a permit–required confined space?

In Oregon, under Oregon OSHA standard OAR 437-002-0146, you have the following options:



We will look at the requirements for each option in the order they appear.

Instructor

The Federal OSHA standard 29 CFR 1910.146 allows the following:

- Employees do not enter (ultimately, a contractor is usually hired)
- Full permit entry
- Reclassification when only a physical hazard is present (for example, for hazardous energy use lockout/tagout)
- Alternate entry when only an atmospheric hazard is present (test and use forced-air ventilation continuously)

Employees Do Not Enter

What are your responsibilities if you decide your employees will not enter your permit-required confined spaces?

Your employees must know how to identify your permit-required confined spaces, and that they are not allowed to enter.

If you have someone else enter your permit-required confined spaces, such as a contractor, then you are required to provide them any information you have about the hazards of the space (e.g. why you consider the space to be a permit-required confined space). More information on this topic will be provided in a later section of this workbook, Multi-employer Worksites.

Entry with a Permit

To enter a permit-required confined space with a full permit, do or have the following. The corresponding paragraphs in the Confined Space Rule are found in parentheses:

- Evaluations (4)
- Permit-required confined space written entry program and permits (5)
- Permit entry procedures (6)
- Equipment (7)
- Personnel (8)
- Rescue (9)
- Training (11)
- Multi-employer worksite procedures (12)
- Records(13)

Entry with a Permit - Written Program and Permits

What must be included in the written program? The full list of requirements is found on page J-9 of the rule, which is included as Appendix A of this workbook, but here is a partial summary:

- Develop and implement a written program that describes the means, practices, and procedures to safely identify and enter those spaces.
- On fixed sites, also include a catalog of the locations of all permit spaces, and the reasons why they are permit spaces. A group of similar spaces, such as manholes, can be identified in a general way.
- Ensure employees and their representatives have access to the written program.

As a best practice for construction, you may wish to develop a written program that can be tailored to the different potential sites you might encounter in your line of business, well in advance of any actual entry. Also, many general contractors require subcontractors to have a written program.

There are requirements in the program for managing permits, also. Within one year of their cancellation date, all permits must be reviewed to evaluate the program. Also, the program must be reviewed and revised if there is reason to believe employees are not adequately protected. Situations that require this review include unauthorized entry of a permit-required space, and any injury or near-miss during entry.

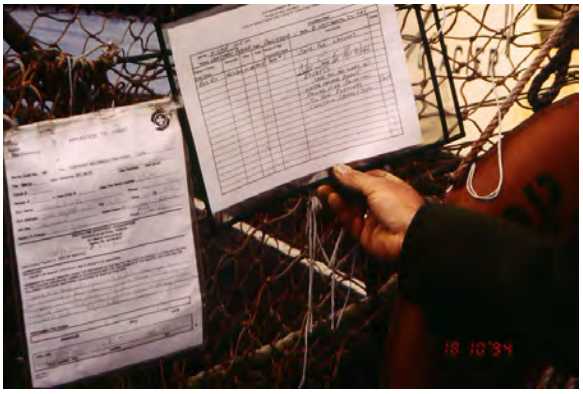
Note: A permit is documentation of your process for performing a permit-required confined space entry. It serves as the written authorization from your company to perform the entry.

Entry with a Permit - Procedures

You must have the following in place to enter a permit space:

1. Entry permits that include the following information:

- ✓ The space to be entered
- ✓ The purpose of the entry
- ✓ The date, start, and stop times of the permit
- ✓ The hazards of the space
- ✓ Acceptable entry conditions
- ✓ Results of initial tests and periodic monitoring, or the period for continuous monitoring, and the names or initials of the testers and when the tests were performed
- ✓ Measures to isolate the space and eliminate or controls hazards before entry
- ✓ Names of entrants and current attendants
- ✓ Signature of the original supervisor authorizing entry
- ✓ Current entry supervisor
- ✓ Communication procedures for entrants and attendants
- ✓ Equipment provided for entry
- ✓ Rescue services available and how to contact them
- ✓ Other information needed for safety
- ✓ Additional permits for work in the space, such as for hot work
- ✓ Any problems encountered during entry



2. Procedures for issuing permits
3. Testing for atmospheric hazards before entry
4. Provide results of atmospheric testing to entrants
5. Maintain safe entry conditions for the duration of the entry
6. Follow all actions and precautions on the permit
7. If you have to evacuate, re-assess the conditions of the space to ensure it is safe for re-entry and ensure the permit reflects the evacuation and subsequent re-assessment. Another option is to issue a new permit.
8. Allow entrants to observe monitoring, testing, and any other actions taken to eliminate or control hazards

There is an example of a blank entry permit in the Confined Space Rule, found in Appendix A of this workbook. There is also an example of a completed entry permit, in Appendix C of this workbook.

Instructor
Air monitoring is performed before entry and then periodically. If monitoring continuously, record peaks.

Entry with a Permit - Equipment

All equipment must be maintained and used in accordance with the instructions from the manufacturer. For example, if the manufacturer's directions say to perform a factory calibration, then that's what you need to do.

Bump testing of air monitoring equipment is recommended prior to every use. Keep in mind that a bump test confirms that the monitor reads a given substance, as opposed to zeroing, which means nothing is detected.

Provide all necessary equipment at no cost to your employees. Ensure all employees who use equipment are trained to do so.

Note: If you keep calibration gases on hand to perform bump checks (or to do calibration), make sure they are within their expiration dates.

Activity:
Name the types of equipment in the pictures

_____

_____

_____

_____

_____

_____

_____

Instructor
- You must follow the requirements of the Respirator Standard
- Follow all requirements in the respirator standard about egress bottles
- Emergency Respirators must be inspected monthly, and the documentation must stay with the respirator; Escape Respirators must be inspected before they are carried into the workplace.

Entry with a Permit - Personnel

What are the roles and training requirements for personnel involved with a permit-required entry?

Entrants must:

- Know about hazards that they may face during entry and the signs, symptoms and consequences of exposure
- Communicate with the attendant so the attendant can monitor their status and warn them when they need to evacuate
- Alert the attendants about hazardous conditions in the space or symptoms of exposure
- Exit the space immediately when:
  - An order to evacuate is given by the attendant or the entry supervisor
  - An entrant recognizes any warning sign or symptom of exposure to a dangerous situation
  - An entrant detects a dangerous or hazardous condition
  - An evacuation alarm is activated

Attendants must:

- Know the hazards entrants may face during entry and the signs, symptoms, and consequences of exposure
- Be aware of the behavioral effects of hazards on entrants
- Keep an on-going count of entrants and ensure that the count identifies who is in the space
- Remain outside the space during entry operations until relieved by another attendant
- Communicate with entrants to monitor their status and to alert them if they need to evacuate
- Monitor activities inside and outside the space to determine if it is safe for entrants to remain in the space. Order entrants to evacuate immediately under the following conditions:
    - A dangerous or hazardous condition is detected
    - If the behavioral effects of hazard exposure are detected
    - If there is a dangerous situation outside the space
    - If the attendant cannot perform all required duties
- Summon emergency services as soon as entrants need to escape from the space
- Warn unauthorized persons to stay away if they approach the space; tell them to leave immediately if they enter the space; and inform the entrants and entry supervisor if unauthorized persons have entered the space.
- Perform non-entry rescues following your established rescue procedure
- Do nothing that would interfere with monitoring and protecting an entrant (note: even while monitoring another space.)

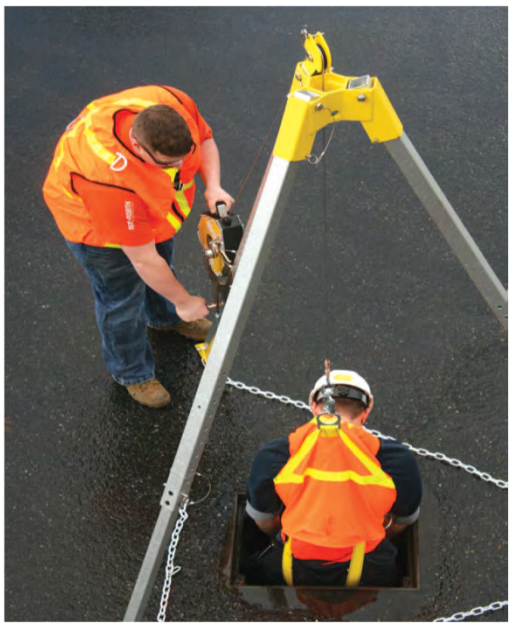
Entry Supervisors must:

- Know the hazards that entrants may face during entry, including the signs, symptoms, and consequences of exposure
- Understand how to control or eliminate hazards associated with the space
- Verify, by checking that the appropriate entries have been made on the permit, that all tests specified by the entry permit have been conducted and that all procedures and equipment specified by the permit are in place before signing the permit and allowing entry to begin
- Inform entrants and attendants about the hazards and conditions associated with the space and the methods used to eliminate or control the hazards
- Terminate the entry and cancel the entry permit as required by the entry procedures
- Verify that rescue service providers are available and that they can be contacted in an emergency
- Remove unauthorized individuals who enter or attempt to enter
- Reevaluate the conditions within the space whenever responsibility for a permit space entry operation is transferred and at intervals dictated by the hazards and operations performed within the space.

Entry with a Permit - Rescue

What are your options for performing rescue? If workers cannot evacuate without outside help, then these are your options:

Non-entry rescue
This means nobody beyond the entrant goes in. It also typically means the entrant is wearing a harness that is attached to a retrieval device that is designed to allow them to be pulled them out of the space by somebody else, such as the attendant.



Note: The chains on this tripod are necessary for stability They shouldn't be removed!

Entry rescue
This means somebody goes in. They must have equipment and training, and follow all requirements in the rule.

Third-party rescue
This means somebody else goes in, with whom you have made arrangements to do so. The third-party must follow entry requirements. Simply planning to rely on 911 services does not meet requirements of the rule.

Whatever option you choose, **rescue procedures must include** :

- A process for summoning rescue services
- A process for summoning emergency medical services or transporting injured entrants to a medical facility.
- A way for the Safety Data Sheet (SDS) or other similar written information be kept at the worksite, and be made available to the medical facility treating an exposed entrant.
- They must also have practiced performing a rescue before the entry, but no more than 12 months before.

Note: Have rescue onsite for IDLH conditions.

The rescue team must have access to the spaces before the entry because they need to develop a rescue plan and practice before the actual entry. If the team has access to a space similar in size, configuration and accessibility to the one that needs to be entered, they can use that space for the practice rescue instead.

When your workers are mobile, they do not need to do the annual practice (either entry or non-entry) if the rescue team does a practice rescue in the space that needs to be entered, before the actual entry.

Note: For your information, a couple of case studies from accident investigations are included in Appendix D of this workbook.

What about the fire department? In most cases, fire departments do not provide rescue services. If they do , they must follow the same requirements as any third-party rescue provider. For more information, see the Confined Space Rule, Non-Mandatory Appendix D - Rescue Considerations

Activity:
Can a space be modified to make rescue safer or easier?

Entry with a Permit - Training

Train employees involved in permit space activities so they have the understanding, knowledge, and skills necessary to safely perform their duties.

Training is required:

- For all new employees
- Before an employee is assigned permit-space duties
- Before there is a change in an employee's assigned duties
- When there is a hazard for which an employee has not been trained
- When there are changes to the permit program
- When the permit audit shows deficiencies
- When there is a deviation from established procedures or an employee's knowledge of the procedures is inadequate

Awareness training is required for employees who work or may work in areas where permit spaces are present. It must explain the permit-space program, the entry permit system, the alternate entry procedures, if used, and how to recognize permit spaces in their work area. It provides a basic overview of the permit space program.

Repeat training when there is a change in the written program and when there are new or previously unidentified permit spaces.

Record each employee's training, including the employee's name, the trainer's signature, the training date, and the employee's responsibilities. Employees must be able to inspect their training records.

Instructor
If the company identifies a new permit-required confined space, affected employees must be retrained at the awareness level.

Alternate Entry

Alternate entry is a specific procedure for entering a permit space without a full permit. Alternate entry procedures vary from permit entry procedures in several significant ways. For example: an attendant is not required; rescue procedures are not required; and there are fewer documentation requirements.

The following sections of the rule apply. The corresponding paragraphs in the Confined Space Rule are found in parentheses:

- Evaluations (4)
- Equipment (7)
- Alternate entry procedures (10)
- Training (11)

You need to do the following:

- Eliminate all hazards

  OR
- Eliminate all physical hazards in the space and control all hazardous atmospheres with continuous ventilation

You need to develop and implement alternate entry procedures that address the following:

- Who can authorize alternate entry procedures and is responsible for ensuring safe entry conditions
- The hazards associated with the space
- The methods used to eliminate the hazards
- The methods used to ensure the hazards have been eliminated
- The methods used to test the space for all hazardous atmospheres
- The methods used to determine if unsafe conditions occur before or during entry
- The criteria and conditions used for evacuating the space
- The methods for training employees in these procedures
- The methods for ensuring employees follow these procedures

Alternate entry procedures do not have to be in writing, but you may find it beneficial to do so.

When using ventilation to control atmospheric hazards:

- Use only properly calibrated direct-reading meters to test the atmosphere.
- Test the atmosphere for all identified atmospheric hazards before entering the space.
- Do not allow employees to enter until testing verifies that all identified atmospheric hazards are adequately controlled by the ventilation.
- Perform continuous monitoring for all atmospheric hazards during the entry.
- Immediately evacuate the space:
  - When monitoring indicates the return of atmospheric hazards.
  - Upon any failure with the direct-reading instrument.
  - Upon any failure with the ventilation.
  - When a new hazard is introduced or conditions within the space change.

If a space is evacuated, it cannot be re-entered as an alternate entry unless:

- The conditions that necessitated the evacuation are corrected; and
- The re-entry is treated and documented as a new entry.

There is an example of a blank alternate entry form in the Confined Space Rule, found in Appendix A of this workbook. There is also an example of a completed alternate entry form, in Appendix C of this workbook.

Note: The requirements for alternate entry are different between the Oregon OSHA Rule and the Federal OSHA Rule. Also, reclassification is not allowed under the Oregon OSHA Rule.

Ensure that all employees who enter:

- Have the opportunity to observe the activities required to comply with the alternate entry procedures
- Have an effective means of communication to request help in an emergency

Finally, remember to document the entry! There are ten items that must be documented, if they apply:

- ✓ The location of the space
- ✓ The hazards of the space
- ✓ Measures taken to eliminate the hazards
- ✓ Measures taken to control the atmospheric hazards
- ✓ The identity of the direct-reading instruments used to test the atmosphere
- ✓ The results of the atmospheric testing
- ✓ The date of entry
- ✓ The duration of the entry
- ✓ Any and all conditions that required the evacuation of the space
- ✓ The name, title, and signature of the person responsible for ensuring the safe entry conditions

Maintain this documentation for the duration of the entry at the location of the entry. The rule does not require the documentation to be kept after the entry is complete, but it would be a best practice to do so. It would allow you to evaluate your alternate entry procedures for effectiveness and to make improvements.

Alternate entry cannot be used to enter a continuous system unless you can isolate the area to be entered from the rest of the space, or can demonstrate the conditions that caused the hazard or potential hazard no longer exist within the system during the entry, or can demonstrate that engulfment cannot occur and continuous ventilation in the area to be entered is sufficient to control atmospheric hazards.

Note: An example of isolating the area could be using double-block-and-bleed to separate a tank from the rest of the system.

Multi-employer Worksites

Does someone else's employees enter permit-required confined spaces you control?

If so, you need to do the following:

- Let them know about the hazards of the spaces and about any precautions you require to protect your own employees.
- When your employees are working in a space and someone else's employees are working in or around that space, coordinate entry with the other employers so your employees are not exposed to hazards created or discovered by the other employees, and vice-versa.
- Discuss any hazards created or encountered, after the operation is finished.

Do your employees enter permit spaces someone else controls?

If so, you need to evaluate the permit space. Use information from the host employer or controlling contractor, if there is any. After entry, you need to let whoever is in control of that space (such as the property owner or a general contractor) know about the precautions and procedures you followed and about any hazards that you found during entry or that developed during entry operations.

Note: "Control" in this case means the authority to regulate, direct or influence. A "Controlling Contractor" is an employer that has overall responsibility for construction at a worksite. A "Controlling Contractor" who owns or manages a property is both a controlling contractor and a host employer.

Records

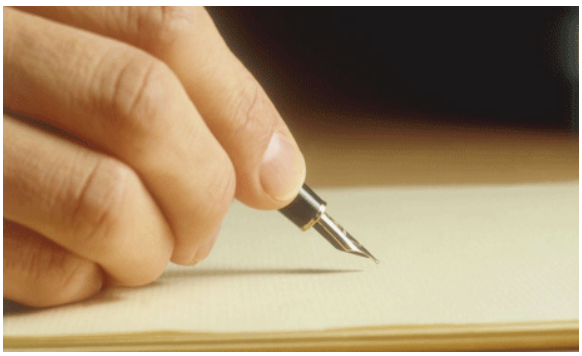
After a permit entry, keep cancelled permits for at least one year from the date the permit expires. To evaluate the permit program, review permits to ensure that the procedures for issuing them are still effective and the information still protects employees who enter the space.

After an alternate entry, keep the entry document where the space is located for the duration of the entry. There is no requirement to keep it after the entry. It would be a best practice to keep it for review of the effectiveness of the procedure.

Keeping records of the evaluation of permit-required confined spaces is required if an employer enters using permit entry procedures and has to have a written program, but is not if an employer only uses alternate entry or if their own employees do not enter. It would be a best practice to keep these records, because there is a chance that a contractor may enter the space at a later date.

There is a special relationship between permits, alternate entry forms and 1910.1020 “Access to Employee Medical and Exposure Records.” If the permit or alternate entry form documents exposure to an atmospheric hazard, it becomes an exposure record and must be maintained for 30 years.

If an air monitor is used that datalogs, and the monitoring is associated with a specific person, then the logged data can be used as an exposure record. If so, then it must be kept in an accessible form for 30 years.



Appendices

Appendix A

OAR 437-002-0146

Appendix B
Highlights of the Amendments to the Oregon OSHA Rule

Under the Oregon OSHA Confined Space Rule…

- Both General Industry and Construction employers are covered, unless they are exempt from the rule
- Include a catalog of permit spaces in your written program that describes why they are permit spaces
- Use equipment in accordance with manufacturer's instructions
- Train employees in how to use necessary equipment
- Awareness training is required for employees who work or may work in areas where permit spaces are present. It must explain the permit-space program, the entry permit system, the alternate entry procedures (if used), and how to recognize permit spaces in their work area.
- If you use a third-party rescue service, have an agreement with them
- Reclassification as defined in the Federal OSHA Rule 1910.146(c)(7)is not allowed under the Oregon OSHA regulation.
- Alternate entry may be used to enter a permit space if all physical hazards have been eliminated and all atmospheric hazards have been eliminated or controlled with continuous ventilation. This is not the same as requirements found in the Federal OSHA Rule 1910.146(c)(5)

Appendix C

Example completed entry permit

Example completed alternate entry form

Appendix D

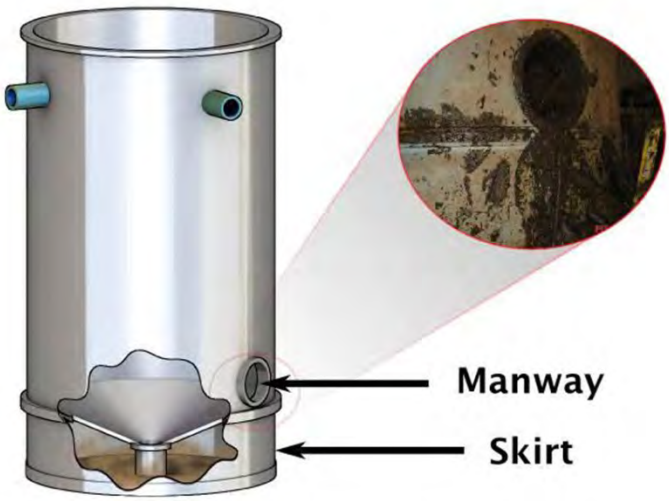
Case Studies
from
Accident Investigations

ConAgra Foods
Boardman, Oregon
February 16, 2009
1 Worker Killed

A welding contractor was killed while repairing a 1 ¼ by ½ inch crack on the bottom of a water clarifier tank at a ConAgra Foods facility. The 23-foot-tall tank was used to separate dirt and debris from wastewater in a potato-washing process area. The tank was open at the top and had a metal skirt around it's cone-shaped base. While the welder was working inside the tank, an explosion occurred; the internal tank structures collapsed, resulting in his death.

The CBS determined that approximately 14 inches of debris-laden water had leaked through the crack in the tank and accumulated in the hidden space under the tank skirting. Examination of a sample of the liquid indicated that bacterial decomposition of the organic matter likely produced flammable gas, which was then ignited by the welding activity.

In this case, ConAgra personnel had tested for combustible gas inside the tank prior to the hot work, but only from the entrance of the tank and no flammable gas was detected. Monitoring for combustible gases was not conducted in the immediate area of the crack just prior to the initiation of the welding or in the adjacent space where flammable gas was present. Personnel were inadequately trained on the use of the specific combustible gas detector that was used and no hot work permit had been issued prior to commencing the welding.



Woodpecker Trucking
Pendleton, Oregon
October 2008

An employee was strengthening baffles inside a truck-mounted water tank. The tank w.as divided into three compartments by two baffles. The employee had tools that included a wire fed welder with argon gas, a pneumatic grinder, an oxygen/acetylene cutting torch and various hand tools. A fire broke out approximately 15 minutes after the employee entered the tank and lasted for approximately 2 minutes. The employee was killed by inhaling superheated gases.

Several items, including a Bic lighter, were found in compartment #2. It was determined the fire started in compartment #2 and moved to compartment #3, apparently following the employee. The Bic lighter was considered a possible source of ignition, although the possibility of sparks from rivets on the employee's clothing was not ruled out. Oxygen from the cutting torch, which was attached to an oxygen/acetylene manifold and had been left in the tank overnight. The employee had an airline respirator, but the space did not appear to be ventilated at the time of the incident.

Appendix E
Resources

www.orosha.org (Oregon OSHA)

www.osha.gov (Federal OSHA)

www.cdc.gov/niosh (Centers for Disease Control and Prevention/ National Institute of Occupational Safety and Health)

www.elcosh.org (Electronic Library of Construction Occupational Safety & Health)

www.croetweb.com (Oregon Institute of Occupational Health Sciences)

Appendix F
Answer Key to Workbook Activities

Activity pages 6-7 – Look at the photos in this section. Are they exempted activities? Why or why not?

Pipe in Excavation:

- The work is covered by the Confined Space rule if you have to bodily enter the sewer space, which is an existing sewer pipe or manhole, or new construction connected to an existing sewer.
- The work does not fall under the Confined Space Rule if the sewer space is large enough to bodily enter but entry is not required. If the work is not covered by the Confined Space Rule, then Division 3/P Excavations applies, which has its own requirements about hazardous atmospheres.
- If work is performed in an underground pipe that is not part of or connected to a sanitary sewer and is not part of excavation work, then the work is covered by the Confined Space Rule.
- Note: this photo shows a shield height violation because it's not tall enough.

Welding During Tank Construction:

- As shown, this is not a confined space so it isn't covered by the Confined Space Rule. However, if work continues and the space changes to a confined space, it could be covered under the rule, if there are hazards in addition to those related to welding. Said another way, if the space is a confined space but the only hazards are related to welding, then it is covered by Division 2/Q Welding.

Grain Elevator Headworks:

- As shown this is not covered by the Confined Space Rule because it is a grain storage facility. It is covered by 1910.272 ,Grain Handling Facilities.

Activity page 9-11: Identify the confined spaces in the following photos:

Sport Utility Vehicle – not a confined space, since it is designed for continuous human occupation.

Plastic Tanks –the larger ones are confined spaces, the two smaller ones appear to be too small to enter bodily.

Tank Under Construction –not a confined space as shown, but could become one later during construction.

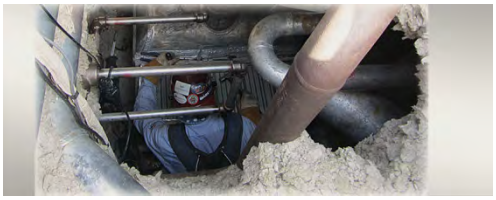
Cement Mixer – cab is not a confined space since it is intended for continuous human occupation. Drum is a confined space.

Cement Mixer Drum – confined space.

Produce Washer – confined space

Fermentation Tank – confined space

Manhole in Excavation – Excavation is not a confined space, but the manhole is a confined space.



Underground Utility Tunnel – is covered under the Confined Space Rule, unless it is covered by 1926.953, Division 3/V Electric Power Generation, Transmission And Distribution for enclosed spaces.

Activity page 16: Can this four-gas monitor be used to measure all atmospheric hazards? Why or why not? What can it measure?

It cannot measure all atmospheric hazards. There may be toxic chemicals present it cannot measure because a specific sensor is required. It can measure the following:

Oxygen (02) level in percent (%)

Oxygen deficiency is the lack of oxygen in the air that can lead to dizziness, nausea, impaired thinking, and death. It is has poor warning properties, because we can't smell, taste, touch or hear it. It can be caused by anything that consumes oxygen, or displaces it. Curing of paint or coatings, burning of fuels like propane or gasoline, and rust all consume oxygen. Purging a space with an inert gas, such as argon, displaces oxygen. To work in an oxygen deficient atmosphere oxygen must be provided by forced-air ventilation or a supplied-air respirator. A filtering face-piece respirator is not enough.

Oxygen enrichment is a surplus of oxygen in air that can lead to an explosion if ignited, or accelerate a fire.

Flammable or explosive atmospheres in percent lower explosive limit (% LEL)

Examples include gases, liquids, vapors, mists, fibers or dusts that will burn or explode if ignited. Ignition sources can include static electricity, light bulbs, hand tools and power tools, welding, cutting, burning, brazing, and grinding.

Toxic materials Carbon Monoxide (CO) and Hydrogen Sulfide (H2S)
in parts per million (ppm)

Carbon monoxide poisoning can lead to sleepiness, dizziness, headaches, nausea, impaired thinking and death. It also has poor warning properties. Burning fossil fuels like propane, gasoline, and diesel, in addition to wood products, produces carbon monoxide. To work in a space with carbon monoxide, forced-air ventilation or a supplied air respirator must be used. Carbon monoxide can't be filtered out.

Hydrogen sulfide is a product of rotting organic material and is also known as "sewer gas". It has a very distinctive warning property – it smells like rotten eggs! However, the smell usually goes away fairly quickly. Not because the hydrogen sulfide has gone away, but because we experience olfactory fatigue. Forced-air ventilation may be used to protect employees, or an acid gas cartridge used with the appropriate respirator.

A couple of examples of common atmospheric hazards that require a specific sensor or device to measure include the following:

Ammonia

Ammonia is a colorless gas with a distinct odor. It is commonly found in household and industrial cleaners, in fertilizer and as a refrigerant. It can cause irritation and burning of the skin, mouth, throat, lungs and eyes. Other symptoms include pain, coughing and difficulty breathing. High levels can be deadly.

Chlorine

Chlorine has a distinctive, pungent order that many people recognize as bleach, and is yellow-green in color as a gas. It is one of the most commonly used industrial chemicals and is also found in household cleaners. Symptoms include pain and burning of the skin, eyes, nose and throat, coughing and difficulty breathing, and nausea and vomiting. High levels can be deadly.

Activity p.17 : Under what conditions would the confined spaces shown below be permit-required confined spaces?.

Excavation

- The work is covered by the Confined Space Rule if you have to enter the sewer space, such as an existing sewer pipe or manhole, or new construction connected to an existing sewer.
- The work does not fall under the Confined Space Rule if the sewer space is large enough to enter but entry is not required.
- If the work is not covered by the Confined Space Rule, then Division 3/P Excavations applies, which has its own requirements about hazardous atmospheres.
- If work is performed in an underground pipe that is not part of or connected to a sanitary sewer and is not part of excavation work, then the work is covered by the Confined Space Rule.

Tank

The tank is a confined space, and a permit space if a hazard is present, such as baffles that present a configuration hazard, mixers that present a mechanical hazard or chemicals (including cleaning chemicals) that present an atmospheric hazards. LOTO and ventilation could potentially be used to allow use of alternate entry procedures.

Cement mixer cab and drum –

The cab of the truck is not a confined space.

The drum is a confined space, and is a permit space on the basis of hazardous energy alone. Other potential hazards are: noise caused by jackhammering out cured concrete if the noise interferes with communication or warnings; atmospheric hazards caused by cleaning chemicals; and hazards caused by welding on baffles inside the drum. Hazards would have to be controlled or eliminated to enter using alternate entry procedures.

Activity page 29: Name the types of equipment in the pictures

Lighting

Non-sparking tools

Respirator

Air-monitoring equipment (four-gas meter)

Rescue equipment

Ventilation Equipment

Barrier

Activity page 36: Can a space be modified to make rescue easier and/or safer? While not always an option, it may be possible in some situations. For example, in a large silo with openings only at the top, could another entrance or opening be built in at ground level? Instead of rescuers having to climb or be lifted to the top of the silo, and then pulling the person to the top and letting them back down to the ground, they could go directly through the opening at ground level.