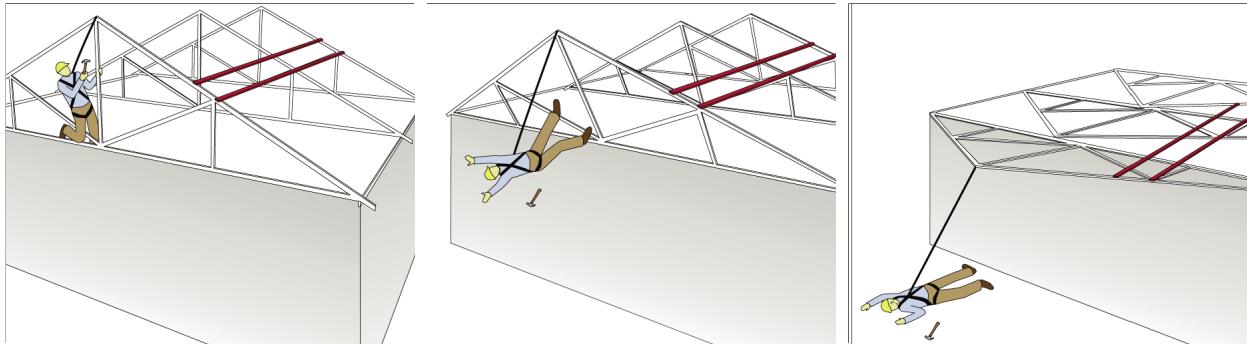


If a worker falls while using a single truss as an anchor point, the whole truss assembly can collapse. Such a structural failure puts workers' lives and entire buildings at risk.



## How to Reduce Risks

### **During Initial Truss Installation**

Guardrails, nets, or PFAS (conventional fall protection) may not be practical for all phases of truss installation. Instead, employers should plan to use other methods, such as ground assembly, scaffolds, aerial lifts, or ladders to keep workers safe.

**Ground assembly:** By assembling a truss section on the ground, employers can greatly reduce the risk of falls for workers. A section of trusses can be sheathed while still on the ground. Peak anchors and lifelines can be pre-installed before the section is lifted into place. Many builders find it efficient to pre-assemble truss sections on the ground and then lift them with a crane so that workers can secure the section to the building frame.

**Lifts:** Depending on the building layout and the tasks involved, lifts (e.g., aerial, scissor) may be options for setting trusses. Lifts provide a stable, elevated platform from which workers can operate. Workers must follow all safety procedures and conduct all operations from inside the lift basket. For other requirements for using lifts, refer to 29 CFR 1926.453, Aerial Lifts.

**Scaffolds:** When properly constructed and used, internal and external scaffolds can provide suitable protection for truss-setting tasks. For example, bracket scaffolds placed on the inside or outside of a building provide large, stable walking and working areas for workers. To ensure safe use and appropriate load limits for bracket scaffold systems, workers should always follow the manufacturer's instructions or consult a qualified person. For other requirements for scaffolds, refer to 29 CFR 1926 Subpart L, Scaffolds.

**Ladders:** For certain truss-setting jobs, platform and stepladders can provide a stable work platform for workers. They can be particularly helpful when set up inside a building. Workers should always use a ladder safely by following the requirements spelled out in 29 CFR 1926 Subpart X, Stairways and Ladders.

**Spreader:** An engineered spreader, when installed in accordance with the manufacturer's instructions, distributes the force of a PFAS across multiple trusses. The roof trusses do not need to be sheathed to use a spreader. These engineered anchorage devices are reusable and can be uninstalled and reinstalled quickly. **A qualified person should decide if the spreader is suitable for use as an anchor.**

### **After a Complete Truss Section Is Fully Installed**

Once the assembled truss section has been set and secured, it can be used as an attachment point for an anchorage device. From this point on, PFAS can be used to protect workers while they install additional trusses and roof sheathing.

#### **Truss Section**

Multiple (typically four) individual trusses that are interconnected and fully sheathed. A truss section that has been restrained, braced and sheathed in accordance with the manufacturer's instructions can provide a suitable structure to establish an anchor point.

**Anchors:** Fixed anchors provide a secure point where workers can tie off their lifelines as part of a PFAS. Anchors for a PFAS must meet the 5,000-pound strength requirement or maintain a safety factor of at least two under the supervision of a qualified person – 29 CFR 1926.502(d)(15). See

29 CFR 1926 Subpart M, Fall Protection for more information and additional requirements.

Different types of anchors for these systems include, but are not limited to:

- Peak anchors
- Strap anchors
- Bolt-on anchors

Once a group of trusses has been properly restrained and braced, a roof peak anchor can provide a usable tie-off point for a lifeline. Multiple peak anchors and lifelines can protect several workers. After confirmation from the manufacturer, some peak anchors may be strong enough to serve as tie-off points for two lifelines. Peak anchors can also be useful for fall protection during later roofing tasks or while setting another truss section.

### **Written Fall Protection Plans**

If the employer does not use ladders, scaffolds, or aerial lifts, and can demonstrate that it is not feasible or would create a greater hazard to use conventional fall protection equipment (guardrails, safety nets, or PFAS) when working at heights of 6 feet or greater, the employer must develop a written site-specific fall protection plan in accord with 29 CFR 1926.502(k). The plan must be prepared by a qualified person as defined by 29 CFR 1926.32(m). This person could be the owner, the supervisor, or a worker who has extensive knowledge, training and experience with fall protection and is able to solve problems relating to fall protection. States with OSHA-approved State Plans may have additional requirements for written fall protection plans.

The site-specific fall protection plan must document at each location why the use of conventional fall protection equipment is not feasible or will create a greater hazard. The plan must also describe the alternative methods that the employer will use so that workers are protected from falls. Workers and their supervisors must be trained on the proper use of those other fall protection methods.

Conventional fall protection equipment can reduce or eliminate the chances of a fatal fall. Written site-specific fall protection plans ensure that protection continues, even when conventional fall protection methods are determined to not be feasible.

### **OSHA standard:**

#### **29 CFR 1926 Subpart M – Fall Protection**

Available online at

[http://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=STANDARDS&p\\_id=10922](http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10922)

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DOC FS-3477 9/2011

# OSHA® FactSheet

## Reducing Falls During Residential Construction: Installing Standing Seam Metal Roofs

When workers install standing seam metal roofs they are at risk of falling. Using a personal fall arrest system (PFAS) is the most common way to control falls during residential construction. However, these systems are not the only way to protect workers. This fact sheet describes various steps that roofing contractors may be able to take before and during roofing jobs to keep workers from falling. The fall protection methods in this fact sheet may not be suitable in all situations. Employers are responsible for ensuring compliance with applicable OSHA requirements.

### Workers Can Fall While Roofing

Roofers installing standing seam metal roofs risk permanent injury or death from falls. Even experienced roofers are exposed to unpredictable fall hazards caused by sudden gusts of wind, loose roofing materials and surfaces that become slick when wet. Taking appropriate fall protection measures reduces risks and saves lives.

The employer must provide a training program for each worker who might be exposed to fall hazards. The program must enable each worker to recognize the hazards of falling and train each worker in the procedures to follow to minimize these hazards. For fall protection training requirements, refer to 29 CFR 1926.503. In all cases, employers must evaluate the hazards and take measures to reduce the risk of falls.

More than one-third of fall deaths in residential construction are caused by falls from roofs.

### Installing Standing Seam Metal Roofs Safely: Important Steps

Before beginning the job, focus on identifying fall protection needs. Survey the roof to determine if there are pre-installed anchorages available that can be used. If not, then begin planning immediately to identify those systems needed to protect workers from falls and have them in place before the workers report to the job.

### Preparing the Work Site

Safeguarding against hazards is as important to preventing fatal falls as having good fall

protection equipment. Before work begins on a roof, employers need to prepare the site to protect workers from situations that could cause them to fall.

### Preventing Slip Hazards

Workers should avoid working on metal roofs that are wet and slippery. If work must be performed in such conditions, have the worker wear proper slip-resistant soles to reduce slipping hazards.

**Safeguarding skylights and openings:** Every year, workers die from falling through openings and weak surfaces on roofs. Employers must protect workers around skylights and roof openings by using a personal fall arrest system (PFAS), covers or guardrails. Covers, when used, must be secured and clearly marked and must be able to withstand twice the weight that may be imposed on it at any one time (29 CFR 1926.502(i)).

**Accessing the roof:** Employers should ensure that safe roof access and egress is established and make sure that workers know how to get up and down in a way that minimizes the risk of falling. Extension ladders must extend at least 3 feet above the roof level to ensure safe access to the roof. Ladders must also be secured when they are used in locations where they maybe displaced. For full requirements on the safe use of ladders, refer to 29 CFR 1926 Subpart X - Ladders.

**Staging your materials:** Loose material and hand-held equipment can create tripping hazards on the roof surface. To minimize exposure to fall hazards,

employers can stage materials so that workers on the roof have quick and safe access to them. While handling material on the roof, the worker should hold the material on the side of his or her body that faces the down-sloped edge to prevent being struck by the materials if they are dropped. Material can also be staged so it cannot slide off the roof edge and potentially strike a worker on the ground. Slide guards can help to keep material from sliding off the roof. Establishing a restricted area around the perimeter of the project can also keep workers out of the danger zone where debris, tools or materials may fall to the ground. The area should be posted with signs that warn of the potential hazard.

### Performing Edgework

Roofers must work near the roof edge when securing metal roof panels to the roofing deck. Scaffolds, ladders, aerial lifts, and PFAS may be able to provide workers with safe access to the edge.

### Communicating Your Needs

The contractor who is building and sheathing the roof structure will need fall protection equipment for workers. At a pre-construction meeting or at the first meeting on the work site, a roofer can ask the building contractor to leave roof anchors or other fall protection equipment in place after sheathing is completed.

### Selecting the Right Equipment for the Job

Roofers must use fall protection equipment that meets OSHA requirements whenever they work 6 feet or more above a lower level. Depending on the tasks involved, where the work is taking place, and other circumstances specific to standing seam metal roofing, contractors can protect their workers using the following equipment:

- Personal fall arrest systems;
- Guardrails; or
- Ladders.

Note: Fall protection requirements for residential construction work performed on ladders are in Subpart X, not in 29 CFR 1926.501(b)(13).

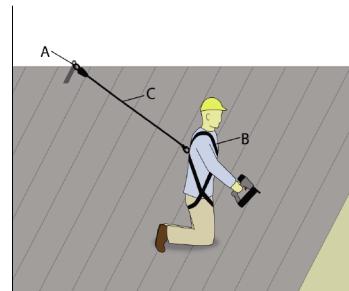
**Personal Fall Arrest System:** A PFAS is one tool available to workers during roofing jobs. In fact, a PFAS is the system of choice for many workers at heights. However, a breakdown in any component of a PFAS could be disastrous for a worker.

Always follow the manufacturer's instructions on selecting, installing and using PFAS components correctly.

### Personal Fall Arrest System (PFAS)

A PFAS is designed to safely stop a fall before the worker strikes a lower level. It includes three major components:

- An **anchorage** to which the other components of the PFAS are rigged.
- A full body **harness** worn by the worker.
- A connector, such as a **lanyard or lifeline**, linking the harness to the anchorage. A rip-stitch lanyard, or deceleration device, is typically a part of the system.



For more information on the requirements for a PFAS, refer to 29 CFR 1926.502(d).

Remember that workers must use full-body harnesses in fall arrest systems. Body belts can cause serious injury during a fall, and OSHA prohibits their use as part of fall arrest systems.

**Fall Restraint:** While fall restraint systems are not mentioned in OSHA's fall protection rules, OSHA will accept a properly utilized fall restraint system instead of a personal fall arrest system when the restraint system is rigged so that the worker cannot get to the fall hazard. In effect, (if properly used) the system tethers a worker in a manner that will not allow a fall of any distance. A fall restraint system is comprised of a body belt or body harness, an anchorage, connectors, and other necessary equipment. Other components typically include a lanyard, and may also include a lifeline and other devices.

Always follow the manufacturer's instructions or consult a qualified person to ensure proper installation of anchor points. Fall restraint may be a viable way to provide fall protection in situations in which the employer has concerns about the adequacy of available anchorage points for fall arrest equipment.

## Attaching Anchors

OSHA requires that anchors for a PFAS be able to hold at least 5,000 pounds of weight per person or maintain a safety factor of at least two (twice the impact load) under the supervision of a qualified person, as defined by 29 CFR 1926.32(m). This person could be the owner, the supervisor, or any other worker who has extensive knowledge, training and experience with fall protection and is able to solve problems relating to fall protection.

Always follow the manufacturer's instructions or consult a qualified person when installing anchors to ensure they are strong enough to hold the sudden weight of a falling worker. OSHA believes that anchorages available on the market will meet the strength requirements if they are installed as per the manufacturer's instructions, with the right number of properly sized nails or screws through the roof sheathing and into one or more roof trusses.



When choosing an anchor to use for fall protection, employers have a number of options; for example,

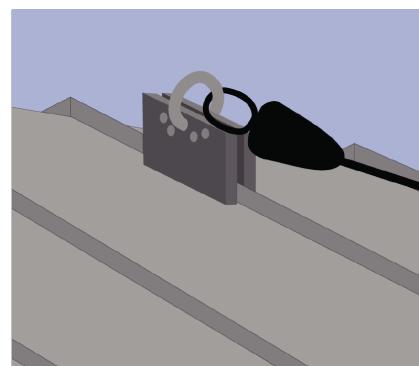
- Peak anchor: At the top of the roof, peak anchors are typically solid, non-moving pieces secured to the trusses underneath.
- Permanent D-rings: Inexpensive D-ring anchors are attached to the truss frame; they can be left permanently on the roof for future use.
- Standing seam roof clamps: There are different types of anchors available for standing seam metal roofs. Employers need to ensure that the type used is specifically designed for residential roofing. Always follow the manufacturer's instructions for safe installation and use. These clamps allow workers to securely anchor to the roof without damaging or penetrating the finished roof. The clamps are removed once work is complete and they can be reused,

making them a practical option for anchorage when installing or repairing standing seam metal roofs.

### Install an anchor above the area being built:

Choose an anchor that is appropriate for the standing seam metal roof panels and anchor location. Depending on the roof design, the best location might be at the peak of the roof, directly over a truss.

**Consider leaving anchors in place:** Where practical, employers may consider leaving anchors in place. This can make the current job simpler and reduce the burden for roofers in the future. Roofing is not always the last step in the construction process. Skylight windows and solar panels might be installed later during construction. Workers installing those units will also need fall protection anchors.



**Other considerations:** Some employers have found success in eliminating fall hazards by using scaffolds and aerial lifts when site conditions permit their use. Fall protection requirements performed on scaffolds and aerial lifts can be found in 29 CFR 1926 Subpart L – Scaffolds.

## Written Fall Protection Plans

When working at heights of 6 feet or greater, if the employer does not use ladders, scaffolds, aerial lifts or fall restraint systems and can demonstrate that it is not feasible or would create a greater hazard to use conventional fall protection equipment (guardrails, safety nets or PFAS), the employer must develop a written site-specific fall protection plan in accord with 29 CFR 1926.502(k). The plan must be prepared by a qualified person. This person could be the owner, the supervisor, or any other worker who has extensive knowledge, training and experience with fall protection and is able to solve problems relating to fall protection.

The site-specific fall protection plan must document, for each location, why the use of

conventional fall protection equipment is not feasible or will create a greater hazard. The plan must also describe the alternative methods that the employer will use so that workers are protected from falls. Workers and their supervisors must be trained on the proper use of those other fall protection methods.

Conventional fall protection equipment can reduce or eliminate the chances of a fatal fall. Otherwise, a written site-specific fall protection plan ensures that protection continues, even when conventional fall protection methods are determined to not be feasible.

**OSHA Standard:**

**29 CFR 1926 Subpart M – Fall Protection**

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# OSHA® FactSheet

## Reducing Falls During Residential Construction: Installing Tile Roofs

When workers install tile roofs they are at risk of falling. Using personal fall arrest systems (PFAS) is the most common way to control falls during residential construction. These systems are not the only way to protect a worker and there are other options. This fact sheet describes various steps that roofing contractors can take before and during roofing jobs to keep workers from falling.

### Workers Can Fall While Tiling Roofs

Roofers installing tiles risk permanent injury or death from falls. Even experienced roofers are exposed to unpredictable fall hazards caused by uneven sheathing, sudden gusts of wind, loose roofing materials, and surfaces that become slick when wet. Taking appropriate fall protection measures can reduce these risks and save lives. The employer shall provide a training program for each worker who might be exposed to fall hazards. The program shall enable each worker to recognize the hazards of falling and shall train each worker in the procedures to be followed in order to minimize these hazards. For fall protection training requirements, refer to 29 CFR 1926.503.

### Tiling Roofs Safely – Important Steps

Before beginning the job, focus on identifying fall protection needs. Survey the roof to determine if there are pre-installed anchorages available that can be used. If not, then begin planning immediately to identify those systems needed to protect workers from falls and have them available before the workers report to the job.

### Communicating Your Needs

The contractor that is building and sheathing the roof structure will need fall protection equipment for workers performing these jobs. At a pre-construction meeting, or at the first meeting on the work site, ask the building contractor to leave roof anchors or other fall protection equipment in place after sheathing is completed.

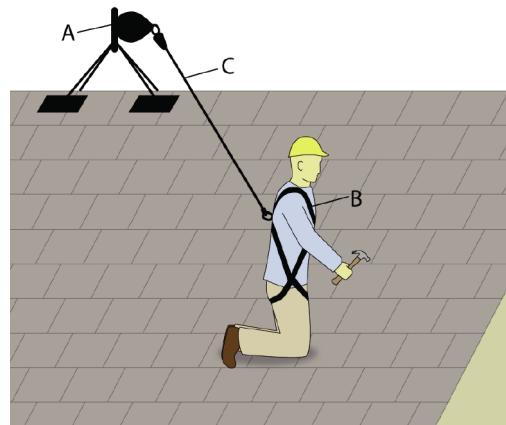
### Using the Right Equipment

Roofers must use fall protection equipment that meets OSHA requirements whenever they work 6 feet or more above a lower level. States with OSHA-approved State Plans may have additional

#### **Personal Fall Arrest System (PFAS)**

A PFAS is designed to safely stop a fall before the worker strikes a lower level. It includes three major components:

- A. An **anchorage** to which the other components of the PFAS are rigged.
- B. A full body **harness** worn by the worker.
- C. A connector, such as a **lanyard or lifeline**, linking the harness to the anchorage. A rip-stitch lanyard, or deceleration device, is typically a part of the system.



For more information on the requirements for a PFAS, refer to 29 CFR 1926.502(d).

Remember that for fall arrest systems, workers must use full-body harnesses. Body belts can cause serious injury during a fall and so OSHA prohibits their use as part of fall arrest systems.

requirements beyond OSHA requirements. Depending on the tasks involved, where the work is taking place, and other circumstances specific to tile roofing, contractors may be able to protect

their workers using the following equipment:

- Scaffolds
- Aerial lifts
- Personal Fall Arrest Systems (PFAS)
- Guardrails

### Preparing the Work Site

Safeguarding against hazards is as important to preventing fatal falls as having good fall protection equipment. When work begins on a roof, employers must prepare the site by protecting workers from situations that could cause them to fall.

#### Wet or windy weather

Roofing should only be performed when weather permits. Wind and rain put workers at a greater risk for falling. In damp or windy weather, put work on hold until conditions improve.

**Skylights and openings:** Every year, workers die from falling through openings and weak surfaces on roofs. Employers must protect employees working around skylights and roof openings with covers, PFAS or guardrails.

**Accessing the roof:** Safe roof access is as important as having effective fall protection while on the roof. Employers must provide safe access and make sure that workers know how to get up and down from a roof in a way that minimizes the risk of falling. Extension ladders must extend at least three (3) feet above the roof level to ensure safe access to the roof. For other requirements on the safe use of ladders, refer to 29 CFR 1926 Subpart X – Stairways and Ladders.

**Stage your materials:** Preventing falls is as much about reducing the risks around workers as it is about having the right fall protection equipment.

**Be sure to put all working materials in safe spots.** Loose tiles and hand-held equipment create tripping hazards on the roof surface. Workers can fall after tripping or slipping on something they did not see. While walking on the roof and carrying materials, the worker should keep the materials on the down-sloped edge to prevent the materials from falling into the worker if the materials are dropped.

### Performing Edgework

When installing the first rows of tile near the roof edge, workers have several fall protection options. In addition to a PFAS, scaffolds and aerial lifts can provide safe access to the edge.

**Scaffolds:** When properly constructed and used, external scaffolds can provide suitable protection for roof repairs along the edge of the roof. Pump-jack scaffolds offer a secure platform from which to work and can be raised and lowered for specific tasks, such as working from underneath the eaves. Guardrails along the scaffold will provide fall protection. For other requirements for scaffolds, refer to 29 CFR 1926 Subpart L – Scaffolds.

**Aerial lifts:** A portable boom lift can allow roofers easy access to the leading edge of the roof. The adjustable angle is useful for working on roofs of all grades. It offers an easy place for workers to tie off their lifelines and to work from within the basket. Care must be taken when loading material. Do not overload the lift. For other requirements for lift, refer to 29 CFR 1926.453 – Aerial Lifts.

### Anchorage

When working in an area where a scaffold or aerial lift is not practical, workers can use a PFAS with a secure anchor. OSHA requires that anchors for a PFAS are able to hold at least 5,000 pounds of weight per person, or maintain a safety factor of at least two (twice the impact load) under the supervision of a qualified person [29 CFR 1926.502(d)(15)]. Anchors must not be attached to sheathing alone, because it may not be strong enough to hold the sudden weight of a falling worker. Anchors should be fixed to a strong structural feature (like a sheathed truss). Always follow the manufacturer's instructions or consult a qualified person when installing anchors. When choosing an anchor to use for fall protection, employers have a number of options. For example:

- **Peak anchor:** At the top of the roof, peak anchors are typically solid, nonmoving pieces secured by the anchor to the trusses underneath.
- **Permanent D-rings:** Inexpensive D-ring anchors are attached to the truss frame; they are often removed after the job is done, although they can be left permanently on the roof.



#### Install an anchor above the area being built:

Choose an anchor that is appropriate for the tile type and anchor location. Depending on the roof

design, the best location might be at the peak of the roof, directly over a truss.

**Leave anchors in place:** Where practical, consider leaving anchors in place. It will make the current job simpler and reduce the burden for roofers in the future. Roofing is not always the last step in the construction process. Skylight windows and solar panels might be installed later during construction. Workers installing those units will also need fall protection anchors.

### **Written Fall Protection Plans**

If the employer does not use ladders, scaffolds, or aerial lifts, and can demonstrate that it is not feasible or would create a greater hazard to use conventional fall protection equipment (guardrails, safety nets, or PFAS) when working at heights of 6 feet or greater, the employer must develop a written site-specific fall protection plan in accord with 29 CFR 1926.502(k). The plan must be prepared by a qualified person as defined by 29 CFR 1926.32(m). This person could be the owner, the supervisor, or a worker who has extensive knowledge, training and experience with fall protection and is able to solve problems relating to fall protection. States with OSHA-approved State Plans may have additional requirements for written fall protection plans.

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Conventional fall protection equipment can reduce or eliminate the chances of a fatal fall. Written site-specific fall protection plans ensure that protection continues, even when conventional fall protection methods are determined to not be feasible.

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DOC FS-3478 9/2011

# OSHA® FactSheet

## Reducing Falls During Residential Construction: Roof Repair

Residential roof repair requires workers to operate on existing, largely intact roofs. These roofs are rarely designed with fall protection in mind, so roofers making repairs must plan ahead and take steps to reduce the risk of falls. This fact sheet describes several fall protection methods that contractors can incorporate into roof repair jobs so that roofers can work safely.

### Risks During Roof Repair

Roofers typically work at heights that put them at risk for falls. Workers making roof repairs face the same hazards, but they can be at increased risk if the roof shows signs of lost integrity or if they are uncertain how to use fall protection on a roof that is already weatherproofed. The employer shall provide a training program for each worker who might be exposed to fall hazards. The program shall enable each worker to recognize the hazards of falling and shall train each worker in the procedures to be followed in order to minimize these hazards. For fall protection training requirements, refer to 29 CFR 1926.503. In all cases, employers must evaluate the hazards and take measures to reduce the risk of falls. For patching and repair jobs, roofers have several options, including scaffolding, aerial lifts and various types of conventional fall protection. The best choice depends on where the repair is needed and on the type of building.

### How to Reduce Risk

#### *Structural Integrity*

Employers must determine the structural integrity of the roof and take all necessary precautions to protect the workers before repairs begin. If workers notice signs of structural deterioration (e.g., dry rot) as old weatherproofing is removed, a competent person should evaluate the area.

#### *At the Roof's Edge*

**Access from stable platforms:** When the damaged section of roof is along an edge, a roofer can work from a scaffold or aerial lift. Regardless of the condition of the roof, this equipment provides safe, stable work platforms from which the worker can reach the area to be repaired.

**Lifts:** Depending on the building layout and the tasks involved, lifts (e.g., scissor, aerial) may be an option for roofing work near the edge. Lifts provide stable, elevated platforms from which workers can operate safely. For small tasks, aerial lifts might be more efficient than installing scaffolds. Plus, aerial lifts are a practical way to get to a customized height above or below the roof level. Care must be taken when loading material. Do not overload the lift. For more information on the safe operation of aerial and scissor lifts, refer to 29 CFR 1926.453, Aerial Lifts and 29 CFR 1926.452(w), Mobile Scaffolds.

**Scaffolds:** When properly constructed and used, external scaffolds can provide suitable protection for roof repairs along the edge of the roof. Pump-jack scaffolds offer a secure platform from which to work and can be raised and lowered for specific tasks, such as working from underneath the eaves. Guardrails installed along the open side of the scaffold provide fall protection. For other requirements for scaffolds, refer to 29 CFR 1926 Subpart L-Scaffolds.

#### *Working Higher Up on the Roof*

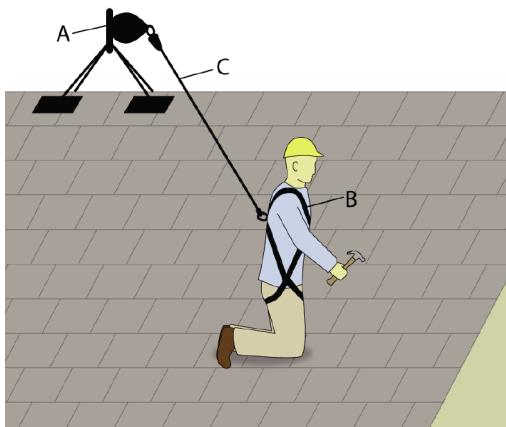
**Scaffolds:** When working farther up on the roof and beyond arm's reach, scaffolds can still provide fall protection if they are properly constructed. The top rail may have to extend higher than 45 inches above the roof surface to adequately protect workers from falls. For other requirements on how to build a secure scaffold, refer to the 29 CFR 1926 Subpart L – Scaffolds.

**Personal Fall Arrest System (PFAS):** A PFAS is another tool available to roofers during repair jobs. In fact, a PFAS is usually the system of choice for most roofers. A breakdown in any of these parts could be disastrous for a worker.

### **Personal Fall Arrest System (PFAS)**

A PFAS is designed to safely stop a fall before the worker strikes a lower level. It includes three major components:

- A. An **anchorage** to which the other components of the PFAS are rigged.
- B. A full body **harness** worn by the worker.
- C. A connector, such as a **lanyard or lifeline**, linking the harness to the anchorage. A rip-stitch lanyard, or deceleration device, is typically a part of the system.



For more information on the requirements for a PFAS, refer to 29 CFR 1926.502(d).

Remember that for fall arrest systems, workers must use full-body harnesses. Body belts can cause serious injury during a fall and so OSHA prohibits their use as part of fall arrest systems.

### **Installing, Finding and Using Anchors**

Unlike other roofing jobs, patching and repair involves otherwise intact roofs. Selecting a location to install an anchor is a critical step in avoiding a fatal fall. An anchor gives the worker a secure point to tie off the lifeline for a fall arrest system. Most of the time, existing residential roofs will not have permanent anchors available for use as fall protection. However, a qualified person should survey the roof to confirm that this is the case. An anchor for a fall arrest system must meet the 5,000-pound strength requirement or maintain a safety factor of at least two (twice the impact load) under supervision of a qualified person [29 CFR 1926.502(d)(15)].

**Identifying existing anchors:** Inspect the ridge cap and last rows of shingles for permanently installed anchors. This activity should be performed from ground level. If present, these may

be fastened to the top chord or other frame part during construction. Anchors could also have been installed with the original roof, using a low-profile style sometimes painted to match the roof color (making it less obvious from the ground).

When available, existing anchors might be effective points for a worker to tie off. Before using them as tie-off points, have a qualified person inspect them to make sure they can support the weight of a falling worker. The qualified person should make sure that the anchor is solid, unbent, and well-fixed into the wood frame below. See 29 CFR 1926 Subpart M, Appendix C, for guidance about testing anchorage points.

Existing anchors are rare, but they may become more common as builders embrace practices that “design out” safety hazards.

In its *Prevention Through Design* program, the National Institute for Occupational Safety and Health (NIOSH) promotes construction practices that minimize risks to workers early in the design process.



**Retrofit with anchors:** If the roof was not fitted with permanent anchors, employers can install them as the first phase of the job. This retrofit process should be planned so that the roof remains intact and does not leak after the job is completed. It will likely be necessary to replace an additional shingle or reset a couple shingles or tiles. **If attaching a new anchor, roofers must fix it to the truss or rafter structure underneath. Roof sheathing does not provide enough support by itself.**

Always follow the manufacturer’s instructions, or consult a professional engineer, for proper installation. Here are some anchor options that could be used, depending on the roof design:

- Peak anchor: At the apex of the roof, peak anchors are typically solid, unmoving pieces

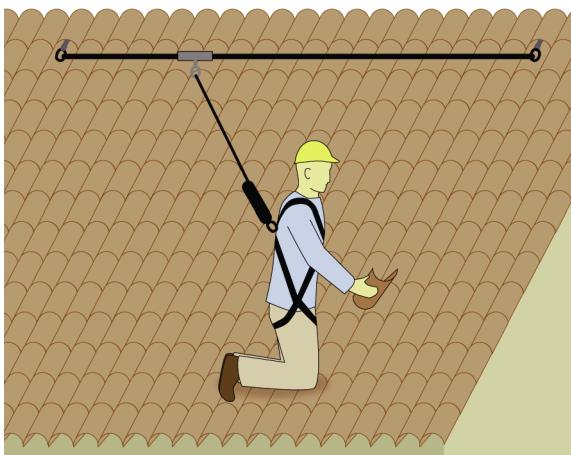
secured to the trusses underneath.

- **Permanent D-rings:** Inexpensive D-ring anchors attached to the truss frame that can be removed after the job is done, or left permanently on the roof.

**Consider the anchor location:** Depending on the roof design, some roofers choose the peak of the roof, directly over a truss. There, it will be above the worker and it will be easy to replace a small section of the ridge cap if the anchor is removed when the job is complete. Always follow the anchor manufacturer's installation instructions. See 29 CFR 1926 Subpart M, Fall Protection, for more information and additional requirements for anchor installation and use.

**Add anchor points:** Depending on the size of the repair job and the number of workers who need to be on the roof, it might be necessary to install more than one anchor.

An engineered horizontal lifeline is another way to increase the area in which a worker is protected. The system should be installed following the manufacturer's instructions or under the supervision of a qualified person.



**Leave anchors in place:** Where practical, consider leaving roof anchors in place. It will make the current job simpler and reduce the burden for roofers in the future.

### Safe Roof Repair – Important Steps

- Before beginning the job, focus on identifying fall protection needs.

- Guard against falls through skylights or other roof openings. Use a guardrail system, PFAS or protective cover that will support two times the weight of a worker.
- If necessary to protect workers below from falling debris, set up a work zone while roofers remove old roofing materials from the repair area.
- Workers should be careful of air hoses and power cords for nail guns and other electrical equipment. If a worker steps on one, hoses and cords can slip underfoot and lead to falls.
- Remember to place any removed shingles or replacement tiles in a safe location. If unsecured, these materials can visually blend in against the roof and create a dangerous trip hazard.
- New materials staged on the roof should be placed so that they are safe and secure.

### Written Fall Protection Plans

If the employer does not use ladders, scaffolds, or aerial lifts, and can demonstrate that it is not feasible or would create a greater hazard to use conventional fall protection equipment (guardrails, safety nets, or PFAS) when working at heights of 6 feet or greater, the employer must develop a written site-specific fall protection plan in accord with 29 CFR 1926.502(k). The plan must be prepared by a qualified person as defined by 29 CFR 1926.32(m). This person could be the owner, the supervisor, or a worker who has extensive knowledge, training and experience with fall protection and is able to solve problems relating to fall protection. States with OSHA-approved State Plans may have additional requirements for written fall protection plans.

The site-specific fall protection plan must document at each location why the use of conventional fall protection equipment is not feasible or will create a greater hazard. The plan must also describe the alternative methods that the employer will use so that workers are protected from falls. Workers and their supervisors must be trained on the proper use of those other fall protection methods.

Conventional fall protection equipment can reduce or eliminate the chances of a fatal fall. Written site-specific fall protection plans ensure that protection continues, even when conventional fall protection methods are determined to not be feasible.

**OSHA standard:****29 CFR 1926 Subpart M – Fall Protection**

Available online at

[http://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=STANDARDS&p\\_id=10922](http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10922)

OSHA Residential Fall Protection Web Page

[http://www.osha.gov/doc/residential\\_fall\\_protection.html](http://www.osha.gov/doc/residential_fall_protection.html)

**OSHA Compliance Guidance:****Compliance Guidance for Residential****Construction – STD 03-11-002 (dated 12/16/2010)**

Available online at

[http://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=DIRECTIVES&p\\_id=4755](http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=DIRECTIVES&p_id=4755)

**State Plan Guidance:** States with OSHA-approved State Plans may have additional requirements for Residential Roofing within State Plans. For more information on these requirements, please visit: <http://www.osha.gov/dcsp/osp/statestandards.html>.

**Help for Employers:** OSHA's On-site Consultation Program offers free and confidential advice to small and medium-sized businesses in all states across the country, with priority given to high-hazard worksites. On-site Consultation services are separate from enforcement and do not result in penalties or citations. Consultants from state agencies or universities work with employers to identify workplace hazards, provide advice on compliance with OSHA standards, and assist in establishing safety and health management systems. To locate the OSHA On-site Consultation Program nearest you, call 1-800-321-6742 (OSHA) or visit <http://www.osha.gov/dcsp/smallbusiness/index.html>

**NIOSH Prevention Through Design Program**

Available online at

<http://www.cdc.gov/niosh/topics/ptd>

This is one in a series of informational fact sheets highlighting OSHA programs, policies or standards. It does not impose any new compliance requirements. For a comprehensive list of compliance requirements of OSHA standards or regulations, refer to Title 29 of the Code of Federal Regulations. This information will be made available to sensory-impaired individuals upon request. The voice phone is (202) 693-1999; teletypewriter (TTY) number: (877) 889-5627.

**For assistance, contact us. We can help. It's confidential.**



U.S. Department of Labor  
[www.osha.gov](http://www.osha.gov) (800) 321-OSHA (6742)

DOC FS-3479 9/2011



## Tilt-Up Panel Construction Hazard

### Safety and Health Information Bulletin

SHIB 10-15-2003

#### Purpose

The purpose of this Safety and Health Information Bulletin is:

1. To alert tilt-up contractors, constructors, and erectors about the hazards of unsupported panels toppling over and causing severe injury or death to workers.
2. To inform tilt-up contractors, constructors and erectors not to remove braces from panels until all structural connections are complete and properly secured.
3. To identify regulatory requirements for, and provide safety recommendations to employers and workers involved in tilt-up construction.

#### Background

Federal OSHA's Directorate of Construction received notice of a multiple fatality accident on a construction project located in Greensboro, North Carolina. An inspection of the construction site was conducted by North Carolina Department of Labor Division of Occupational Safety and Health (OSH-NC). During this inspection OSH-NC identified hazardous conditions occurring during a tilt-up panel erection operation at a large retail warehouse.<sup>1</sup>

This Safety and Health Information Bulletin is **not** a standard or regulation, and it creates no new legal obligations. The Bulletin is advisory in nature, informational in content, and is intended to assist employers in providing a safe and healthful workplace. The Occupational Safety and Health Act requires employers to comply with hazard-specific safety and health standards as issued and enforced by either the Occupational Safety and Health Administration (OSHA), or an OSHA-approved State Plan. In addition, employers must provide their employees with a workplace free from recognized hazards likely to cause death or serious physical harm under Section 5(a)(1), the General Duty Clause of the Act. Employers can be cited for violating the General Duty Clause if there is a recognized hazard and they do not take steps to prevent or abate the hazard. However, failure to implement any guidelines in this bulletin is not, in itself, a violation of the General Duty Clause. Citations can only be based on standards, regulations, and the General Duty Clause.

#### Accident Investigation

The OSH-NC accident investigation revealed:

1. Three employees working at the construction site took a lunch break in the shade provided by a twenty (20) ton, 23' high by 19'7" wide, inadequately supported, reinforced concrete tilt-up wall panel.
2. The unbraced wall panel collapsed killing all three employees.
3. The tilt-up erection employer failed to install adequate bracing and/or removed temporary braces on approximately fourteen (14) tilt-up wall panels prior to the completion of all permanent connections to the structure.

<sup>1</sup> *Tilt-up panel construction a construction technique of casting concrete elements in a horizontal position at the job site and then tilting and lifting the panels to their final position in a structure.*

4. Joist welds, grout, and pour back strips, as specified by the contract documents, were not all in place prior to temporary brace removal.
5. A number of "K" series steel joists designed to be attached to the embed plates were not welded or properly secured.
6. Supervisors and employees lacked adequate knowledge about measures necessary to address hazards associated with tilt-up construction.

### **OSHA Standards and Suggested Safety Tips for Tilt-up Construction**

1. Employers shall initiate and maintain such programs as may be necessary to provide for frequent and regular inspections of the job site, materials, and equipment by designated competent persons. **1926.20(b)(1) through (2)**
2. Employers shall instruct each employee in the recognition and avoidance of unsafe conditions and the regulations applicable to his work environment to control or eliminate any hazard or other exposure to illness or injury.  
**1926.21(b)(2).** For example employers should instruct supervisors and workers not to remove temporary braces until roof structure and/or columns are in place to stabilize the building.
3. Employers shall comply with all of the requirements for precast concrete construction. **1926.704**
4. Employers should ensure that tilt-up panels are properly braced to resist wind and lateral forces.
5. Employers shall use only certified welders when welding steel joists to embeds and inserts on tilt-up wall panels.

### **Further Information**

Further information can be obtained from Occupational Safety and Health Administration, Directorate of Construction internet website [www.OSHA.gov.doc](http://www.OSHA.gov.doc) or by contacting the Office of Construction Services at 202-693-2020.

### **Additional information is available from**

American National Standards Institute (ANSI)  
[www.ansi.org](http://www.ansi.org)

American Society of Testing and Materials (ASTM)  
[www.astm.org](http://www.astm.org)

Tilt-Up Concrete Association (TCA)  
[www.tilt-up.org](http://www.tilt-up.org)

# OSHA® FactSheet

## Reducing Falls during Residential Construction: Working in Attics

Protecting workers from falls while working in attics can be challenging for some employers. This fact sheet highlights some of the hazards of attic work and details some practical methods that employers can use to protect those who work in attics. The fall protection methods in this fact sheet may not be suitable in all situations. Employers are responsible for ensuring compliance with applicable OSHA requirements.

### Risk of Falls during Attic Work

Working in a low attic can be difficult. Employees moving through these spaces may be exposed to fall hazards at the openings between truss chords. Exposed nails, cables, wires, low-hanging rafters or cross-beams, hot conditions, poor lighting, and truss chords hidden by deep insulation, can add to the risk of falling.

The employer must provide a training program for each worker who might be exposed to fall hazards. The program must train each worker to recognize fall hazards and to know the procedures to follow to minimize these hazards. For fall protection training requirements, refer to 29 CFR 1926.503. In all cases, employers must evaluate the hazards and take steps to reduce the risk of falls. Using appropriate fall protection measures reduces risks and saves lives.

### Reducing Risks:

#### *Planning*

Planning for the use of fall protection equipment can help employers protect workers from falls. Before beginning the job, identify fall protection needs. Survey the attic to determine what fall protection systems can be used. Plan ahead and have those systems in place before the workers report to the job.

#### *Determining Structural Integrity of Truss Chords or Ceiling Joists*

Workers can be injured if they fall through the ceiling to a lower level. Employers must determine if the walking/working surfaces in attics have the strength and structural integrity to support workers safely (29 CFR 1926.501(a)(2)). Only after this determination has been made should workers be allowed to enter those areas. Using a piece of plywood or planking to stand on could improve footing.



If the area around the plywood or planking is open, and the work area is 6 feet or more above a lower level, the employer generally must ensure that workers use fall protection meeting OSHA requirements (29 CFR 1926.501(b)(13)). Employers also may choose to use scaffolds or ladders for attic work.

(Note: OSHA's fall protection requirements for residential construction work performed on scaffolds and ladders are specified in Subpart L and Subpart X, respectively, not in 29 CFR 1926.501(b)(13)).

#### *Personal Fall Arrest System (PFAS)*

A PFAS is a tool available to workers performing attic work. In fact, a PFAS is the system of choice for many workers who work at heights. However, a malfunction in any component of a PFAS could be disastrous for a worker. Always follow the manufacturer's instructions on selecting, installing and using PFAS components correctly.

### **Personal Fall Arrest System**

A PFAS is designed to safely stop a fall before the worker strikes a lower level. The system includes three major components:

- A. An **anchorage** to which the other components of the PFAS are rigged.
- B. A full **body harness** worn by the worker.
- C. A connector, such as a **lanyard or lifeline**, linking the harness to the anchorage. A rip-stitch lanyard, or deceleration device, is typically a part of the system.



For more information on the requirements for a PFAS, refer to 29 CFR 1926.502(d).

Remember that workers must use full-body harnesses in fall arrest systems. Body belts can cause serious injury during a fall, and OSHA prohibits their use as part of fall arrest systems.

### **Attaching Anchors**

OSHA requires that anchors for a PFAS either be able to hold at least 5,000 pounds per worker or maintain a safety factor of at least two (twice the impact load) and be used under the supervision of a qualified person. Always follow the manufacturer's instructions or consult a qualified person when installing anchors to ensure that they are strong enough to hold the sudden weight of a falling worker. There are anchorages available on the market that can meet OSHA's strength requirements if they are installed in accord with the manufacturer's instructions, with the right number of properly-sized nails or screws. Also, employers may find it possible to provide safe anchorage down the length of an entire attic by properly installing an engineered horizontal lifeline.

### **Pre-installed Anchorage Systems**

With advance planning on new construction projects, some anchorage systems can be pre-installed before the trusses are lifted into position. This method permits workers to attach their lanyards

to an anchorage immediately upon entering the attic space.

**Consider leaving anchors in place:** Where practical, employers should consider leaving anchors in place. This can make the current job simpler and reduce the burden for attic workers in the future.



A pre-installed attic anchorage system.

### **Fall Restraint**

Fall restraint systems prevent falls by keeping the worker from reaching a fall hazard. While fall restraint systems are not mentioned in OSHA's fall protection rules, OSHA will accept a properly utilized fall restraint system in place of a personal fall arrest system when the restraint system is rigged so that the worker cannot reach the fall hazard. In effect, (if properly used) the system tethers a worker in a manner that will not allow a fall of any distance. A fall restraint system is comprised of a body belt or body harness, an anchorage, connectors, and other necessary equipment. Other components typically include a lanyard, and may also include a lifeline and other devices. Note: A self-retracting lanyard is not appropriate for a fall restraint system unless the worker cannot reach the fall hazard when the lanyard is fully extended.

Always follow the manufacturer's instructions or consult a qualified person to ensure proper installation of anchor points. OSHA recommends that fall restraint systems have the capacity to withstand 3,000 pounds of force or twice the maximum expected force that is needed to restrain the worker from exposure to the fall hazard. As a result, fall restraint may be a viable way to provide fall protection in situations in which the employer has concerns about the adequacy of available anchorage points for fall arrest equipment.

### **Safety Net Systems**

In some situations, employers may be able to place safety nets underneath truss chords to prevent workers from falling to the level below. Safety nets must be installed to prevent contact with the surface or structures below them. For requirements for safety nets, refer to 29 CFR 1926.502(c)—Safety Net Systems.

### **Scaffolds**

Scaffolds, stationary or mobile, can be erected below the attic work area. Workers on the scaffold can work between truss chords and joists to perform some installation activities. For requirements for scaffolds, refer to 29 CFR 1926 Subpart L – Scaffolds.

### **Ladders**

Like scaffolds, A-frame and platform ladders can provide safe platforms from which workers on the lower level can perform some tasks in the attic above. Consult 29 CFR 1926 Subpart X – Stairways and Ladders for ladder safety requirements.

### **Written Fall Protection Plans**

When working at heights of 6 feet or greater, if the employer does not use ladders, scaffolds, aerial lifts or fall restraint systems and can demonstrate that it is not feasible or would create a greater hazard

to use conventional fall protection equipment (guardrails, safety nets or a PFAS), the employer must develop a written site-specific fall protection plan in accord with 29 CFR 1926.502(k). The plan must be prepared by a qualified person. This person could be the owner, the supervisor, or any other worker who has extensive knowledge, training and experience with fall protection and is able to solve problems relating to fall protection.

The site-specific fall protection plan must document, for each location, why the use of conventional fall protection equipment is not feasible or will create a greater hazard. The plan must also describe the alternative methods that the employer will use so that workers are protected from falls. Workers and their supervisors must be trained on the proper use of those other fall protection methods.

#### **OSHA Standard:**

#### **29 CFR 1926 Subpart M – Fall Protection**

Available online at:

[www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=STANDARDS&p\\_id=10922](http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10922).

OSHA Residential Fall Protection Web Page:  
[www.osha.gov/doc/topics/residentialprotection/index.html](http://www.osha.gov/doc/topics/residentialprotection/index.html).

#### **OSHA Compliance Guidance:**

#### **Compliance Guidance for Residential Construction – STD 03-11-002 (dated 12/16/2010)**

Available online at:

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**State Plan Guidance:** Twenty-seven states or territories currently operate their own OSHA-approved state plans. State plan workplace health and safety standards must be at least as effective as comparable Federal OSHA standards. State plans have the option of promulgating more stringent standards and, therefore, may have additional requirements for residential

construction. For more information on state plans and their requirements, please visit:  
[www.osha.gov/dcsp/osp/statestandards.html](http://www.osha.gov/dcsp/osp/statestandards.html).

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[www.osha.gov/dcsp/smallbusiness/consult.html](http://www.osha.gov/dcsp/smallbusiness/consult.html).

Almost every OSHA area office has a compliance assistance specialist to assist employers in complying with OSHA standards. To find the compliance assistance specialist nearest you, call 1-800-321-OSHA (6742) or visit:  
[www.osha.gov/html/RAMap.html](http://www.osha.gov/html/RAMap.html).

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# OSHA SUSAN HARWOOD PROGRAM 2016-17

## Confined Space Safety Training

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# Disclaimer

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This training is conducted under the OSHA Susan Harwood training grant #SH-29667-SH6 from the U.S. Department of labor. It does not necessarily reflect the views or policies of the U. S. Department of Labor, nor does mention of trade names, commercial products, or organizations imply endorsement by the U. S. Government.

# Agenda

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As a result of this training Participants will be able to:

1. OSHA New rule for Confined Spaces
2. Know what a confined space is.
3. Identify and understand Permit-Required Confined Spaces.
4. Identify and understand non-Permit Confined Spaces.
5. Understand the hazards associated with Confined Spaces.
6. Understand the roles associated with confined space entry.
7. Have an awareness understanding of the types of PPE that may be required for entry into confined spaces.

# OSHA New Rule

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On May 4, 2015, OSHA issued a new standard for construction work in confined spaces, which became effective August 3, 2015. The new standard, **Subpart AA of 29 CFR 1926** will help prevent construction workers from being hurt or killed by eliminating and isolating hazards in confined spaces at construction sites similar to the way workers in other industries are already protected.

**The NEW rule requires employers to determine what kinds of spaces their workers are in, what hazards could be there, how those hazards should be made safe, what training workers should receive, and how to rescue those workers if anything goes wrong. Previously the only requirement for confined spaces in construction was training**

# *What is a Confined Space?*

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A space that:

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

# Examples of Confined Spaces

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**Tanks**

**Manholes**

**Boilers**

**Furnaces**

**Sewers**

**Silos**

**Hoppers**

**Vaults**

**Pipes**

**Trenches**

**Tunnels**

**Ducts**

**Bins**

**Pits**

# Potential Hazards in Confined Spaces

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## Oxygen Deficiency

- <19.5% or >23.5% oxygen concentration

## Combustibles

- Methane
- Hydrogen
- Acetylene
- Propane
- Gasoline fumes

## Toxic Materials

- Carbon Monoxide
- Hydrogen Sulfide
- Welding fumes
- Corrosives

## Electricity

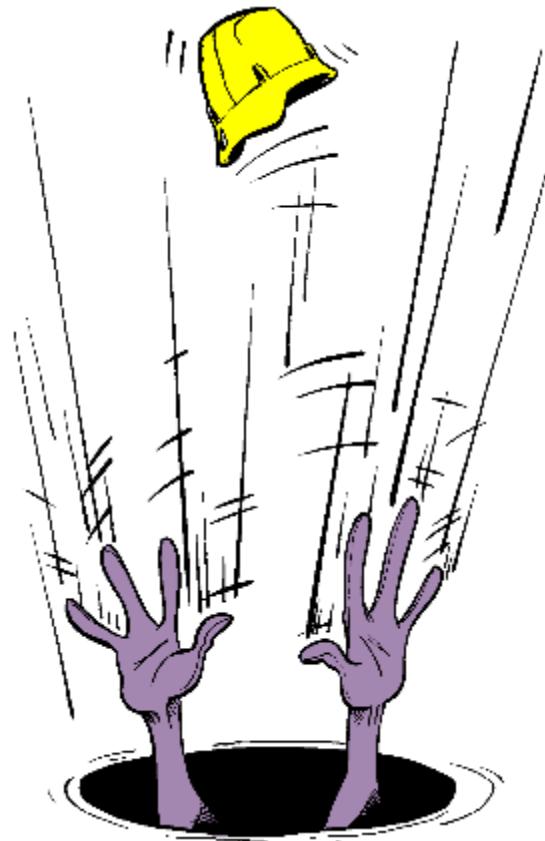
## Mechanical Hazards

- Mixers
- Crushers

# ENTRY

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- *The act by which a person intentionally passes through an opening into a permit required confined space.*
- *Any part of the body passing through the opening is considered entry.*



# IDLH

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## **IMMEDIATELY DANGEROUS TO LIFE OR HEALTH**

- Any condition which poses an immediate threat to the health of life on an entrant, or;
- Would cause irreversible adverse health effects, or;
- Would interfere with an individual's ability to escape unaided from a permit space.

# ENTRANT

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*The employee  
who will  
physically enter  
the confined  
space to perform  
the work.*



# ATTENDANT

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*The employee who remains outside the confined space and monitors the entrant(s); guards the space against unauthorized entry; warns the entrants of any unusual conditions; and summons the rescue personnel if needed.*



# Permit-Required Confined Space

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

- Contains or has the potential to contain a hazardous atmosphere;
- Contains a material that has the potential for engulfing an entrant;
- Has an internal configuration such that an entrant could become trapped or asphyxiated; or
- Contains any other serious safety or health hazard.

# Entry Supervisor

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*The employee responsible for coordinating the entry into the confined space. This must be a team leader or foreman.*



# Responsible Person

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***The person directly responsible for the work being performed in the confined space. This can be the Team Leader, Foreman, journeyman, or other person qualified by training and experience.***

# Non-Permit Confined Space

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*A confined space that does not contain or, with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm.*



# Two Options for Entering Confined Spaces:

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## *Permit-required confined space entry*

- *For hazardous or potentially hazardous confined space work*

### Examples of Permit Required Confined Spaces:

- Manholes going into sewers
- Grain Silos
- Trenches

## *Non-permit confined space entry*

- *For non-hazardous confined space work*

### Examples of a Non-Permit Required Confined Space:

- Drop ceiling
- Motor control cabinets

# Permit-Required Confined Space Entry Procedure

---

1. Isolate the space
2. Ventilate the space
3. Conduct Tailboard
4. Complete permit
5. Test the atmosphere
6. Enter the space

# 1. Isolate the Space from all hazards

---

## **Close Valves**

- Double block & bleed, or
- Blank flange

## **Empty the Space**

- Depressurize, vent & drain

## **Lockout/Tagout Equipment**

- Electrical sources
- Rotating/reciprocating parts
- Hazardous materials

## **Clean residue from the space**

# 2. Ventilate the Space

---

## Use mechanical ventilation

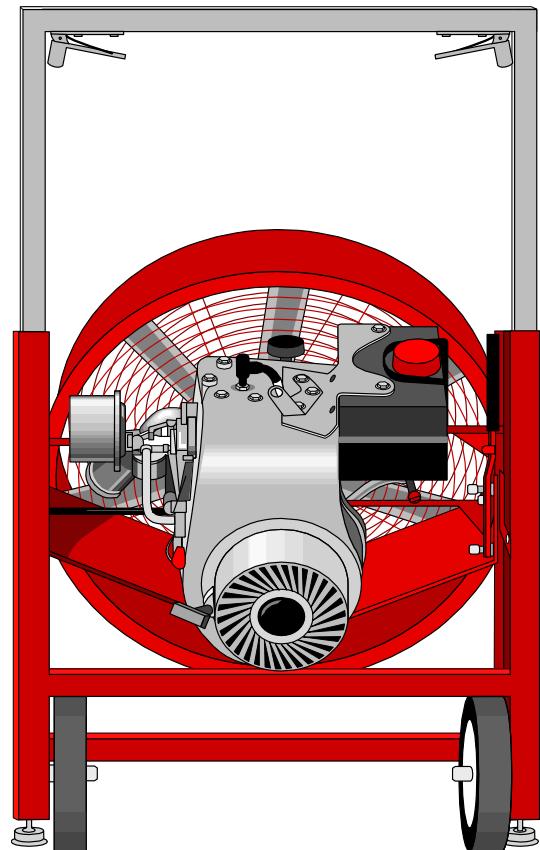
- Fans
- Air horns

## Ventilate at the rate of at least four (4) volumes per hour

- Larger spaces require more ventilation

## Make sure air supply is not contaminated

- Ventilation air supply must be from fresh air uncontaminated with flammables, toxins, etc.



# 3. Conduct a Tailboard Briefing

---

## **Entire crew must attend**

- Attendants, entrants, entry supervisor

## **Review hazards of entry and work**

## **Review PPE**

## **Review procedure for contacting rescue**

- verify rescue available

## **Complete permit**

# 4. Complete Entry Permit Form

---

- ***Permit must be correctly and completely filled out prior to entry.***
- ***Permit must be activated by Entry Supervisor's signature to be valid.***
- ***No entry is allowed without a valid permit.***
- ***Permits are valid for up to 12 hours.***
- ***When work is completed, permit and tailboard form should be returned to safety.***
- ***Canceled permits must be kept on file for at least one year.***

# 5. Test the Atmosphere

## In this following order

### ✓ Check for Oxygen Content:

- At least 19.5% and less than 23.5%

### ✓ Check for Combustibles:

- Less than 10% of the LEL (Lower explosive limit)

### ✓ Check for Toxic Gasses:

- Most commonly carbon monoxide (PEL <35 ppm)
- or any other hazardous materials as determined by the use of the space.



# NOTICE:

---

***Any time a limit is exceeded, no matter what the reason, all personnel shall immediately exit the space, and no others shall enter until atmospheric conditions are returned to safe levels.***

**THERE ARE NO EXCEPTIONS TO THIS!**

# Atmosphere Testing Shall Be Performed:

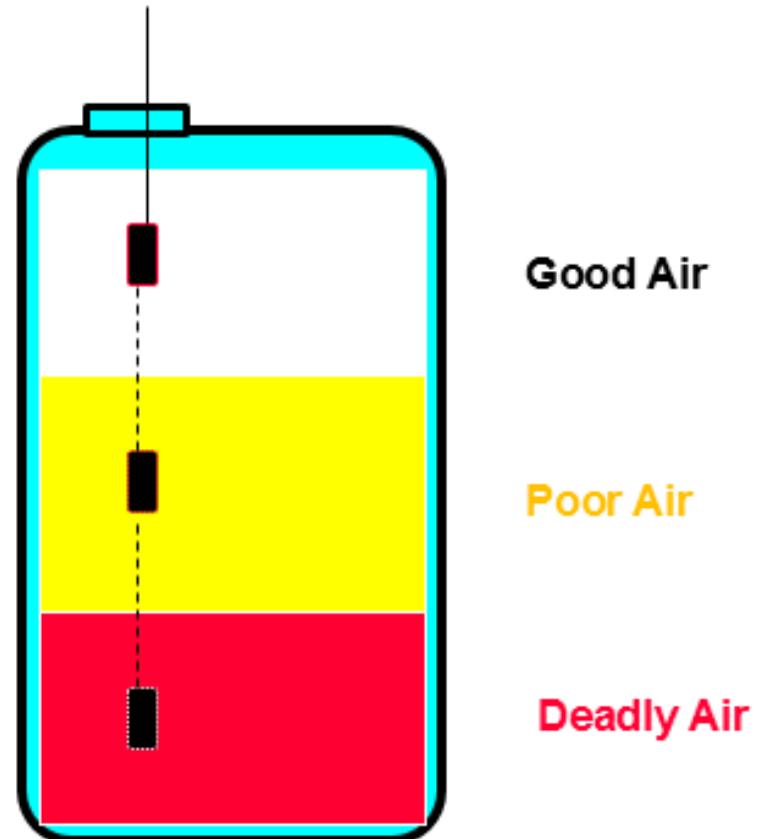
---

- ✓ Prior to every entry when the space is vacant;
- ✓ After a 10 minute ventilation period (if ventilation is necessary);
- ✓ At least hourly for permit-required confined spaces.
- ✓ More frequently, if conditions or suspicions warrant.

# **Always test the air at various levels to be sure that the entire space is safe.**

---

**Good air near the opening does NOT mean there is good air at the bottom!**



# 6. Enter the Space and Proceed with work:

---

- An attendant shall be posted near the entrance for the duration of the work. He shall be in constant communication with the entrants while the job is in progress.
- All entrants shall sign the sign in log when entering the space and sign out when exiting.
- The attendant shall maintain the permit and sign in log for the duration of the work.

# When the Job is Done:

---

- ✓ Remove all personnel, tools, and debris from the space. Sign off the log.
- ✓ Close the space.
- ✓ Cancel the permit.
- ✓ Review the job with the host employer (hazards, problems, other employers, etc.)

# Non-Permit Confined Space Entry

---

1. Isolate the space
2. Ventilate the space
3. Evaluate the space
  1. Test atmosphere
  2. Assure justification conditions are met
4. Conduct tailboard
5. Enter the space

# 1. Isolate the Space from all hazards

---

## Close Valves

- Double block & bleed, or
- Blank flange

## Empty the Space

- Depressurize, vent & drain

## Lockout/Tagout Equipment

- Electrical sources
- Rotating/reciprocating parts
- Hazardous materials

## Clean residue from the space

# 2. Ventilate the Space.

---

## Use mechanical ventilation

- Fans
- Air horns

## Ventilate at the rate of at least four (4) volumes per hour

- Larger spaces require more ventilation

## Make sure air supply is not contaminated

- Ventilation air supply must be from fresh air uncontaminated with flammables, toxins, etc.

# 3. Evaluate the Space

---

- ✓ Determine that the space meets all the conditions set forth in the non-permit justifications
- ✓ Conduct atmospheric testing
- ✓ Evaluation must be certified by Entry Supervisor's signature
- ✓ Determine that the confined space does not:
  - contain or have the potential to contain a hazardous atmosphere
    - Continuous mechanical ventilation not acceptable as good atmosphere
  - contain a material with the potential for engulfment
  - Has an internal configuration which could trap or asphyxiate, or
  - contain any recognized serious safety or health hazard

# 4,5. Enter the Space and Proceed with work:

---

If non-permit conditions change during the job, the space shall be immediately evacuated, and reclassified as a permit-required confined space; or conditions shall be returned to non-permit conditions and again certified as such by the entry supervisor.

# Contractor Confined Space Entry

---

- ❑ Contractors must be informed of the hazards within the space
- ❑ Contractors must follow their own established confined space entry procedure and use their own permit forms
- ❑ Contractors must supply their own attendants
  - ❑ One attendant is acceptable for multiple companies' entrants
- ❑ Contractors must supply their own air monitors
- ❑ Contractors must review entry after completion of job

# Attendant Responsibilities

---

- ✓ *To monitor entrants during the job and during entry & exit to help insure their safety.*
- ✓ *The attendant **may not abandon** his post for any reason while personnel are in the space unless relieved by another qualified attendant.*
- ✓ *To monitor atmospheric conditions in the space prior to and during entry.*
- ✓ *To control access to the confined space.*
- ✓ *To summon emergency assistance as needed.*
- ✓ *To assess hazards in and around the space, and take action on the same.*
- ✓ *To keep records of confined space work, such as air test results, personnel entry/exit, etc.*

# Entrant Responsibilities

---

- ✓ To assure that the space has been adequately ventilated, isolated, emptied, or otherwise made safe for entry.
- ✓ To immediately exit a space, without question, upon word of the attendant, no matter what the reason.
- ✓ To follow all safety rules and procedures that apply to the job.
- ✓ To be familiar with the work to be performed and the procedures that apply to the job.
- ✓ To use the appropriate PPE whenever necessary.

# Supervisor Responsibilities

---

- ✓ To assure adequate protection is provided to the entrants by verifying adequate lockout/tagout and that all hazards are securely isolated.
- ✓ To support the attendant's authority in controlling access to a confined space.
- ✓ To verify that all personnel have exited prior to closing the space.
- ✓ To assure that all personnel involved are aware of the hazards associated with the space.
- ✓ To assure that rescue services are available prior to entry.

# Information sources

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- <https://www.osha.gov/confinedspaces/faq.html>
- <https://www.osha.gov/confinedspaces/index.html>

# Confined Space Training

# Confined Space Training

## Disclaimer

This material was produced under grant number SH-05073-SH8 from the Occupational Safety and Health Administration, U.S. Department of Labor.

It does not necessarily reflect the views or policies of the U.S. Department of Labor, nor does mention of trade names, commercial products, or organizations imply endorsement by the U.S. Government.

# Confined Space Training

## Welcome

- What is a Confined Space
- When does it become Permit Required?
- What are the Hazards
- Training

# Confined Space Training

## Module-1

- What is a Confined Space
- When does it become Permit Required?
- What are the Hazards
- Training

# What is a Confined Space

According to OSHA

29 CFR 1910.146b

A Confined Space is defined as:

1. Large enough and so configured that a worker can bodily enter it, and
2. Has limited or restricted means of entry or exit, and
3. Is not designated for continuous worker occupancy.

# What is a Confined Space - Part 2

According to OSHA

29 CFR 1910.146b

A con-

1.

2.

3.

**NOTE: What is considered ENTRY?**

If you break the plane of a confined space, you have entered the confined space!

# Confined Space Training

## Module-1b      Permit Required?

- What is a Confined Space
- When does it become Permit Required?
- What are the Hazards
- Training

# When does it become Permit Required?

**Permit Required Confined Space** has one or more of the following characteristics:

- ▶ 1. Contains or has the potential to contain a hazardous atmosphere;
- ▶ 2. Contains a material that has the potential for engulfing an entrant;
- ▶ 3. Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by sloped/tapered floors.

# When does it become Permit Required? - Part 2

Example of a permit-required confined space.



# When does it become Permit Required? - Part 3

- ▶ Permit-required confined space entry
- ▶ Permit is required whenever there is a hazard
- ▶ Or potential hazard

CONFINED SPACE ENTRY PERMIT							
ENTRY SUPERVISOR: COMPLETE AND INITIAL FORM (PLEASE PRINT)							
Entry Supervisor:							
Department(s) Involved:							
Location of Space: (be specific)							
Work to be Accomplished:							
Authorized Entrant(s):							
Authorized Attendant(s):							
Entry Date(s) & Time(s):							
(Permit is limited to one project at location of space)							
<b>PERMIT SPACE HAZARDS</b> (See Space ID List)							
<input type="checkbox"/> ATMOSPHERIC <input type="checkbox"/> Oxygen Deficiency <input type="checkbox"/> Oxygen Enrichment <input type="checkbox"/> Explosive (Gas/Vapor) <input type="checkbox"/> Carbon Monoxide <input type="checkbox"/> Hydrogen Sulfide <input type="checkbox"/> Other Toxic gases/vapors _____							
<input type="checkbox"/> ENGULFMENT <input type="checkbox"/> CONFIGURATION (ENTRAPMENT) <input type="checkbox"/> MECHANICAL <input type="checkbox"/> ELECTRICAL <input type="checkbox"/> SUBSTANCE HAZARDOUS TO SKIN OR EYES <input type="checkbox"/> HEAT STRESS <input type="checkbox"/> OTHER POTENTIAL HAZARDS (e.g. radiation, noise, etc) _____							
<b>CONTROLS</b> (Check all that apply)							
<input type="checkbox"/> ATMOSPHERIC TESTING (Required) <input type="checkbox"/> Continuous <input type="checkbox"/> Periodic (Give interval) _____							
<input type="checkbox"/> VENTILATION <input type="checkbox"/> Continuous forced air <input type="checkbox"/> Local Exhaust <input type="checkbox"/> Natural							
<input type="checkbox"/> ISOLATION <input type="checkbox"/> Lockout/Tagout (Specify) _____							
<input type="checkbox"/> Blanking/Blinding <input type="checkbox"/> Double Block & Bleed <input type="checkbox"/> Line Breaking/Misalign <input type="checkbox"/> Other							
<input type="checkbox"/> PURGE / FLUSH / CLEAN <input type="checkbox"/> BARRICADES / COVER REMOVAL							
<b>TOOLS / EQUIPMENT</b> (Check mandatory items)							
<input type="checkbox"/> AIR MONITOR <input type="checkbox"/> Tripod w/ mechanical winch <input type="checkbox"/> Explosion proof lighting <input type="checkbox"/> Intrinsically Safe Tools & Electrical Equip. GFCI <input type="checkbox"/> Ladders <input type="checkbox"/> FIRE EXTINGUISHER <input type="checkbox"/> Water <input type="checkbox"/> ABC							
<input type="checkbox"/> Other _____							
<b>RESCUE PROCEDURES</b> BEFORE Attempting Non-Entry Rescue Call Emergency Number First!							
EMERGENCY PHONE #		Back-up emergency #					
STATE: "This is a Confined Space Emergency" NEVER ENTER SPACE to attempt rescue.							
Have you called Maintenance Dispatch before entry? <input type="checkbox"/> YES <input type="checkbox"/> NO / Additional entries <input type="checkbox"/> YES <input type="checkbox"/> NO							
Is pre-entry set-up of emergency equipment required? <input type="checkbox"/> YES <input type="checkbox"/> NO							
If not, where is location of rescue equipment?							
<b>EQUIPMENT (Check mandatory items)</b>							
<input type="checkbox"/> Safety Glasses <input type="checkbox"/> Face Shield <input type="checkbox"/> Other: (specify) _____							
<input type="checkbox"/> Rubber <input type="checkbox"/> Slip Prevention <input type="checkbox"/> Steel toes <input type="checkbox"/> Other: (specify) _____							
<input type="checkbox"/> Leather <input type="checkbox"/> Cotton <input type="checkbox"/> Other: (specify) _____							
<input type="checkbox"/> Harness & Lifelines <input type="checkbox"/> Supplied air <input type="checkbox"/> Other: (specify) _____							
<input type="checkbox"/> Anchors <input type="checkbox"/> Anchor points: (specify) _____							
DATE _____ (verified all conditions are met before entry)							
<input type="checkbox"/> Bump test on Air Monitor is required prior to using							
<input type="checkbox"/> H <sub>2</sub> S ppm (hydrogen sulfide) 10 ppm <input type="checkbox"/> Explosive dust <input type="checkbox"/> Other < LFL 5 Ft. Visibility							
In/out	Att. Initials	Time In/out	Att. Initials				
Project completed <input type="checkbox"/> YES <input type="checkbox"/> NO							
Project cancelled <input type="checkbox"/> YES <input type="checkbox"/> NO _____							
Entry Supervisor (Initial)							

# Confined Space Training

## Module-3

- What is a Confined Space
- When does it become Permit Required?
- What are the Hazards
- Training

# What are the Hazards?

## Potential Hazards in Confined Spaces

- Asphyxiating - Oxygen Deficiency
  - <19.5% or >23.5% oxygen concentration
- CO<sub>2</sub>
  - CO<sub>2</sub> is toxic in higher concentrations:
    - 1% (10,000 ppm) will make some people feel drowsy.
    - Concentrations of 7% to 10% cause dizziness, headache, visual and hearing dysfunction, and unconsciousness within a few minutes to an hour.

- Toxic Materials
  - Carbon Monoxide
  - Hydrogen Sulphide
  - Welding fumes
  - Corrosives
- Mechanical Hazards
  - Mixers
  - Crushers
  - **Engulfment**
    - Soil around an excavation
    - Grain in a silo
    - Powdered material in a bin

# What are the Hazards? - Part 2

## ► Potential Hazards in Confined Spaces

- Asphyxiating - Oxygen Deficiency

- <19.5% or >23.5% oxygen concentration

- CO<sub>2</sub>

- CO<sub>2</sub> is toxic in higher concentrations:
    - 1% (10,000 ppm) will make some people feel drowsy.
    - Concentrations of 7% to 10% cause dizziness, headache, visual and hearing dysfunction, and unconsciousness within a few minutes to an hour.

- Toxic Materials

- Carbon Monoxide
  - Hydrogen Sulphide
  - Welding fumes
  - Corrosives

- Mechanical Hazards

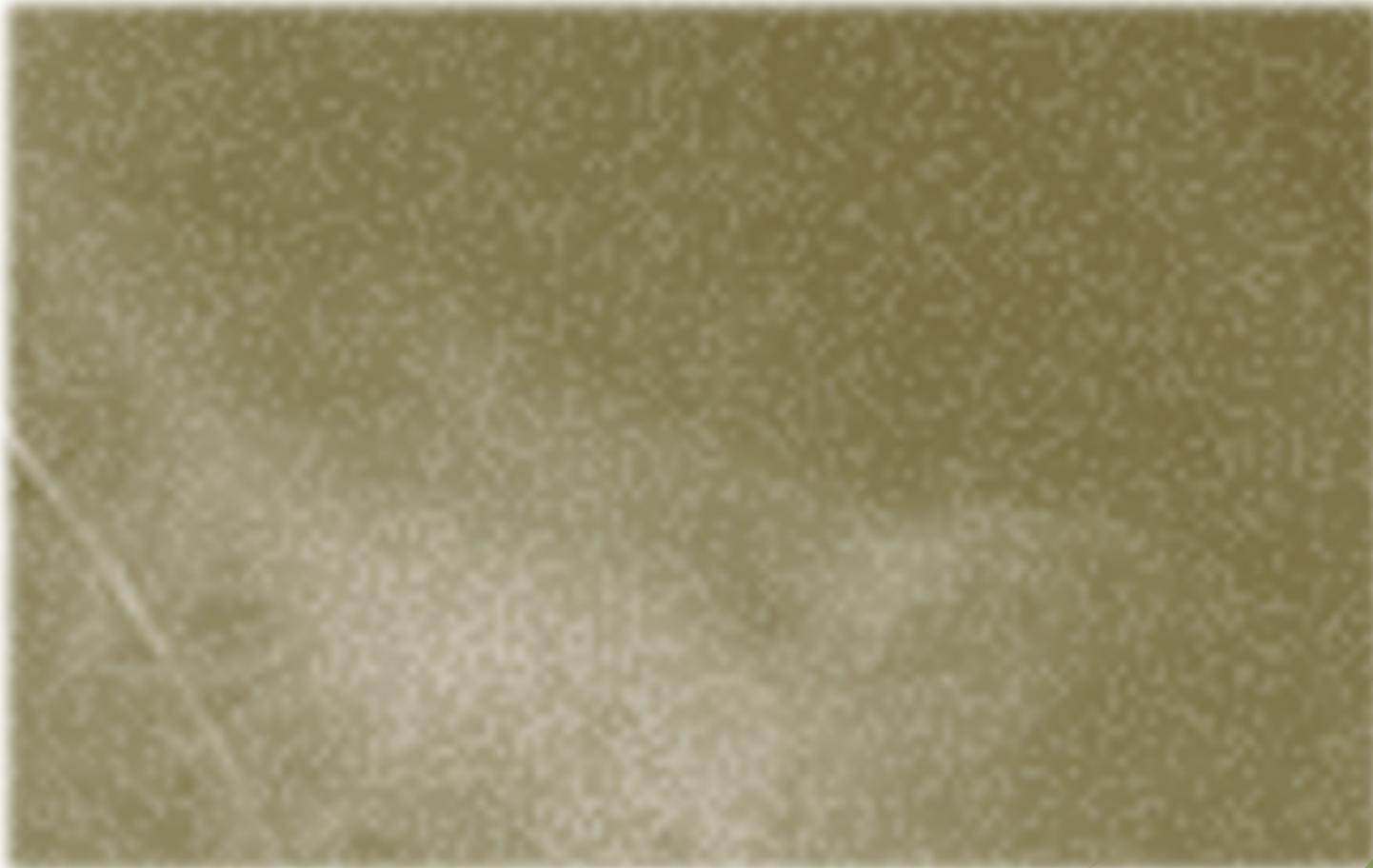
- Mixers
  - Crushers

- Engulfment

- Soil around an excavation
  - Grain in a silo
  - Powdered material in a bin

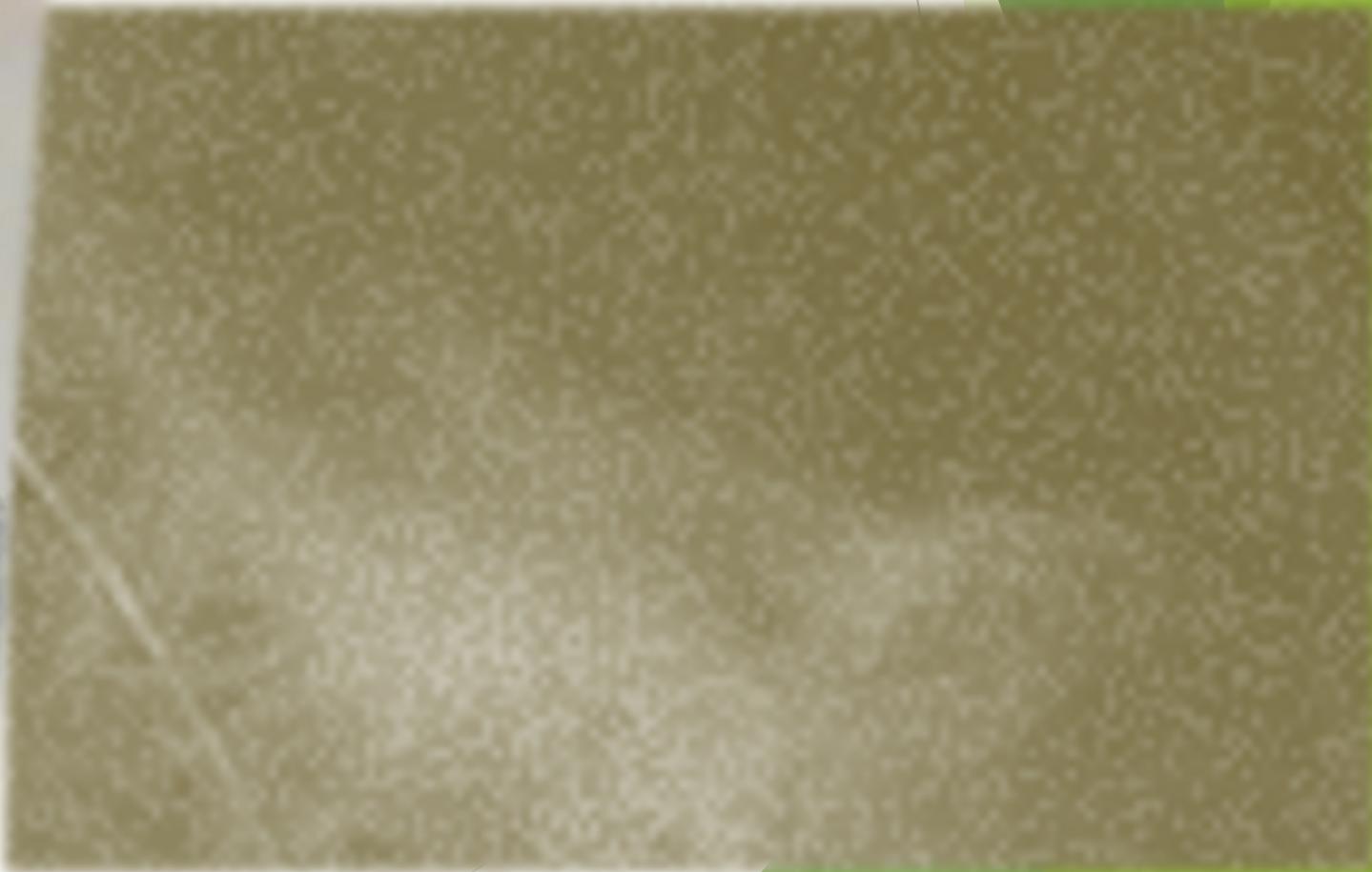
## Gasses

What are the Hazards? - Part 3



Combustibility

# What are the Hazards? - Part 4



Engulfment

# What are the Hazards? - Part 5



Mechanical

# What are the Hazards? - Part 6



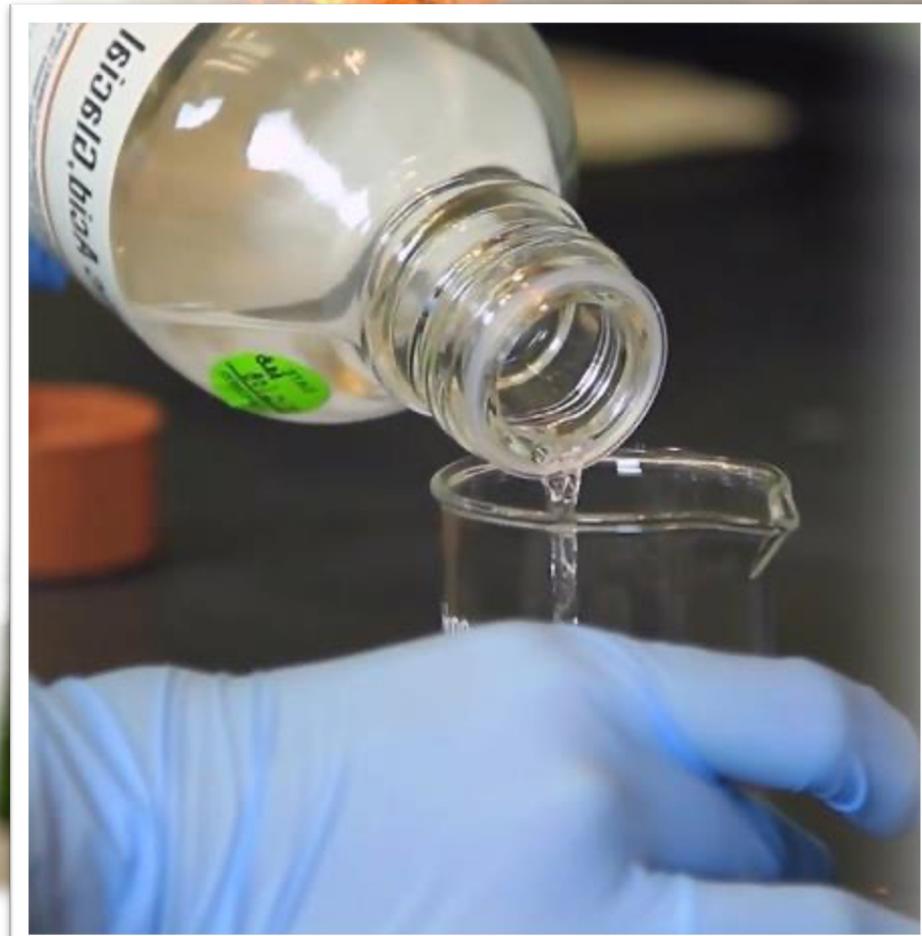
Biological

# What are the Hazards? - Part 7



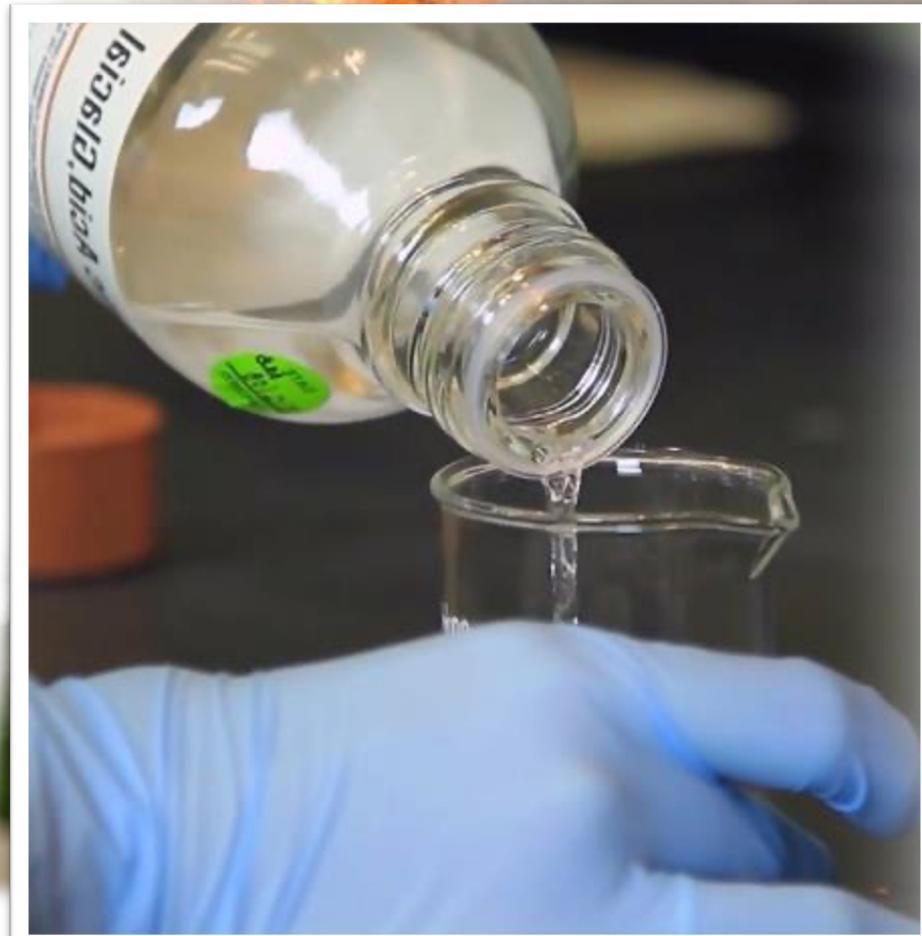
Chemical

# What are the Hazards? - Part 8

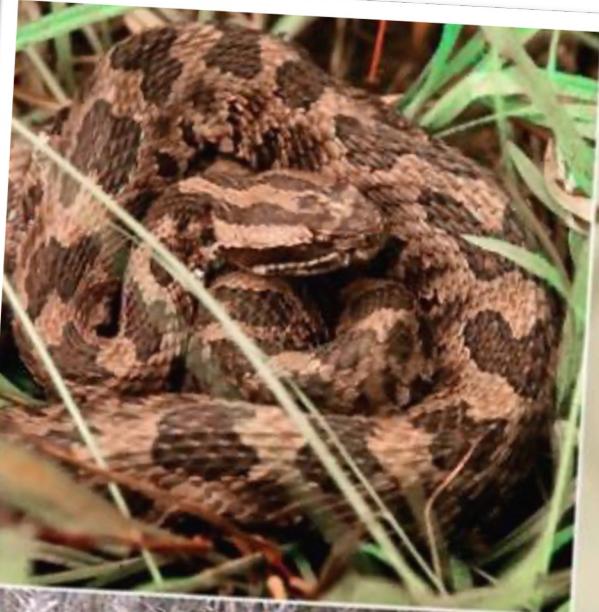


## Extreme Temperatures

# What are the Hazards? - Part 9



# What are the Hazards? - Part 10



# Confined Space Training

## Module-4

- What is a Confined Space
- When does it become Permit Required?
- What are the Hazards
- Training

# Confined Space Training

## ► OSHA 1910.146(g) Training

The employer shall provide training so that all employees whose work is regulated by this section acquire the understanding, knowledge, and skills necessary for the safe performance of the duties assigned under this section.

# Confined Space Training - Part 2

## ►OSHA 1910.146(g) Training

Training shall be provided to each affected employee:

- ✓ Before the employee is first assigned duties under this section;
- ✓ Before there is a change in assigned duties;
- ✓ Whenever there is a change in permit space operations that presents a hazard about which an employee has not previously been trained;
- ✓ Whenever the employer has reason to believe either that there are deviations from the permit space entry procedures.

# Confined Space Training - Part 3

## Confined Space Entry

► **Entry:**

The action by which a person passes through an opening into a permit-required confined space; Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.

# Confined Space Training - Part 4

## Confined Space Personnel

### ► Authorized Entrant

Enters the confined space

### ► Authorized Attendant

Stands watch outside the entry point of the space

### ► Entry Supervisor

Oversees entry, ensures conformity to permit & acceptable conditions for entry

# Confined Space Training - Part 5

## Confined Space Personnel

### ► Authorized Entrant

The employee who will physically enter the confined space to perform the work.



# Confined Space Training - Part 6

## Confined Space Personnel

### ► Authorized Attendant

The employee who remains outside the confined space and;

- monitors the entrant(s)
- guards the space against unauthorized entry
- warns the entrants of any unusual conditions
- and summons the rescue personnel if needed.



# Confined Space Training - Part 7

## Confined Space Personnel

### ► Entry Supervisor

The employee who remains outside the confined space and;

- warns the entrants of any unusual conditions
- Completes Permits,
- ensures conformity to permit & acceptable conditions for entry



# Confined Space Training - Part 8

## Confined Space Permits



# Confined Space Training - Part 9

## Confined Space Permits



DANGER

- Required for work in any space with a hazard.
- Establishes the hazards.
- Arranges for protection.



CONFINED SPACE  
DO NOT ENTER

# Confined Space Training - Part 10

## Confined Space Permits

### CONFINED SPACE ENTRY PERMIT

ENTRY SUPERVISOR: COMPLETE AND INITIAL FORM (PLEASE PRINT)

Entry Supervisor:	
Department(s) Involved:	
Location of Space: (be specific)	
Work to be Accomplished:	
Authorized Entrant(s):	
Authorized Attendant(s):	
Entry Date(s) & Time(s):	

(Permit is limited to one project at location of space)

#### PERMIT SPACE HAZARDS (See Space ID List)

<input type="checkbox"/> ATMOSPHERIC	
<input type="checkbox"/> Oxygen Deficiency	
<input type="checkbox"/> Oxygen Enrichment	
<input type="checkbox"/> Explosive (Gas/Vapor)	
<input type="checkbox"/> Carbon Monoxide	
<input type="checkbox"/> Hydrogen Sulfide	
<input type="checkbox"/> Other Toxic gases/vapors	

<input type="checkbox"/> ENGULFMENT	
<input type="checkbox"/> CONFIGURATION (ENTRAPMENT)	
<input type="checkbox"/> MECHANICAL	
<input type="checkbox"/> ELECTRICAL	
<input type="checkbox"/> SUBSTANCE HAZARDOUS TO SKIN OR EYES	
<input type="checkbox"/> HEAT STRESS	
<input type="checkbox"/> OTHER POTENTIAL HAZARDS (e.g. radiation, noise, etc.)	

#### COMMUNICATION PROCEDURES USED BY ENTRANT(S) and ATTENDANT(S) (Check all that apply)

<input type="checkbox"/> Visual	<input type="checkbox"/> Rope
<input type="checkbox"/> Voice	<input type="checkbox"/> Radio
<input type="checkbox"/> Other (specify)	

Contact Rescue Service  
with what method?  
(Radio's, cell phone, in-house phone, etc.)

HOT WORK PERMIT NEEDED  
 SDS (Reviewed)

#### RESCUE PROCEDURES BEFORE Attempting Non-Entry Rescue Call Emergency Number F

EMERGENCY PHONE #  Back-up emergency #

STATE: "This is a Confined Space Emergency" NEVER ENTER SPACE to attempt rescue.

Have you called Maintenance Dispatch before entry?  YES  NO / Additional entries  YES  NO

Is pre-entry set-up of emergency equipment required?  YES  NO

If not, where is location of rescue equipment?



PERSONAL PROTECTIVE EQUIPMENT (Check mandatory items)					
<input type="checkbox"/> EYE PROTECTION	<input type="checkbox"/> Safety Glasses	<input type="checkbox"/> Face Shield	<input type="checkbox"/> Other: (specify)		
<input type="checkbox"/> HEARING PROTECTION					
<input type="checkbox"/> PROTECTIVE CLOTHING	(specify)				
<input type="checkbox"/> BOOTS	<input type="checkbox"/> Rubber	<input type="checkbox"/> Slip Prevention	<input type="checkbox"/> Steel toes	<input type="checkbox"/> Other: (specify)	
<input type="checkbox"/> GLOVES	<input type="checkbox"/> Rubber	<input type="checkbox"/> Leather	<input type="checkbox"/> Cotton	<input type="checkbox"/> Other: (specify)	
<input type="checkbox"/> HARD HAT					
<input type="checkbox"/> RESPIRATOR	<input type="checkbox"/> Air Purifying	<input type="checkbox"/> Supplied air	<input type="checkbox"/> Other: (specify)		
<input type="checkbox"/> FALL PROTECTION/ RETRIEVAL EQUIPMENT (Non-entry rescue)	<input type="checkbox"/> Safety Harness & Lifelines	<input type="checkbox"/> Anchor points: (specify)			
	<input type="checkbox"/> Mechanical: (specify)				
	<input type="checkbox"/> Other: (specify)				
<input type="checkbox"/> OTHER: (specify)					

#### ADDITIONAL INSTRUCTIONS

(Primary) ATTENDANT (Print & Initial)	DATE	(verified all conditions are met before entry)
---------------------------------------	------	--

#### ATMOSPHERIC TESTS (Check the appropriate ones) (Bump test on Air Monitor is required prior to using)

O <sub>2</sub> (oxygen)	LEL (Lower Explosive)	CO ppm (carbon monoxide)	H <sub>2</sub> S ppm (hydrogen sulfide)	Explosive dust	Other
19.5 - 23.5	< 10% LEL	35 ppm	10 ppm	< LFL 5 Ft. Visibility	

Time Initials Test results BEFORE space preparation

Test results After space preparation

#### RECHECKS


#### ENTRANT(s) (print name & initials)

	Time In/out	Att. Initials	Time In/out	Att. Initials	Time In/out	Att. Initials
	/		/		/	
	/		/		/	
	/		/		/	
	/		/		/	
	/		/		/	
	/		/		/	
	/		/		/	
	/		/		/	
	/		/		/	

ENTRY SUPERVISOR (Print & Initial) DATE Project completed  YES  NO

Project cancelled  YES  NO

Entry Supervisor (Initial)

# Confined Space Training - Part 11

## Confined Space Permits

# **CONFINED SPACE ENTRY PERMIT**

**ENTRY SUPERVISOR: COMPLETE AND INITIAL FORM. (PLEASE PRINT)**

**PERSONAL PROTECTIVE EQUIPMENT (Check mandatory items)**

EYE PROTECTION       Safety Glasses       Face Shield       Other: (specify) \_\_\_\_\_  
 HEARING PROTECTION

Entry Supervisor:	
Department(s) Involved:	
Location of Space: (be specific)	
Work to be Accomplished:	
Authorized Entrant(s):	
Authorized Attendant(s):	
Entry Date(s) & Time(s):	

**ATMOSPHERIC TESTS** (Check the appropriate ones) (Bump test on Air Monitor is required prior to using)

<input type="checkbox"/> O <sub>2</sub> (oxygen)	<input type="checkbox"/> LEL (Lower Explosive)	<input type="checkbox"/> CO ppm (carbon monoxide)	<input type="checkbox"/> H <sub>2</sub> S ppm (hydrogen sulfide)	<input type="checkbox"/> Explosive dust	<input type="checkbox"/> Other _____
19.5 – 23.5	≤ 10% LEL	35 ppm	10 ppm	≤ LEL – 5 Ft. Visibility	

Have you called Maintenance Dispatch before entry?  YES  NO  Accidental entries  YES  NO

Is pre-entry set-up of emergency equipment required?  YES  NO

If not, where is location of rescue equipment?

**ENTRY SUPERVISOR (Print & In)**

---

DATE

Project ID: MUL-UXFQ-LINC

Project completed  YES  NO \_\_\_\_\_

YES  NO \_\_\_\_\_

# Confined Space Training - Part 12

## Confined Space Permits

### Atmosphere Testing Must Be Performed

- ▶ Prior to every entry when the space is vacant;
- ▶ After a 10-minute ventilation period (if ventilation is necessary);
- ▶ At least hourly for permit-required confined spaces. NOTE: A good practice is to re-test the atmosphere after breaks or having been out of the confined space for a period of time.
- ▶ More frequently, if conditions or suspicions warrant.

# Confined Space Training - Part 13

## Confined Space Permits

### Atmosphere Testing Must Be Performed

- ▶ Prior to every entry when the space is vacant;
- ▶ After a 10-minute ventilation period (if ventilation is necessary);
- ▶ At least hourly for permit-required confined spaces. NOTE: A good practice is to re-test the atmosphere after breaks or having been out of the confined space for a period of time.
- ▶ More frequently, if conditions or suspicions warrant.

# Confined Space Training - Part 14

## Evacuation & Rescue

- Procedures clearly spelled-out.
- Rescue teams made available, Means of contact provided.
- Appropriate equipment available; retrieval systems for non-entry rescue; vertical >5 ft.
- In-house rescue teams are **OPTIONAL!**
- Dial 911 & notify of confined space emergency, you may attempt retrieval at that point.

# Confined Space Training - Part 15

## Training: Must Be Certified In Writing

- ✓ for each affected employee
- ✓ before first assignment & with changes
- ✓ deviations from space entry procedures
- ✓ shall establish employee proficiency

# Confined Space Training - Review

REVIEW



# Knowledge Check

1. What is a Confined Space?

# Knowledge Check - Part 2

## 1. What is a Confined Space?

A **Confined Space** is defined as:

- Large enough and so configured that a worker can bodily enter it, and
- Has limited or restricted means of entry or exit, and
- Is not designated for continuous worker occupancy.

## Knowledge Check - Part 3

2. What is a Permit Required Confined Space?

# Knowledge Check - Part 4

## 2. What is a Permit Required Confined Space?

**Permit Required Confined Space has one or more of the following characteristics:**

- ▶ 1. Contains or has the potential to contain a hazardous atmosphere;
- ▶ 2. Contains a material that has the potential for engulfing an entrant;
- ▶ 3. Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by sloped/tapered floors.

# Knowledge Check - Part 5

3. Who are the Qualified workers?

# Knowledge Check - Part 6

## 3. Who are the Qualified workers?

- ▶ ***The Supervisor*** - trained, competent, fills in permits, supervises the work & terminates the entry if needed or when completed
- ▶ ***The Entrant*** - trained & authorized to enter. Performs the work.
- ▶ ***The Attendant*** - trained & authorized

# Knowledge Check - Part 7

4. What is the primary reason for using a retrieval system for work within a Permit Required Confined Space?

# Knowledge Check - Part 8

## 4. What is the primary reason for using a retrieval system for work within a Permit Required Confined Space?

- ▶ To allow the attendant to perform a Non-Entry Rescue if problems develop during the entry.

**NOTE:** Because of the inherent dangers of this work, Only a Trained and Authorized Rescue Team can enter to assist the Entrant (worker)

# Additional Resources

- ▶ OSHA website: <http://www.osha.gov> and OSHA offices: Call or Write (800-321-OSHA)
- ▶ Compliance Assistance Specialists in the area offices
- ▶ National Institute for Occupational Safety and Health (NIOSH) - OSHA's sister agency
- ▶ OSHA Training Institute Education Centers
- ▶ Public libraries

**4-hour Construction Industry Confined Space Hazard**

**Awareness Level Training**

**Workbook**

First Edition

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**School of Public Health**

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**Controlling and Managing Dynamic Hazards associated with Confined Spaces in Construction Workbook.** Topics will include:

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**Federal Disclaimer**

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## **Section One: Introduction: Construction Industry Confined Space**

“The Confined spaces rule could protect nearly 800 construction workers a year from serious injuries and reduce life-threatening hazards. Construction protections now match those in manufacturing and general industry”

OSHA National News Release  
U.S. Department of Labor, May 1, 2015

In May of 2015, OSHA issued a new Standard for construction work in confined spaces, which became effective on August 3, 2015. Once in effect and followed, government research projects that the new Standard will protect nearly 800 construction workers a year from serious injuries and reduce life-threatening hazards associated with confined spaces found and created on construction sites. This grant was created to help both employers and employees learn about the new standard and understand more about confined spaces and permit required confined spaces (PRCS). Employers and those who manage construction related activities, where confined spaces and PRCS may be found, will find helpful guides to control hazards associated with confined spaces and learn their regulatory expectations and how to coordinate their respective activities with other entities. This grant will help assist employers with typical documentation, communication and coordination necessary for compliance. It includes helpful training modules, and other resources OSHA provides to help employers and workers understand the rule and create their own effective adherence.

This new Standard, Subpart AA of 29 CFR 1926 now provides protections for construction workers similar to those in other industries. Construction protections now match those in manufacturing and general industry, where construction activities often occur. Now, no matter where workers perform construction activities, such as toxic substances, electrocutions, explosions, and asphyxiation, there is a code to help specifically protect them. Typical construction related confined spaces include places such as manholes, crawl spaces, tanks, vessels, vaults, pipes that are not designed for continuous occupancy and are difficult to exit in the event of an emergency.

### **Planning, Coordination and Communication: Managing the Construction Industry Confined Space Program**

Since planning and coordination between various employers and or entities is essential to implementing an effective confined space program, this grant contains material that will help trainees learn how to plan work activity with multiple employers and share vital safety

information and monitor hazards. The sharing of responsibility between various entities to protect workers is not a new concept in the OSHA standards and in compliance. Precedent exists that requires multiple employers to multilaterally communicate and coordinate their respective activities and share information, concerning the safety and wellbeing, with associated employers. You may recognize such precedent in these areas (not comprehensive):

- Subpart R- Steel Erection: Controlling Contractor, Concrete Employer, Steel Erector.
- 
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1910.1200 Hazard Communications: Controlling contractor will share information about chemicals with multiple employers.

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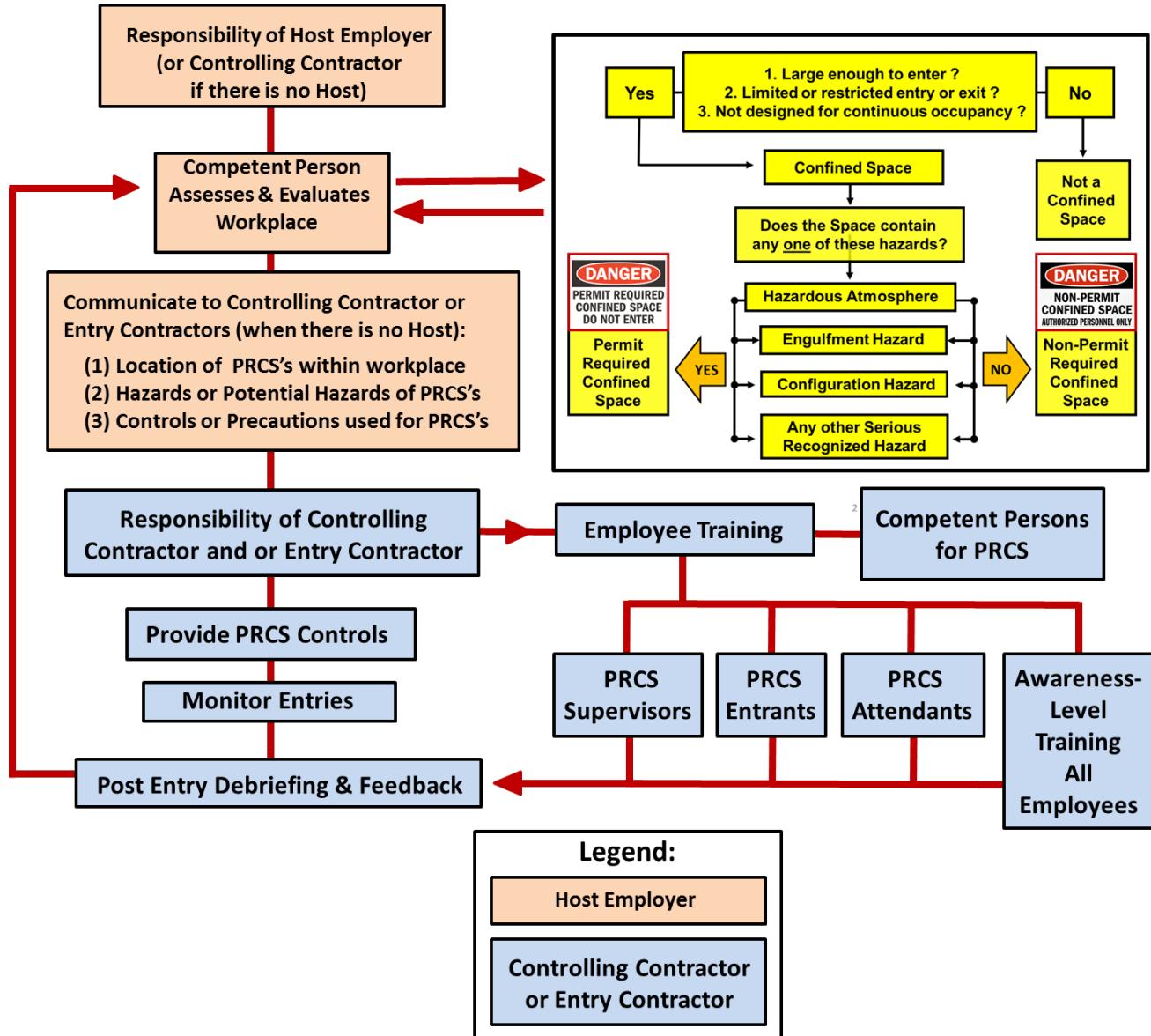
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- Site-wide control of so called general conditions and the respective delegated responsibilities of controlling contractors on multiple employer worksites.
- 
- 

- Subpart CC- host, controlling Contractor, Crane Employer has the responsibility to inform contractors of existing underground hazards
- 
- 

- NFPA 70E: Host shares locations and specific electrical hazard information.
- 
-

## Relationship and Responsibility Flow Chart



### Exceptions to the new Confined Space Rule

It should be noted that this new standard has three exemptions where the standard does not apply. In cases where the standard applies and there is a provision that addresses a confined

space hazard in another applicable OSHA standard, the employer must comply with both that requirement and the applicable provisions of the following standards.

- Construction work regulated by §1926 subpart P—Excavations.
- Construction work regulated by §1926 subpart S—Underground Construction, Caissons, Cofferdams and Compressed Air.
- Construction work regulated by §1926 subpart Y—Diving.

### **Some Quick Definitions**

*Competent person* means one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has the authorization to take prompt corrective measures to eliminate them.

Confined space means a space that:

- (1) Is large enough and so configured that an employee can bodily enter it;
- (2) Has limited or restricted means for entry and exit; and
- (3) Is not designed for continuous employee occupancy.

*Control* means the action taken to reduce the level of any hazard inside a confined space using engineering methods (for example, by ventilation), and then using these methods to maintain the reduced hazard level. Control also refers to the engineering methods used for this purpose. Personal protective equipment is not a control.

*Controlling Contractor* is the employer that has overall responsibility for construction at the worksite.

*Entry* means the action by which any part of a person passes through an opening into a permit-required confined space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space, whether or not such action is intentional or any work activities are actually performed in the space.

*Entry Employer* means any employer who decides that an employee it directs will enter a permit space.

Hazard means a physical hazard or hazardous atmosphere.

Hazardous atmosphere means an atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (that is, escape unaided from a permit space), injury, or acute illness from one or more of the following causes:

- (1) Flammable gas, vapor, or mist in excess of 10 percent of its lower flammable limit (LFL);
- (2) Airborne combustible dust at a concentration that meets or exceeds its LFL;
- (3) Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent;
- (4) Atmospheric concentration of any substance for which a dose or a permissible exposure limit is published in Subpart D—Occupational Health and Environmental Control, or in Subpart Z—Toxic and Hazardous Substances, of this part and which could result in employee exposure in excess of its dose or permissible exposure limit;

Note. An atmospheric concentration of any substance that is not capable of causing death, incapacitation, impairment of ability to self-rescue, injury, or acute illness due to its health effects is not covered by this definition.

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

*Host employer* means the employer that owns or manages the property where the construction work is taking place.

Note. If the owner of the property on which the construction activity occurs has contracted with an entity for the general management of that property, and has transferred to that entity the information specified in §1203(h)(1), OSHA will treat the contracted management entity as the host employer for as long as that entity manages the property. Otherwise, OSHA will treat the owner of the property as the host employer. In no case will there be more than one host employer.

*Hot work* means operations capable of providing a source of ignition (for example, riveting, welding, cutting, burning, and heating).

*Immediately dangerous to life or health (IDLH)* means any condition that would interfere with an individual's ability to escape unaided from a permit space and that poses a threat to life or that would cause irreversible adverse health effects.

Note. Some materials—hydrogen fluoride gas and cadmium vapor, for example—may produce immediate transient effects that, even if severe, may pass without medical attention, but are followed by sudden, possibly fatal collapse 12-72 hours after exposure. The victim "feels normal" after recovery from transient effects until collapse. Such materials in hazardous quantities are considered to be "immediately" dangerous to life or health.

Limited or restricted means for entry or exit means a condition that has a potential to impede an employee's movement into or out of a confined space. Such conditions include, but are not limited to, trip hazards, poor illumination, slippery floors, inclining surfaces and ladders.

Line breaking means the intentional opening of a pipe, line, or duct that is or has been carrying flammable, corrosive, or toxic material, an inert gas, or any fluid at a volume, pressure, or temperature capable of causing injury.

Lockout means the placement of a lockout device on an energy isolating device, in accordance with an established procedure, ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

Lower \_ flammable limit or lower explosive limit means the minimum concentration of a substance in air needed for an ignition source to cause a flame or explosion.

Monitor or monitoring means the process used to identify and evaluate the hazards after an authorized entrant enters the space. This is a process of checking for changes that is performed in a periodic or continuous manner after the completion of the initial testing or evaluation of that space.

Non-entry rescue occurs when a rescue service, usually the attendant, retrieves employees in a permit space without entering the permit space.

Non-permit confined space means a confined space that meets the definition of a confined space but does not meet the requirements for a permit-required confined space, as defined in this subpart.

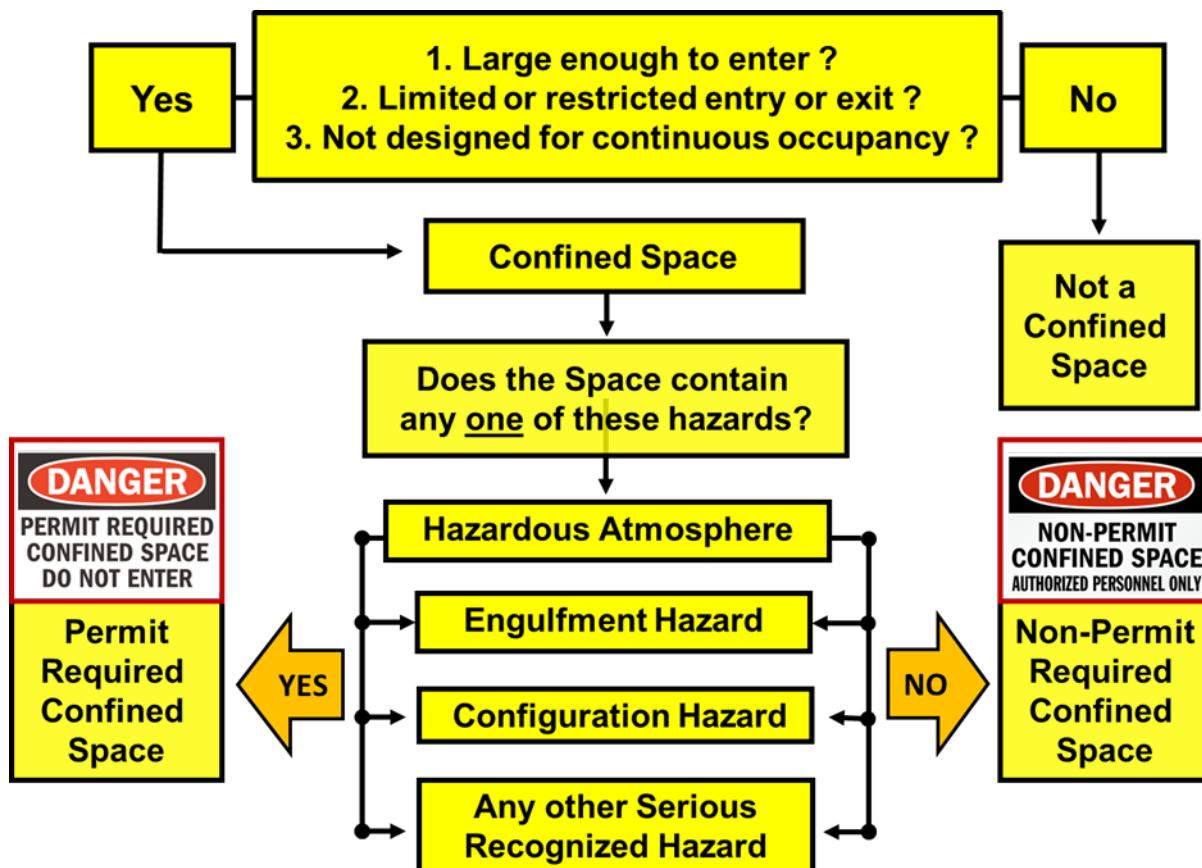
Permit-required confined space (permit space) means a confined space that has one or more of the following characteristics: (1) Contains or has a potential to contain a hazardous atmosphere; (2) Contains a material that has the potential for engulfing an entrant; (3) Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or (4) Contains any other recognized serious safety or health hazard.

Physical hazard means an existing or potential hazard that can cause death or serious physical damage. Examples include, but are not limited to: explosives (as defined by paragraph (n) of §1926.914, definition of “explosive”); mechanical, electrical, hydraulic and pneumatic energy; radiation; temperature extremes; engulfment; noise; and inwardly converging surfaces. Physical hazard also includes chemicals that can cause death or serious physical damage through skin or eye contact (rather than through inhalation).

Qualified person means one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his ability to solve or resolve problems relating to the subject matter, the work, or the project.

Serious physical damage means an impairment or illness in which a body part is made functionally useless or is substantially reduced in efficiency. Such impairment or illness may be

permanent or temporary and includes, but is not limited to, loss of consciousness, disorientation, or other immediate and substantial reduction in mental efficiency. Injuries involving such impairment would usually require treatment by a physician or other licensed health-care professional.



Note: The hazards that would trigger the permit-required confined space provisions: (1) contains or has the potential to contain a hazardous atmosphere; (2) contains a material that has the potential for engulfing an entrant; (3) has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or (4) contains any other recognized serious safety or health hazard (see 1926.1202).

### **Construction Industry Confined Spaces vs. General Industry Confined Spaces**

If you are familiar with the general industry standard regarding confined spaces you should know that there are several key differences between the construction confined space codes. Some of these key differences include:

1. More detailed provisions requiring coordinated activities when there are multiple employers at the worksite (for more detail, see question 16, below). This will ensure hazards are not introduced into a confined space by workers performing tasks outside

the space. An example would be a generator running near the entrance of a confined space causing a buildup of carbon monoxide within the space.

2. Requiring a competent person to evaluate the work site and identify confined spaces, including permit spaces.
3. Requiring continuous atmospheric monitoring whenever possible.
4. Requiring continuous monitoring of engulfment hazards. For example, when workers are performing work in a storm sewer, a storm upstream from the workers could cause flash flooding. An electronic sensor or observer posted upstream from the work site could alert workers in the space at the first sign of the hazard, giving the workers time to evacuate the space safely.
5. Allowing for the suspension of a permit, instead of cancellation, in the event of changes from the entry conditions list on the permit or an unexpected event requiring evacuation of the space. The space must be returned to the entry conditions listed on the permit before re-entry.
6. Requiring that employers who are relying on local entities for emergency services to arrange for those responders to give the employer advance notice if they will be unable to respond for a period of time
7. Requiring employers to provide training in a language and vocabulary that the employee understand

Some Clarifications to the new rule;

In addition, OSHA has added provisions to the new rule that clarifies existing requirements in the General Industry Standard. These include:

1. Requiring that employers who direct workers to enter a space without using a complete permit system prevent workers' exposure to physical hazards through elimination of the hazard or isolation methods such as lockout/tagout.
2. Requiring that employers who are relying on local emergency services for emergency services arrange for responders to give the employer advance notice if they will be unable to respond for a period of time (because they are responding to another emergency, attending department-wide training, etc.).
3. Requiring employers to provide training in a language and vocabulary that the worker understands.
4. Finally, several terms have been added to the definitions for the construction rule, such as "entry employer" to describe the employer who directs workers to enter a space, and "entry rescue", added to clarify the differences in the types of rescue employers can use

#### **Determining the Code to Follow: General Industry or Construction Industry**

The difference between construction and maintenance is the activity to be performed. "Maintenance" means keeping equipment or a structure in proper condition through routine, scheduled or anticipated measures without having to significantly alter the structure or equipment in the process. For equipment, this generally means keeping the equipment working properly by taking steps to prevent its failure or degradation. Here are respective examples of maintenance and construction:

**Example No. 1: Maintenance**

A common household water shut-off valve in a home heating system is removed and replaced. Its replacement is part of the routine maintenance of the system and removing and replacing the valve is done without making major alterations to the heating system. The removal and replacement of the valve would be considered maintenance.

**Example No. 2: Construction**

A 36 inch valve that is one of three major components in a processing system is removed and replaced. To do the job, 50 percent of all parts in the system have to be cut, unbolted, moved, or otherwise altered or replaced. Removing and replacing this valve would be considered construction because the valve constitutes a major portion of the equipment it is in and much of the rest of the system's parts must be moved or altered in the process of doing the jo

## **Section Two: Rights and Responsibilities**

### **Responsibilities under the OSH Act: General Duty Clause**

It is both wise and mandatory for an employer to start any undertaking with some reasonable anticipation of what hazards and obstacles you may likely encounter because it is essential that in each workplace an employer provides the means of assessing and identifying potential hazards and where applicable utilize measures that seek to eliminate, prevent and protect such hazards from causing harm. It is critical that you perform an assessment of your existing Temporary Worker Safety & Health Program to see if you can benchmark it against, code, best practice and industry Standards.

We must always keep in mind the mandatory nature of program management flows directly from The Williams-Steiger Occupational Safety and Health Act of 1970, which can also be referred to as, "The Occupational Safety and Health Act of 1970" (OSH Act). The primary purpose of the OSH Act is to assure, so far as possible, safe and healthful working conditions for every working man and woman, but in various places the OSH Act or OSHA regulations clearly spells out the responsibility of an employer and employees:

The Occupational Safety and Health Act of 1970: "General Duty Clause"

5. General Duties
  - (a) Each employer
    - (1) shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees;
    - (2) Shall comply with occupational safety and health Standards promulgated under this Act.
  - (b) Each employee shall comply with occupational safety and health Standards and all rules, regulations, and orders issued pursuant to this Act which are applicable to his own actions and conduct.

### **Additional Worker Rights**

- Among other employer responsibilities a worker also has the right to:
- Be trained in a language the worker understands
- Work on machines, tools and equipment that are in safe working condition
- Be provided required safety gear, such as gloves or a harness and lifeline for falls
- Be trained and protected from hazardous and toxic chemicals
- Request an OSHA inspection, and speak to the inspector

- Report an injury or illness, and receive copies of their medical records
- See and examine copies of the workplace injury and illness log for the employer
- Review records of work-related injuries and illnesses
- Get copies of test results done to find hazards in the workplace

### **Employer Responsibility**

- Under the OSH law, employers have a responsibility to provide a safe workplace. This is a short summary of key employer responsibilities:
- Provide a workplace free from serious recognized hazards and comply with standards, rules and regulations issued under the OSH Act.
- Examine workplace conditions to make sure they conform to applicable OSHA standards.
- Make sure employees have and use safe tools and equipment and properly maintain this equipment.
- Use color codes, posters, labels or signs to warn employees of potential hazards.
- Establish or update operating procedures and communicate them so that employees follow safety and health requirements.
- Provide safety training in a language and vocabulary workers can understand.
- Employers with hazardous chemicals in the workplace must develop and implement a written hazard communication program and train employees on the hazards they are exposed to and proper precautions (and a copy of safety data sheets must be readily available). See the OSHA page on Hazard Communication.
- Provide medical examinations and training when required by OSHA standards.
- Post, at a prominent location within the workplace, the OSHA poster (or the state-plan equivalent) informing employees of their rights and responsibilities.
- Report to the nearest OSHA office all work-related fatalities within 8 hours, and all work-related inpatient hospitalizations, all amputations and all losses of an eye within 24 hours. Call our toll-free number: 1-800-321-OSHA (6742); TTY 1-877-889-5627.  
[Employers under federal OSHA's jurisdiction were required to begin reporting by Jan. 1, 2015. Establishments in a state with a state-run OSHA program should contact their state plan for the implementation date].
- Keep records of work-related injuries and illnesses. (Note: Employers with 10 or fewer employees and employers in certain low-hazard industries are exempt from this requirement.)
- Provide employees, former employees and their representatives access to the Log of Work-Related Injuries and Illnesses (OSHA Form 300). On February 1, and for three months, covered employers must post the summary of the OSHA log of injuries and illnesses (OSHA Form 300A).
- Provide access to employee medical records and exposure records to employees or their authorized representatives.
- Provide to the OSHA compliance officer the names of authorized employee representatives who may be asked to accompany the compliance officer during an inspection.
- Not discriminate against employees who exercise their rights under the Act. See our "Whistleblower Protection" webpage.

- Post OSHA citations at or near the work area involved. Each citation must remain posted until the violation has been corrected, or for three working days, whichever is longer. Post abatement verification documents or tags.
- Correct cited violations by the deadline set in the OSHA citation and submit required abatement verification documentation.

### The Whistleblower Protection Programs: How to File a Discrimination Complaint

File a discrimination complaint if your employer has retaliated against you for exercising your rights as an employee. If you have been punished or retaliated against for exercising your rights under the OSH Act, **you must file a complaint with OSHA within 30 days of the alleged reprisal.** In states with approved state plans, employees may file a complaint under the OSH Act (Section 11(c)) with both the State and Federal OSHA.

- Complaints need to be filed within 30 days after an alleged retaliation.
  - You may file complaints by: telephone calling (800) 321-OSHA for situations where you believe there is an immediate risk that threatens life or injury or call a local area office (number listed below), you can also go online at <http://www.osha.gov/as/opa/worker/complain.html> and download forms for faxing OSHA at: <http://www.osha.gov/oshforms/osha7.pdf> Contact your local OSHA office as soon as possible, because you must file your complaint within the legal time limits. New York (212) 337-2378
- OSHA will conduct an in-depth interview with each complainant. The investigation must reveal that:
  - The employee engaged in protected activity;
  - The employer knew about the protected activity;
  - The employer took an adverse action; and
  - The protected activity was the motivating factor, or under some laws, a contributing factor in the decision to take the adverse action against the employee.
- Letter - You may also send a letter describing your complaint to your local OSHA Regional or Area Office. Please include your name, address and telephone number so we can contact you to follow up.
- OSHA will accept your complaint in any language.
- OSHA conducts an interview with each complainant to determine the need for an investigation. If evidence supports the worker's claim of discrimination, OSHA will ask the employer to restore the worker's job, earnings and benefits.



### Right to Be Hard: Your Rights as a Whistleblower

OSHA's Whistleblower Protection Program enforces the whistleblower provisions of more than twenty whistleblower statutes. Rights afforded by these whistleblower acts include, but are not limited to, worker participation in safety and health activities, reporting a work related injury, illness or fatality, or reporting a violation of the statutes.

Protection from discrimination means that an employer cannot retaliate by taking "adverse action" against workers, such as:

- |  |   |
|--|---|
| <input type="checkbox"/> Firing or laying off          | <input type="checkbox"/> Failure to hire or rehire                      |
| <input type="checkbox"/> Blacklisting                  | <input type="checkbox"/> Intimidation                                   |
| <input type="checkbox"/> Demoting                      | <input type="checkbox"/> Making threats                                 |
| <input type="checkbox"/> Denying overtime or promotion | <input type="checkbox"/> Reassignment affecting prospects for promotion |
| <input type="checkbox"/> Disciplining                  | <input type="checkbox"/> Reducing pay or hours                          |
| <input type="checkbox"/> Denial of benefits            |   |

### Limited Right to Refuse to Work

REFUSING WORK IS PROTECTED IF: Your right to refuse to do a task is protected if ALL of the following conditions are met:

- Where possible, you have asked the employer to eliminate the danger, and the employer failed to do so; and
- You refused to work in "good faith." This means that you must genuinely believe that an imminent danger exists. Your refusal cannot be a disguised attempt to harass your employer or disrupt business; and
- A reasonable person would agree that there is a real danger of death or serious injury; and
- There isn't enough time, due to the urgency of the hazard, to get it corrected through regular enforcement channels, such as requesting an OSHA inspection.

WHEN CONDITIONS ARE MET, NEXT STEPS: When all of the above conditions are met, you can take the following steps:

- Ask your employer to correct the hazard;
- Ask your employer if there is other work you can perform that is free from hazards;
- Tell your employer that you won't perform the work unless and until the hazard is corrected; and
- Remain at the worksite until ordered to leave by your employer. (If the worksite is unsafe and poses an imminent risk of danger you should remove yourself from the worksite)

## **How to File a Safety and Health Complaint**

The Occupational Safety and Health Act of 1970 gives employees and their representatives the right to file a complaint and request an OSHA inspection of their workplace if they believe there is a serious hazard or their employer is not following OSHA standards. Workers do not have to know whether a specific OSHA standard has been violated in order to file a complaint. The complaint should be filed as soon as possible after noticing the hazard or lack of compliance because OSHA citations may only be issued for violations that currently exist or existed in the past 6 months.

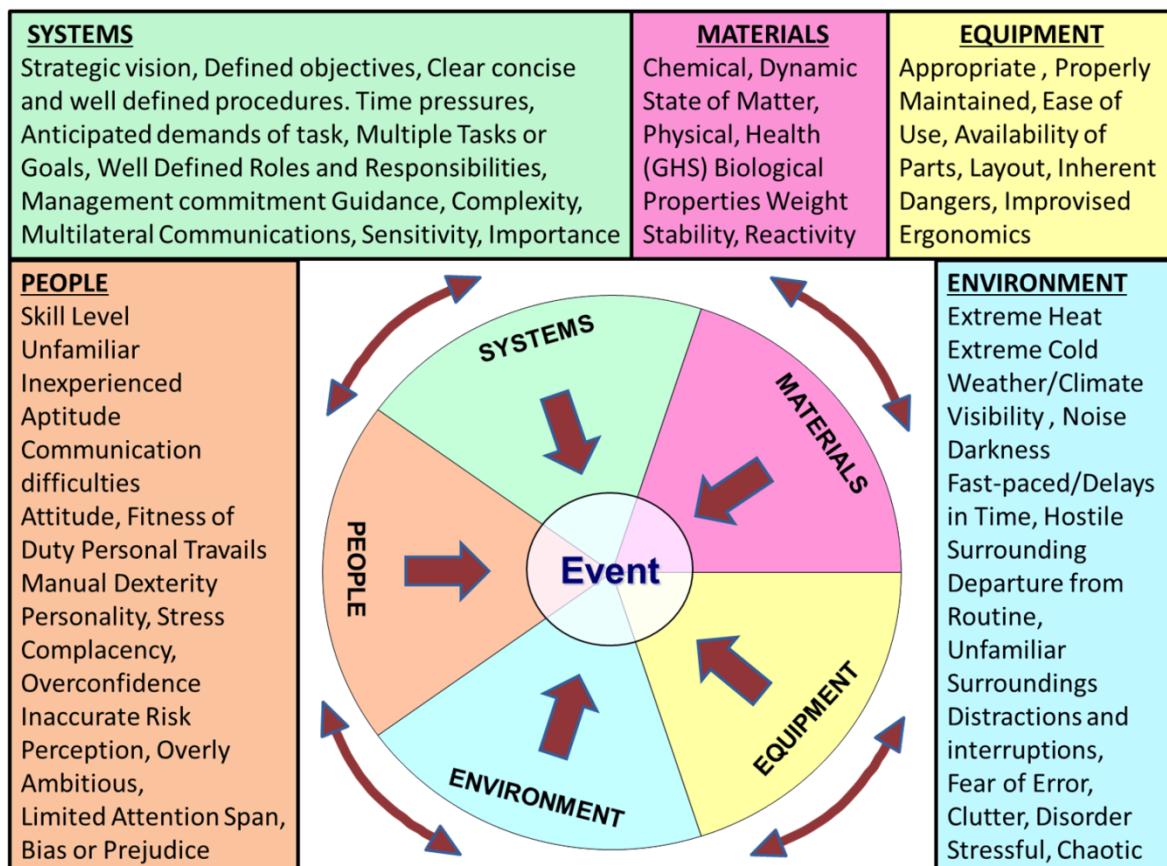
If the worker believes working conditions are unsafe or unhealthful, the worker may file a confidential complaint with OSHA and ask for an inspection. If possible, bring the conditions to the employer's attention. Workers do not have to know whether a specific OSHA standard has been violated in order to file a complaint. The complaint should be filed as soon as possible after noticing the hazard or lack of compliance because OSHA citations may only be issued for violations that currently exist or existed in the past 6 months. Do Not Report an emergency, fatality, or imminent life threatening using a Complaint Form or Email. To report an emergency, fatality, or imminent life threatening situation please contact toll free number 1-800-321-OSHA (6742) TTY 1-877-889-5627 immediately.

The worker also has the right to file a complaint with OSHA if the employer retaliates against them or takes unfavorable personnel action because the employee engaged in protected activity relating to workplace safety and health (See whistleblower program above).

- Online – Go to the Online Complaint Form: Written complaints that are signed by workers or their representative and submitted to an OSHA Area or Regional office are more likely to result in onsite OSHA inspections. Complaints received online from workers in OSHA-approved state plan states will be forwarded to the appropriate state plan for response.
- Fax/Mail - Download the OSHA complaint form [En Espanol] (or request a copy from your local OSHA Regional or Area Office): Complete it and then fax or mail it back to your local OSHA Regional or Area Office. Written complaints that are signed by a worker or representative and submitted to the closest OSHA Area Office are more likely to result in onsite OSHA inspections. Please include your name, address and telephone number so we can contact you to follow up.
- Telephone – your local OSHA Regional or Area Office: OSHA staff can discuss your complaint and respond to any questions you have. If there is an emergency or the hazard is immediately life-threatening, call your local OSHA Regional or Area Office or 1-800-321-OSHA.

Note: Complaints from workers or their representatives are taken seriously by OSHA. OSHA will keep your information confidential.

### **Section Three: Confined Space Safety Training Program**



The following sample training modules are for workers to help them better understand what confined spaces are and the nature of hazards associated with these spaces. This training should be provided to all employees who will be exposed to confined spaces and permit required confined spaces. This training is a sample of core elements to cover and must be trained in a language and a aptitude that workers can readily understand so they can readily apply their knowledge and skill in the field. This training is NOT intended for workers who will enter permit required confined spaces, such training must be much more involved and completely specific to the hazards associated with the permit required spaces they will enter.

**YOUR COMPANY NAME HERE**

## **Construction Industry Confined Space Training Program (SAMPLE)**

### **Key Elements to Training Employees who will be exposed to Confined Spaces**

- 1. General Awareness-level Confined Space Training Module**
- 2. Flammable Atmospheres Module**
- 3. Oxygen Deficient and Enriched Atmospheres Module**
- 4. Vapor Density and Specific Gravity Module**
- 5. The Control of Hazardous Energy Module**
- 6. Oxidizing Agents Module**
- 7. Rescue Module**

#### **1. General Awareness-level Confined Space Training Module**

In keeping with recent additions to the United States Department of Labor's Occupational Safety and Health Administration (OSHA) Standards concerning confined spaces in construction, our team at YOUR COMPANY NAME HERE has compiled a self-guided lesson for our workforce and administrators to ensure that we are all aware of what constitutes a confined space and a permit required confined space and how such spaces can be or can become hazardous to your safety and health. Review this exercise with your competent persons. It's important to know that this awareness-level training is intended to make you generally aware of the existence and terms associated with confined spaces, but it DOES NOT provide enough training to make you able to enter such spaces. Worker entry into such spaces requires additional more rigorous space-specific training. The intent here is to teach our team to be able to "RAP," that is, RECOGNIZE, AVOID and PREVENT exposures to these hazardous spaces.

This change in Standard is designed to save lives of construction workers. Unlike most general industry worksites, construction sites are continually evolving, with the number and characteristics of confined spaces changing as work progresses. Occasionally, the materials we work with or the work activities we perform can create dangerous conditions that would classify our working environment as a confined space or worse a permit required confined space. This new OSHA rule emphasizes the necessity of training as well as continuous worksite evaluation and communication. The Standard also holds various entities accountable for our worksites including controlling contractors, hosts and owners of facilities. These entities are required by OSHA to share information of known or foreseeable confined space and the respective hazards that we may encounter while at work.

We should know that the host, controlling contractor (often referred to as the General Contractor) along with YOUR COMPANY NAME HERE competent person MUST make you aware of specific confined spaces at our worksites. They must brief you on the location of specific confined spaces and respective associated hazards in your work environment. If no confined or permit required confined spaces exist at your worksite then the absence of such spaces must be communicated to you.

It's important to know terms surrounding confined spaces. There are exceptionally hazardous confined spaces that OSHA terms Permit Required Confined Spaces that possess, or could possess, conditions within that can cause or possibly cause death, serious injury or illness. The host/owner of the facility you are working at is responsible to maintain a Confined Space Program that inventories these spaces and their respective hazards.

It is critical that we understand the terms and hazards associated with confined spaces in our working environments. This tutorial will be followed by a 20 question exercise.



Confined Space examples: vaults, pipes, ducts, crawl spaces, attics, ceiling plenums, pits, tanks.

### **What Is a Confined Space?**

It's vital that we all know what is meant by a Confined Space. In order for a space to be classified as a confined space it must possess ALL OF THE FOLLOWING 3 CRITERIA.

1. The space must be large enough for a worker to enter that is, it must have a diameter of at least 18 inches round. Keep in mind any opening smaller than an 18 inch diameter round is considered too small to ever enter and shall not ever be entered.

2. The space must have a limited or restricted means of entry and exit. This typically means that a worker has to contort their body to enter, such as crouching, bending, crawling and kneeling to enter the space. A non-Standard doorway a hatchway, scuttle, manhole, inspection port including spaces only accessible by ladders, concrete-mounted rungs or hoisting devices. A space with a limited number of means of egress, such as single way in and out may constitute a limited means of entry and exit.

3. The space was not designed for continuous occupancy. Even if occasionally workers will enter the space for inspection, repair, clean-up and maintenance the space may still not be

designed for continuous occupancy. Product storage areas, enclosed machinery, vessel tanks, ceiling plenums, attics and crawl spaces are NOT designed for continuous occupancy and hence fulfill this prohibiting design criterion. Other typical confined spaces are boilers, furnaces, ceilings, pipelines, ducts, pits, pumping stations, process vessels, septic tanks, trenches, excavations, silos, storage tanks, barges, sewers, utility vaults, shafts and caissons. Such spaces may include areas above ceilings, catwalks, catacomb or maze-like paths or areas below a raised stage or electronic floor, cubbyholes or sub-basements. Our activity or the materials we use may also affect our working environment and create confined spaces or permit required confined spaces. When accessing certain areas to work, we must be deliberate when staging where we work and how we are going to access such work. For example if we were to have to work, as Michelangelo did on the Sistine Chapel, lying on our backs, this area can conceivably become a confined space. Use this as a basis of consideration; if you have to work in a position or location where it would become difficult for rescuers to extricate you from that space in an emergency, then you are probably in a confined space.

We as a team, through our competent persons, must also say something if we see something, that is, if we recognize various spaces in our work environments that resemble what we have described here, we must tell our competent persons and avoid entry until the space is assessed and classified accordingly.

### **What is a Permit Required Confined Space?**

While we can ordinarily deal with typical confined spaces in the workplace the stakes get much greater if the confined spaces possess additional hazards that can cause Immediate Danger of Life or Health, known as an IDLH. These extremely dangerous spaces can only be entered with extreme precautions and under the permission of a permit created specifically for the hazards associated with the space. In these cases, entrants, attendants, supervisors and competent persons must receive extensive site and hazard specific training that effectively teaches workers about the specific hazards and the planning to control the hazard from doing harm. Training will also include how to monitor hazards and emergency measures to be taken to rescue entrants.

In order for a confined space to be classified as a permit required confined space it must ONLY need to possess or have the potential to possess ONE of the following criteria.

1. The space contains or has the potential to contain a hazardous atmosphere. This means the space may have or possess the potential to have an enriched or depleted oxygen atmosphere, a toxic atmosphere containing a harmful substance or chemical, a combustible or harmful dust atmosphere or a flammable atmosphere.
2. The space contains or has the potential to contain a material that can engulf an entrant such as steam, water, sewage, grain or soil.

3. The space contains has a design that possess a configuration that could trap or asphyxiate an entrant. Such configuration may include internal walls or baffles, nooks, ducts or obstructions to egress that would make emergency extrication difficult or time consuming.

4. The forth criteria is intentionally open-ended and includes any serious safety or health concern that may be within a space or can potentially come into existence in the space. These hazards pose a threat to life or health (IDLH) and can be electrical hazards, pests, animals, ionizing radiation, impalements, punctures, falls, caught-in-between and struck-by hazards and various non-atmospheric chemicals.

A permit documents the steps taken to control or eliminate the hazard before entry is made, and serves as a guideline for acceptable entry conditions.

**Here are some key points and important definitions you MUST remember:**

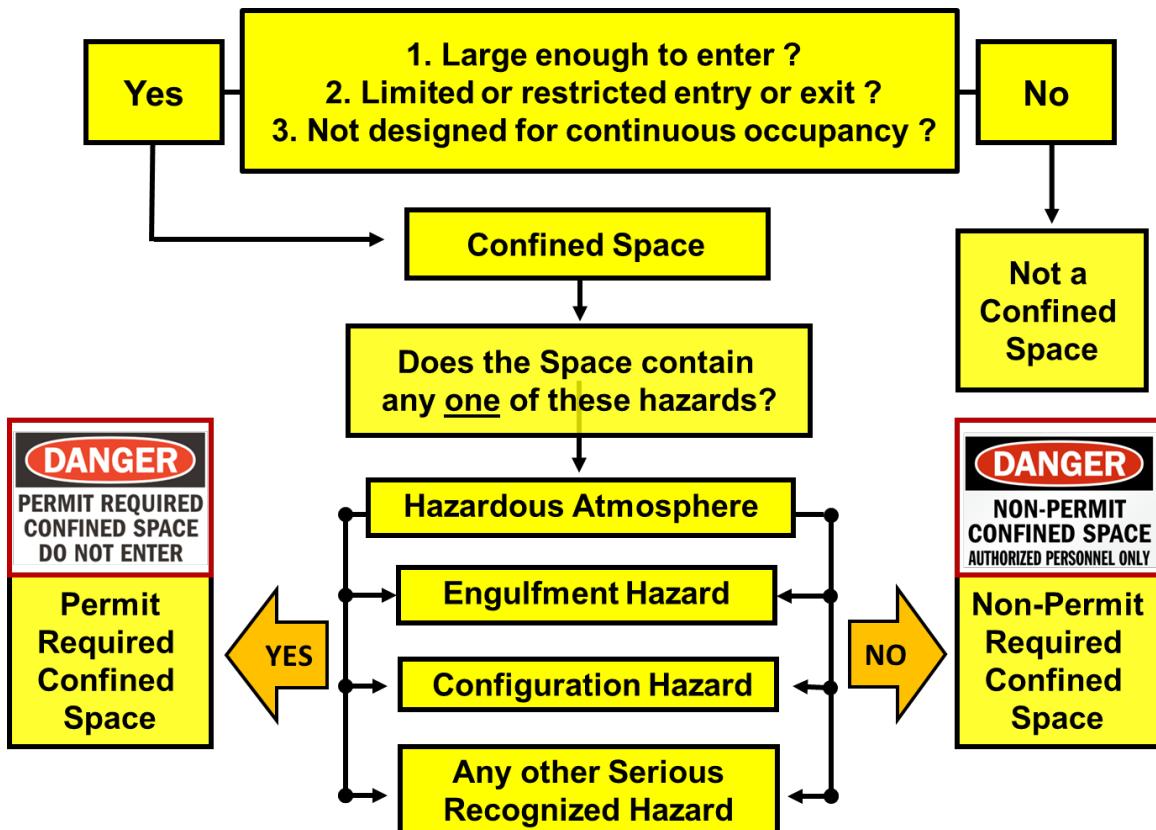
- Before you begin working at a worksite you must be informed by your competent person about confined spaces that you may be directed to work in or near. These spaces must be identified by specific hazards.
- If there are permit required confined spaces at your site they must possess signage or other means of prohibiting unauthorized entry the sign may say “DANGER -- PERMIT- REQUIRED CONFINED SPACE, DO NOT ENTER” or use other similar language.
- Remember the chemicals we us or the activities we perform in a space can introduce a new hazard that would make that space into a confined space or a permit required confined space. For example hot work, which is any task that produces a spark, arc, or any other ignition source such as molten metal.
- Permit required confined spaces possess or can possibly possess hazards that can immediately cause death or serious sickness or injury. We refer to such hazards as “IDLH’s,” which stands for “Immediate Danger of Life or Health.”
- Entry into a confined or permit required confined space means any body part that breaks the plane or opening to the space. Reaching into a space with your hand or arm would constitute and entry.
- A Competent person means one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has the authorization to take prompt corrective measures to eliminate them. You MUST have a competent person at your site at all times.
- The Controlling Contractor is the employer that has overall responsibility for construction at the worksite. This is typically

the General Contractor. If the controlling contractor owns or manages the property, then it is both a controlling employer and a host employer.

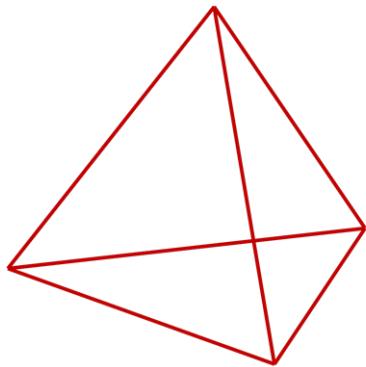
- The Host employer means the employer that owns or manages the property where you are working.
- A Hazardous atmosphere means an atmosphere that may expose employees to the risk of death, incapacitation, impairment, injury, or illness from such hazards as flammable gases, combustible dusts, atmospheric oxygen concentration below 19.5 percent or above 23.5 percent and concentrations of recognized toxic and hazardous substance or any other atmospheric condition that is immediately dangerous to life or health.

### **Confined Space Identification Flow Chart**

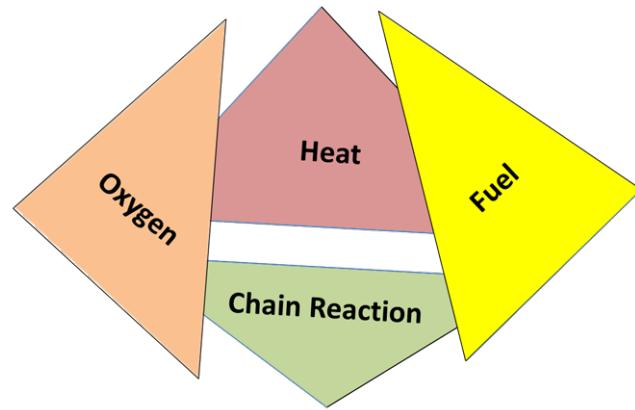
Here is a simple flow chart that can help you better understand how we classify confined and permit required confined spaces. If you have any questions please ask your competent person.



## 2. Flammable Atmospheres Module



A Tetrahedron



The Fire Tetrahedron

The fire tetrahedron include 4 necessary components

1. Fuel (something that will burn)
2. Heat (enough to make the fuel burn)
3. Oxygen (enough to support combustion)
4. Uninhibited chain reaction

Formerly the use of the fire triangle included on three components fuel, heat, oxygen. These three components must be present to have a fire but an uninhibited chain reaction must also be present. According to the National Fire Protection Association (NFPA) a fire tetrahedron more accurately describes the mechanism of a fire. In a real sense a fire is actually an event.

## Fire Classifications

Fires are classified according to the type of fuel that is burning

Class A - ordinary combustibles



Class B - flammable liquids



Class C - electrical fires

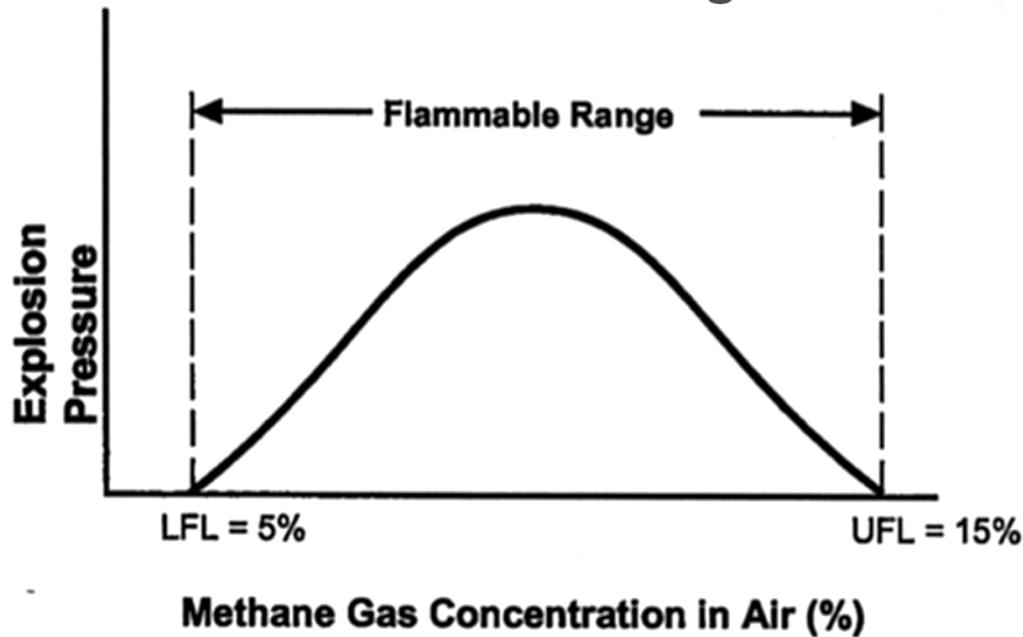


Class D - metals fires



Note: A Class K fire is a kitchen fire (grease fire).

## The LFL and UFL and The Flammable Range



### 3. Oxygen Deficient and Enriched Atmospheres Module

An oxygen deficient atmosphere means an atmosphere containing less than 19.5 percent oxygen by volume and an oxygen enriched atmosphere means an atmosphere containing more than 23.5 percent oxygen by volume. These two states of concentration have pose different hazards to entrants inside of confined spaces.

Oxygen enrichment increase volatility inside the space meaning the atmosphere could become explosive. Oxygen deficient atmospheres impair our breathing and can lead to asphyxiation. Oxygen is a very most important element and is also a fundamental part of combustion.

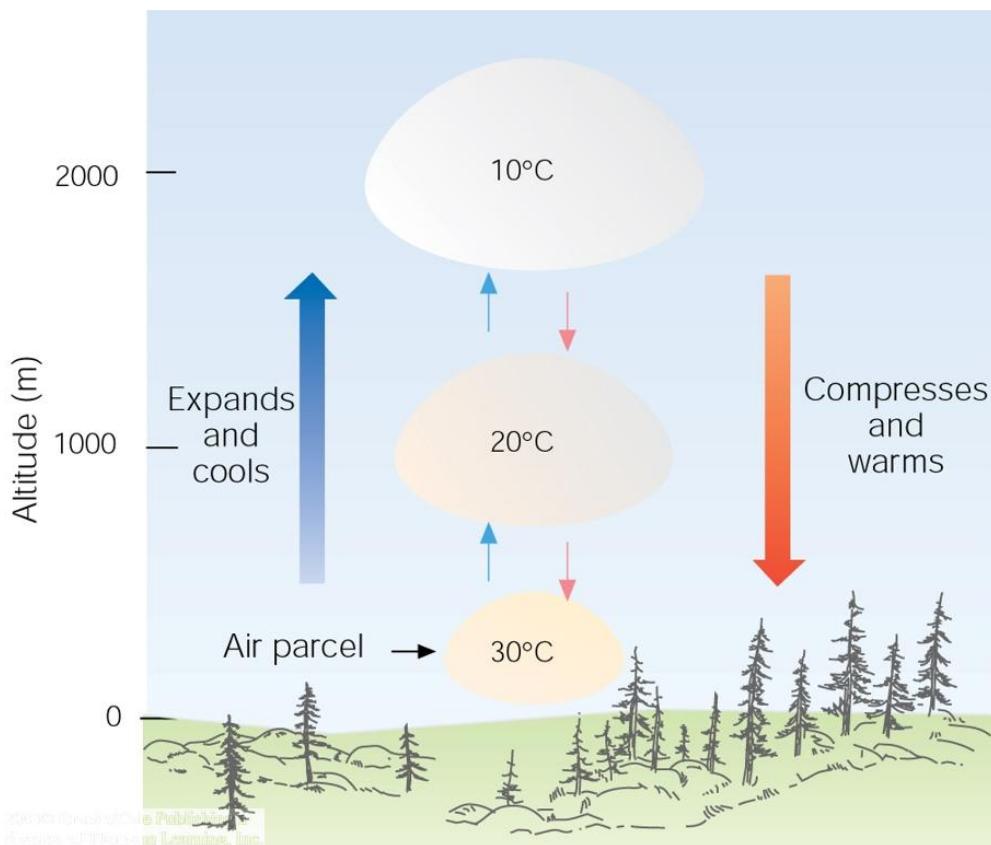
- Oxygen is essential to life. Its normal concentration in the air we breathe is approximately 21 % (20.9%)
  - OSHA 19.5 % to 23.5 %
  - We can breathe in a 50-60% oxygen enriched atmosphere for several hours under medical care (oxygen therapy)
  - Oxygen is not flammable but supports combustion.
  - Most materials burn fiercely sometimes explosively in oxygen.
  - As the oxygen concentration in air increases, the potential fire risk increases. Oxygen enrichment cannot be detected by the human senses
  - At concentrations above 23.5 % in air, the situation becomes dangerous due to the increased fire hazard.
  - Oxygen is colourless, tasteless and has no odour.
  - Oxygen is heavier than air, oxygen can accumulate in low lying areas. such as pits or underground rooms especially in cases of liquid spillage.
  - 3 Means of losing oxygen
    - Displacement
    - Consumption
    - Reaction
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#### **4. Vapor Density and Specific Gravity Module**

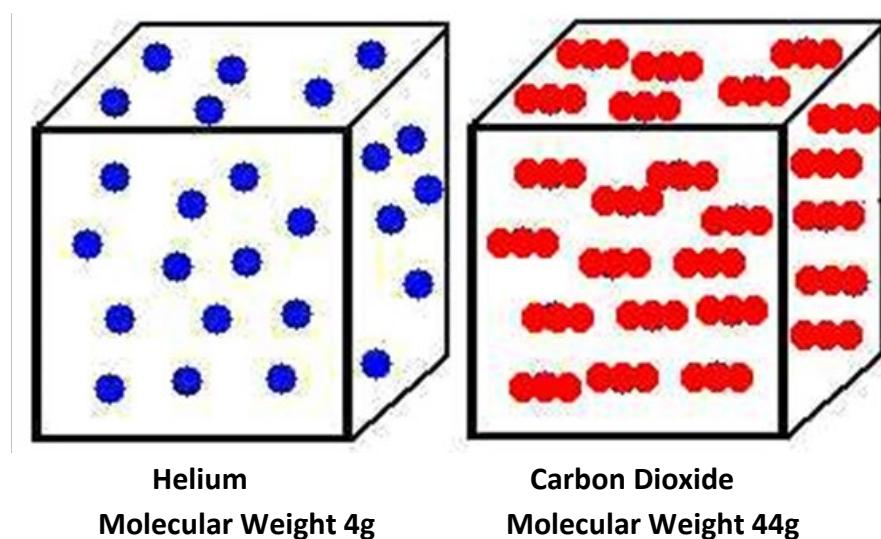
##### **Specific gravity and relative vapor density**

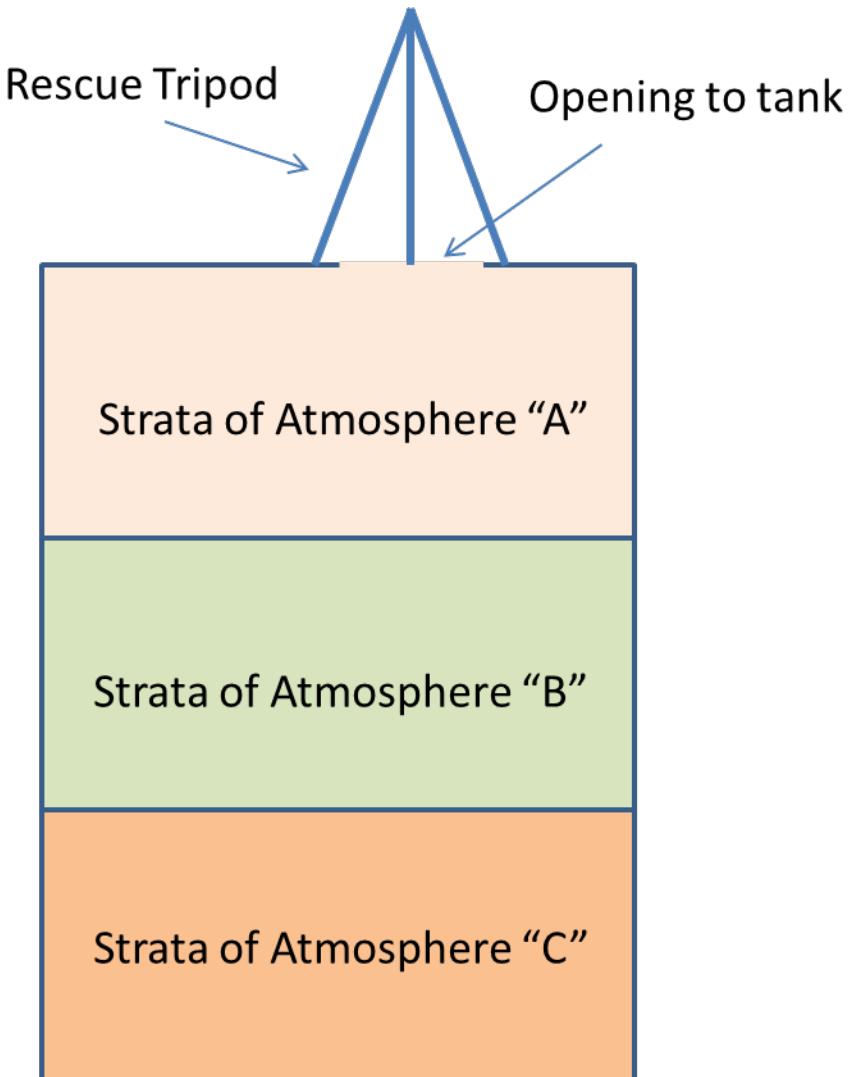
Specific gravity and vapor density comparative measurements based on the respective relative weight of a liquid and a gas or vapor compared to water or air. This “weight” of water or air is an arbitrary value of one (1). If a gas has a vapor density of less than one it will generally rise in air. If the vapor density is greater than one the gas will generally sink in air. Propane for example has a vapor density of 1.554, so it will sink in air, the vapor density of helium is 0.145 so it is significantly lighter than air so it will rise. Acetone is twice as heavy as air so its vapor density is 2. Mercury vapor is nearly seven times heavier than air. As you would imagine, the density of a chemical has great safety and health implications for example storage of chemicals

especially flammables, oxidizers or other highly reactive chemicals that can displace air, possibly presenting hazard to employees.



Vapor Density and Specific Gravity are subject to environmental conditions.





Different Vapor Densities  
in a PRCS Tank Entry

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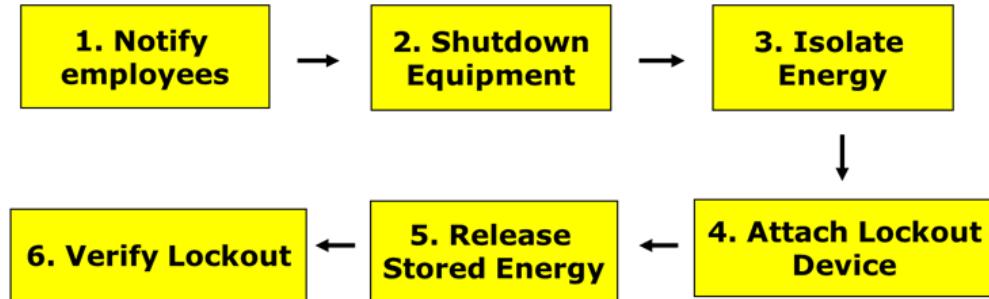
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## 5. The Control of Hazardous Energy Module

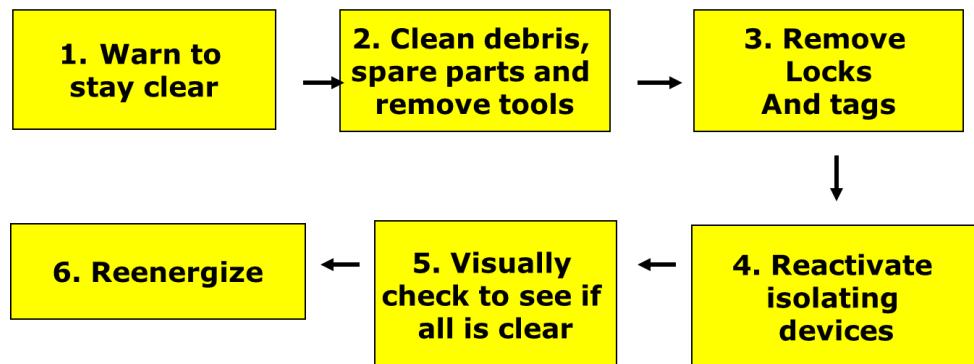
Dr. William Haddon Jr. a physician with degrees from the Massachusetts Institute of Technology, Harvard Medical School and Harvard School of Public Health and the first director of the National Highway Traffic Safety Administration, proposed a general idea that accidents and injuries involve the transfer of energy. His theory is known as the Energy Release Theory, it poses that objects, events, or environments interaction with people cause harm. Many sources of energy are obvious to us such as the moving parts of a machine, motor vehicles, projectiles, gravity, or even wind and weather systems yet we often overlook the tremendous energy found in chemicals simply because we cannot see the energy. To control hazardous energy we have developed procedures commonly referred to as Lock-out Tag-out or LOTO for short.

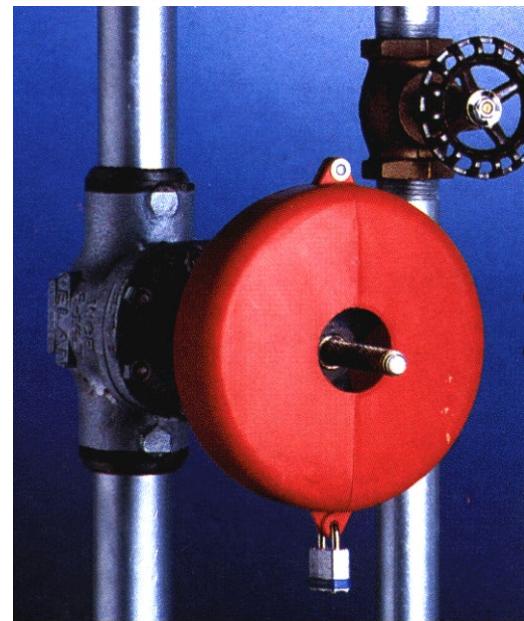
**Other Physical Hazards Module** Isolate or isolation means the process by which employees in a confined space are completely protected against the release of energy and material into the space, and contact with a physical hazard, by such means as: blanking or blinding; misaligning or removing sections of lines, pipes, or ducts; a double block and bleed system; lockout or tagout of all sources of energy; blocking or disconnecting all mechanical linkages; or placement of barriers to eliminate the potential for employee contact with a physical hazard.

Typical Steps to Lockout Tagout Procedure



Typical Steps to Remove Lockout Tagout and Reenergize





### Examples of Isolation Devices

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## 6. Oxidizing Agents Module

An oxidizing agent is a chemical substance that reacts with another chemical called the reactant and results in the removal electrons. This reaction is referred to as a redox chemical reaction and can in some oxidizers release a great deal of chemical energy, which has the potential to cause injury, illness and damage.

### Common Oxidizing Agents

Oxygen ( $O_2$ )  
Ozone ( $O_3$ )  
Hydrogen peroxide ( $H_2O_2$ ) and other inorganic peroxides  
Fluorine ( $F_2$ ), chlorine ( $Cl_2$ ), and other halogens  
Hexavalent chromium compounds such as chromic and dichromic acids and chromium trioxide, pyridinium chlorochromate (PCC), and chromate/dichromate compounds  
Permanganate compounds such as  $KMnO_4$   
Sodium perborate  
Nitric acid ( $HNO_3$ ) and nitrate compounds  
Sulfuric acid ( $H_2SO_4$ )  
Peroxydisulfuric acid ( $H_2S_2O_8$ )  
Peroxymonosulfuric acid ( $H_2SO_5$ )  
Chlorite, chlorate, perchlorate, and other analogous halogen compounds  
Hypochlorite and other hypohalite compounds, including household bleach ( $NaClO$ )  
Nitrous oxide ( $N_2O$ )  
Silver oxide ( $Ag_2O$ )  
Osmium tetroxide ( $OsO_4$ )

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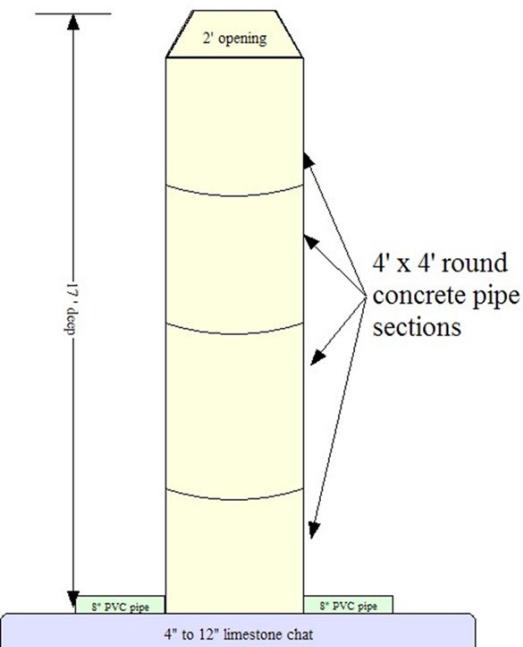
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## 7. Rescue Module

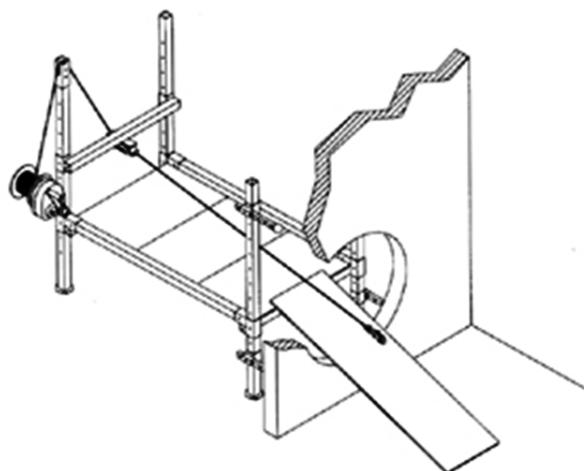
There are three types of rescues for a PRCS. Let's discuss the implications of rescue.

1. Self-Rescue
2. Non-Entry Rescue
3. Entry Rescue



Vertical PRCS

1



Horizontal PRCS

## Section Four: The Checklist

Using checklists has become standard Other critical industries have made aviation, healthcare, hospitals and other critical industries, managers have turned to utilizing checklists to ensure and hedge against human error. Sometimes there are just too many moving parts to remember so deliberate checklist help keep everyone on the right track.

Make a CHECKLIST based upon code and best practice

Communication and Coordination Checklist		Yes	No
1.	Has the host provided controlling contractor the location of the PRCS?	✓	
2.	Has the host provided controlling contractor with the specific nature of the hazard(s) within the PRCS?	✓	
3.	Has the host employer provided controlling contractor with precautions and controls previously utilized in the PRCS by other controlling and entry contractors?	✓	
4.	Has the host communicated and coordinated with controlling contractor on emergency action plan and provided facility orientation protocol?	✓	
5.	Has controlling contractor received, reviewed and consulted with host on above items 1 through 4?	✓	
6.	Has controlling contractor provided and reviewed the information from the host in items 1 through 4 with entry employer?	✓	
7.	Does the entry employer fully understand the information provided by the controlling contractor?	✓	
8.	Have all workers on site been trained to recognize and avoid permit confined spaces?	✓	
9.	Has a plan of communication during entry been established?	✓	
10.	Are there any barriers of communications between workers i.e. language, impairment etc.?		✓
11.	Have all workers been trained in recognition and avoidance of PRCS?	✓	
12.	Has a qualified rescue team been provided a briefing of facility, hazards and procedures?	✓	
13.	Has a bilateral debriefing between the controlling contractor and the entry employer taken place regarding the performance of the PRCS program followed and any hazards confronted or created in the permit space(s) during entry operations?	✓	
14.	Has the controlling contractor apprised the host employer of the information exchanged with the entry entities pursuant to this subparagraph	✓	
15.	Has the host reviewed and archived debriefing notes and information within permit?	✓	

When we perform tasks as a matter of routine, such as completing a checklist day after day, sometimes we move too quickly, less deliberate than we should that can lead to making an error or overlooking something important. This is the reason why in a hospital before a surgery medical professionals will ask a series of the same questions often worded a bit differently. Notice the checklist above has one dissimilar answer. This checklist is developed that each of these questions must have the “correct answer” to help guide the applicant through code and best practice compliance. Yet the validating question, which is different from the others, tells us if the checklist was deliberately completed. If a checklist is used often enough, an employer may change the validating question, just to keep everyone on their toes since we tend to take shortcuts.



Thing People Do: College student takes shortcut off the campus planned path.

### Make a CHECKLIST based upon code and best practice

This is a “validating” question because it can gauge if the person who performed the checklist paid close attention to each individual question. Atypical answers to validating questions may suggest further review. Employers can periodically shuffle the validating question so competent persons don’t become too comfortable with the format.

		Yes	No
Has the entry employer fully understood the purpose of the PRCS?	✓		
Has the entry employer fully understood the specific nature of the hazard(s) within the permit space?	✓		
Has the entry employer fully understood the required precautions and controls to be used during entry operations?	✓		
Has the entry employer fully understood the role of the controlling contractor on emergency situations?	✓		
Has the entry employer fully consulted with host on above items 1 through 4?	✓		
Has the entry employer fully communicated information from the host in items 1 through 4?	✓		

7.	Does the entry employer fully understand the information provided by the controlling contractor?	✓
8.	Have all workers on site been trained to recognize and avoid permit confined spaces?	✓
9.	Has a plan of communication during entry been established?	✓
10.	Are there any barriers of communications between workers i.e. language, impairment etc.?	✓
11.	Have all workers been trained in recognition and avoidance of PRCS?	✓
12.	Has a qualified rescue team been provided a briefing off facility, hazards and procedures?	✓
13.	Has a bilateral debriefing between the controlling contractor and the entry employer taken place regarding the performance of the PRCS program followed and any hazards confronted or created in the permit space(s) during entry operations?	✓
14.	Has the controlling contractor apprised the host employer of the information exchanged with the entry entities pursuant to this subparagraph?	✓
15.	Has the host reviewed and archived debriefing notes and information within permit?	✓

## **Section Five: Confined Spaces in Construction Group Exercise**

### **Exercise Option 1:**

1. Create your own permit required confined space. Congratulations! You just received a contract for the XYZ Company located in Queens, New York. Each group will act as a different entity in this exercise; the host employer, the controlling contractor, the entry employers, rescue team and others. As a group discuss a means of coordination from "your" perspective and plan a course of action.
2. Choose a PRCS and includes as many hazards as you wish; you can be creative here, this is an exercise.
3. Describe the communications that you will use not only for the entry by throughout the facility and beyond.
4. Describe what means you would use to ensure full coordination.
5. Describe the controls you will utilize and complete a Job Hazard Analysis
6. Describe your emergency action plan and rescue procedures.
7. Describe your debriefing procedures.

### **Exercise Option 2:**

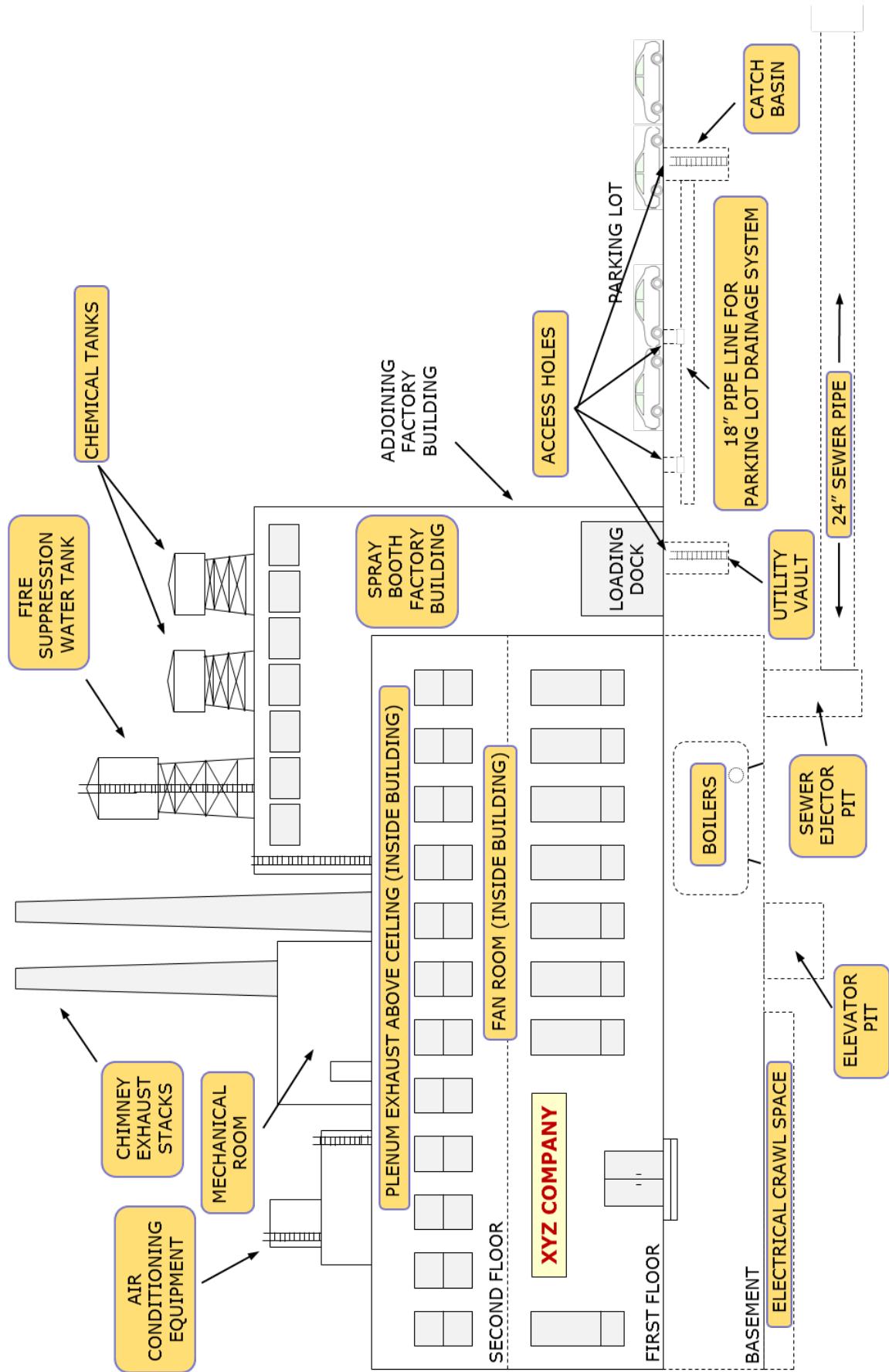
As a group, using the Confined Space Inventory and Checklist matrix below (page 39) try to anticipate other hazards in associated confined spaces throughout the XYZ Company facility. See too if some other construction activity your team may perform in the facility can create another NEW permit required confined space. Be creative with your scenarios.

### **Job Hazard/Safety Analysis Matrix**

<b>Task</b>	<b>Hazard</b>	<b>Control</b>	<b>Means of Implementation</b>
Break tasks down to smaller sub-tasks.	List all possible associated hazards preferably in an order of severity	Use the Hierarchy of Controls 1. Elimination 2. Engineering 3. Mitigation	Should set out procedures that are easy to understand and accomplish in the field. Include the use equipment and requisite training and administrative

A job hazard analysis is a technique that focuses on job tasks as a way to identify hazards before they occur. It focuses on the relationship between the worker, the task, the tools, the work environment and the necessary steps to control a hazard. In a permit required confined space Job Hazard Analysis class to control hazards by eliminating them or engineering them away.

Job Hazard Analysis (JHA) for XYZ Company Queens New York				
#	Step/Task	Hazards	Control	Means of Implementation



**XYZ COMPANY CONFINED SPACE INVENTORY & CHECKLIST**

ID	Confined Space	Location	Permit Required	Employees Informed	Posted Signage	Associated Hazards	Competent Person		
							Yes	No	Yes
A	Access Holes	Parking lot	X	X	X	X	1. Engulfment 2. Hydrogen Sulfide 3. Atmospheric Configuration 4. Configuration 5. Health (biological) 6. Animals 7. Falls	John Doe, ABC Plumbing Phone (212) 555-5555 Email: JOE@ABCPLUMBING.COM	
B	Air Conditioning Equipment	Roof	X	X	X	X	1. Configuration 2. Electrical 3. Legionella 4. Falls 5. Atmospheric 6. Toxic (Cleaners)	Joe SMITH, LMN HVAC Phone (212) 111-1111 Email: Jsmith@LMNHVAC.COM	
C	Boilers	Basement	X	X	X	X	1. Atmospheric (Rust) 2. Explosive 3. Extreme Heat 4. Configuration 5. Toxic (Muck)	John Doe, ABC Plumbing Phone (212) 555-5555 Email: JOE@ABCPLUMBING.COM	
D	Chemical Storage Tanks	Roof	X	X	X	X	1. Toxic (Chemicals) 2. Explosive 3. Falls 4. Atmospheric (Oxygen)	Tom Harry Smith, CHEMS R US Phone (212) 111-1111 Email: THS@CjemsRus..COM	

**XYZ COMPANY CONFINED SPACE INVENTORY & CHECKLIST**

ID	Confined Space	Location	Permit Required	Employees Informed		Associated Hazards	Competent Person
				Yes	No		
E	Fire Suppression Water Tanks						
F	Elevator Pits						

**XYZ COMPANY CONFINED SPACE INVENTORY & CHECKLIST**

ID	Confined Space	Location	Permit Required	Employees Informed		Posted Signage		Associated Hazards		Competent Person
				Yes	No	Yes	No	Yes	No	
I	Catch Basin									
J	Utility Vault									

## **XYZ COMPANY CONFINED SPACE INVENTORY & CHECKLIST**

G Sewer Ejector Pit	
H 18" Pipe line	

## **XYZ COMPANY CONFINED SPACE INVENTORY & CHECKLIST**

XYZ COMPANY CONFINED SPACE INVENTORY & CHECKLIST

## **Section Six Debriefing:**

As is proper with any form of training or education, there should be a means of evaluating the experience and assessing its effectiveness. Let us take a few moments and talk about what this program has achieved and where it can be made better. Also, let's take notes so we can look back on our notes say in the months to come and see if, at all, has this training and what we accomplished today had some longer-term effect on our workplace.

## **Appendix A: Subpart AA Confined Spaces in Construction**

- 1926.1200 Reserved
- 1926.1201 Scope
- 1926.1202 Definitions
- 1926.1203 General requirements
- 1926.1204 Permit-required confined space program
- 1926.1205 Permitting process
- 1926.1206 Entry permit
- 1926.1207 Training
- 1926.1208 Duties of authorized entrants
- 1926.1209 Duties of attendants
- 1926.1210 Duties of entry supervisors
- 1926.1211 Rescue and emergency services
- 1926.1212 Employee participation
- 1926.1213 Provision of documents to Secretary

§1926.1201 Scope.

(a) This Standard sets forth requirements for practices and procedures to protect employees engaged in construction activities at a worksite with one or more confined spaces, subject to the exceptions in paragraph (b) of this section.

Note to paragraph §1926.1201(a). Examples of locations where confined spaces may occur include, but are not limited to, the following: Bins; boilers; pits (such as elevator, escalator, pump, valve or other equipment); manholes (such as sewer, storm drain, electrical, communication, or other utility); tanks (such as fuel, chemical, water, or other liquid, solid or gas); incinerators; scrubbers; concrete pier columns; sewers; transformer vaults; heating, ventilation, and air-conditioning (HVAC) ducts; storm drains; water mains; precast concrete and other pre-formed manhole units; drilled shafts; enclosed beams; vessels; digesters; lift stations;

cesspools; silos; air receivers; sludge gates; air preheaters; step up transformers; turbines; chillers; bag houses; and/or mixers/reactors.

(b) Exceptions. This Standard does not apply to: (1) Construction work regulated by §1926 subpart P—Excavations. (2) Construction work regulated by §1926 subpart S—Underground Construction, Caissons, Cofferdams and Compressed Air. (3) Construction work regulated by §1926 subpart Y—Diving.

(c) Where this Standard applies and there is a provision that addresses a confined space hazard in another applicable OSHA Standard, the employer must comply with both that requirement and the applicable provisions of this Standard.

#### §1926.1202 Definitions.

The following terms are defined for the purposes of this subpart only:

Acceptable entry conditions means the conditions that must exist in a permit space, before an employee may enter that space, to ensure that employees can safely enter into, and safely work within, the space.

Attendant means an individual stationed outside one or more permit spaces who assesses the status of authorized entrants and who must perform the duties specified in §1926.1209.

Authorized entrant means an employee who is authorized by the entry supervisor to enter a permit space.

Barrier means a physical obstruction that blocks or limits access.

Blanking or blinding means the absolute closure of a pipe, line, or duct by the fastening of a solid plate (such as a spectacle blind or a skillet blind) that completely covers the bore and that is capable of withstanding the maximum pressure of the pipe, line, or duct with no leakage beyond the plate.

Competent person means one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has the authorization to take prompt corrective measures to eliminate them.

Confined space means a space that:

- (1) Is large enough and so configured that an employee can bodily enter it;
- (2) Has limited or restricted means for entry and exit; and
- (3) Is not designed for continuous employee occupancy.

Control means the action taken to reduce the level of any hazard inside a confined space using engineering methods (for example, by ventilation), and then using these methods to maintain the reduced hazard level. Control also refers to the engineering methods used for this purpose. Personal protective equipment is not a control.

Controlling Contractor is the employer that has overall responsibility for construction at the worksite.

Note. If the controlling contractor owns or manages the property, then it is both a controlling employer and a host employer.

Double block and bleed means the closure of a line, duct, or pipe by closing and locking or tagging two in-line valves and by opening and locking or tagging a drain or vent valve in the line between the two closed valves.

Early-warning system means the method used to alert authorized entrants and attendants that an engulfment hazard may be developing. Examples of early-warning systems include, but are not limited to: alarms activated by remote sensors; and lookouts with equipment for immediately communicating with the authorized entrants and attendants.

Emergency means any occurrence (including any failure of power, hazard control or monitoring equipment) or event, internal or external, to the permit space that could endanger entrants.

Engulfment means the surrounding and effective capture of a person by a liquid or finely divided (flowable) solid substance that can be aspirated to cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction, crushing, or suffocation.

Entry means the action by which any part of a person passes through an opening into a permit-required confined space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space, whether or not such action is intentional or any work activities are actually performed in the space.

Entry Employer means any employer who decides that an employee it directs will enter a permit space.

Note. An employer cannot avoid the duties of the Standard merely by refusing to decide whether its employees will enter a permit space, and OSHA will consider the failure to so decide to be an implicit decision to allow employees to enter those spaces if they are working in the proximity of the space.

Entry permit (permit) means the written or printed document that is provided by the employer who designated the space a permit space to allow and control entry into a permit space and that contains the information specified in §1926.1206 of this Standard.

Entry rescue occurs when a rescue service enters a permit space to rescue one or more employees.

Entry supervisor means the qualified person (such as the employer, foreman, or crew chief) responsible for determining if acceptable entry conditions are present at a permit space where entry is planned, for authorizing entry and overseeing entry operations, and for terminating entry as required by this Standard.

Note. An entry supervisor also may serve as an attendant or as an authorized entrant, as long as that person is trained and equipped as required by this Standard for each role he or she fills. Also, the duties of entry supervisor may be passed from one individual to another during the course of an entry operation.

Hazard means a physical hazard or hazardous atmosphere. See definitions below.

Hazardous atmosphere means an atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (that is, escape unaided from a permit space), injury, or acute illness from one or more of the following causes:

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

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

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

Note. An atmospheric concentration of any substance that is not capable of causing death, incapacitation, impairment of ability to self-rescue, injury, or acute illness due to its health effects is not covered by this definition.

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

Note. For air contaminants for which OSHA has not determined a dose or permissible exposure limit, other sources of information, such as Safety Data Sheets that comply with the Hazard

Communication Standard, §1926.59 of this part, published information, and internal documents can provide guidance in establishing acceptable atmospheric conditions.

Host employer means the employer that owns or manages the property where the construction work is taking place.

Note. If the owner of the property on which the construction activity occurs has contracted with an entity for the general management of that property, and has transferred to that entity the information specified in §1203(h)(1), OSHA will treat the contracted management entity as the host employer for as long as that entity manages the property. Otherwise, OSHA will treat the owner of the property as the host employer. In no case will there be more than one host employer.

Hot work means operations capable of providing a source of ignition (for example, riveting, welding, cutting, burning, and heating).

Immediately dangerous to life or health (IDLH) means any condition that would interfere with an individual's ability to escape unaided from a permit space and that poses a threat to life or that would cause irreversible adverse health effects.

Note. Some materials—hydrogen fluoride gas and cadmium vapor, for example—may produce immediate transient effects that, even if severe, may pass without medical attention, but are followed by sudden, possibly fatal collapse 12-72 hours after exposure. The victim "feels normal" after recovery from transient effects until collapse. Such materials in hazardous quantities are considered to be "immediately" dangerous to life or health.

Inerting means displacing the atmosphere in a permit space by a noncombustible gas (such as nitrogen) to such an extent that the resulting atmosphere is noncombustible.

Note. This procedure produces an IDLH oxygen-deficient atmosphere.

Isolate or isolation means the process by which employees in a confined space are completely protected against the release of energy and material into the space, and contact with a physical hazard, by such means as: blanking or blinding; misaligning or removing sections of lines, pipes, or ducts; a double block and bleed system; lockout or tagout of all sources of energy; blocking or disconnecting all mechanical linkages; or placement of barriers to eliminate the potential for employee contact with a physical hazard.

Limited or restricted means for entry or exit means a condition that has a potential to impede an employee's movement into or out of a confined space. Such conditions include, but are not limited to, trip hazards, poor illumination, slippery floors, inclining surfaces and ladders.

Line breaking means the intentional opening of a pipe, line, or duct that is or has been carrying flammable, corrosive, or toxic material, an inert gas, or any fluid at a volume, pressure, or temperature capable of causing injury.

Lockout means the placement of a lockout device on an energy isolating device, in accordance with an established procedure, ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

Lower \_ flammable limit or lower explosive limit means the minimum concentration of a substance in air needed for an ignition source to cause a flame or explosion.

Monitor or monitoring means the process used to identify and evaluate the hazards after an authorized entrant enters the space. This is a process of checking for changes that is performed in a periodic or continuous manner after the completion of the initial testing or evaluation of that space.

Non-entry rescue occurs when a rescue service, usually the attendant, retrieves employees in a permit space without entering the permit space.

Non-permit confined space means a confined space that meets the definition of a confined space but does not meet the requirements for a permit-required confined space, as defined in this subpart.

Oxygen deficient atmosphere means an atmosphere containing less than 19.5 percent oxygen by volume.

Oxygen enriched atmosphere means an atmosphere containing more than 23.5 percent oxygen by volume.

Permit-required confined space (permit space) means a confined space that has one or more of the following characteristics: (1) Contains or has a potential to contain a hazardous atmosphere; (2) Contains a material that has the potential for engulfing an entrant; (3) Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or (4) Contains any other recognized serious safety or health hazard.

Permit-required confined space program (permit space program) means the employer's overall program for controlling, and, where appropriate, for protecting employees from, permit space hazards and for regulating employee entry into permit spaces.

Physical hazard means an existing or potential hazard that can cause death or serious physical damage. Examples include, but are not limited to: explosives (as defined by paragraph (n) of §1926.914, definition of "explosive"); mechanical, electrical, hydraulic and pneumatic energy; radiation; temperature extremes; engulfment; noise; and inwardly converging surfaces.

Physical hazard also includes chemicals that can cause death or serious physical damage through skin or eye contact (rather than through inhalation).

Prohibited condition means any condition in a permit space that is not allowed by the permit during the period when entry is authorized. A hazardous atmosphere is a prohibited condition unless the employer can demonstrate that personal protective equipment (PPE) will provide effective protection for each employee in the permit space and provides the appropriate PPE to each employee.

Qualified person means one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his ability to solve or resolve problems relating to the subject matter, the work, or the project.

Representative \_permit space means a mock-up of a confined space that has entrance openings that are similar to, and is of similar size, configuration, and accessibility to, the permit space that authorized entrants enter.

Rescue means retrieving, and providing medical assistance to, one or more employees who are in a permit space.

Rescue service means the personnel designated to rescue employees from permit spaces.

Retrieval system means the equipment (including a retrieval line, chest or full body harness, wristlets or anklets, if appropriate, and a lifting device or anchor) used for non-entry rescue of persons from permit spaces.

Serious physical damage means an impairment or illness in which a body part is made functionally useless or is substantially reduced in efficiency. Such impairment or illness may be permanent or temporary and includes, but is not limited to, loss of consciousness, disorientation, or other immediate and substantial reduction in mental efficiency. Injuries involving such impairment would usually require treatment by a physician or other licensed health-care professional.

Tagout means:(1) Placement of a tagout device on a circuit or equipment that has been deenergized, in accordance with an established procedure, to indicate that the circuit or equipment being controlled may not be operated until the tagout device is removed; and (2) The employer ensures that (i) tagout provides equivalent protection to lockout, or (ii) that lockout is infeasible and the employer has relieved, disconnected, restrained and otherwise rendered safe stored (residual) energy.

Test or testing means the process by which the hazards that may confront entrants of a permit space are identified and evaluated. Testing includes specifying the tests that are to be performed in the permit space.

Note. Testing enables employers both to devise and implement adequate control measures for the protection of authorized entrants and to determine if acceptable entry conditions are present immediately prior to, and during, entry.

Ventilate or ventilation means controlling a hazardous atmosphere using continuous forced-air mechanical systems that meet the requirements of §1926.57—Ventilation.

§1926.1203 General requirements.

- (a) Before it begins work at a worksite, each employer must ensure that a competent person identifies all confined spaces in which one or more of the employees it directs may work, and identifies each space that is a permit space, through consideration and evaluation of the elements of that space, including testing as necessary.
- (b) If the workplace contains one or more permit spaces, the employer who identifies, or who receives notice of, a permit space must:
  - (1) Inform exposed employees by posting danger signs or by any other equally effective means, of the existence and location of, and the danger posed by, each permit space; and
  - (2) Inform, in a timely manner and in a manner other than posting, its employees' authorized representatives and the controlling contractor of the existence and location of, and the danger posed by, each permit space.
- (c) Each employer who identifies, or receives notice of, a permit space and has not authorized employees it directs to work in that space must take effective measures to prevent those employees from entering that permit space, in addition to complying with all other applicable requirements of this Standard.
- (d) If any employer decides that employees it directs will enter a permit space, that employer must have a written permit space program that complies with §1926.1204 implemented at the construction site. The written program must be made available prior to and during entry operations for inspection by employees and their authorized representatives.
- (e) An employer may use the alternate procedures specified in paragraph §1926.1203(e)(2) for entering a permit space only under the conditions set forth in paragraph §1926.1203(e)(1).
  - (1) An employer whose employees enter a permit space need not comply with §§1926.1204 through 1206 and §§1926.1208 through 1211, provided that all of the following conditions are met:

- (i) The employer can demonstrate that all physical hazards in the space are eliminated or isolated through engineering controls so that the only hazard posed by the permit space is an actual or potential hazardous atmosphere;
- (ii) The employer can demonstrate that continuous forced air ventilation alone is sufficient to maintain that permit space safe for entry, and that, in the event the ventilation system stops working, entrants can exit the space safely;
- (iii) The employer develops monitoring and inspection data that supports the demonstrations required by paragraphs §1926.1203(e)(1)(i) and §1926.1203(e)(1)(ii);
- (iv) If an initial entry of the permit space is necessary to obtain the data required by paragraph §1926.1203(e)(1)(iii), the entry is performed in compliance with §§1926.1204 through 1211 of this Standard;
- (v) The determinations and supporting data required by paragraphs §1926.1203(e)(1)(i), (e)(1)(ii), and (e)(1)(iii) are documented by the employer and are made available to each employee who enters the permit space under the terms of paragraph §1926.1203(e) or to that employee's authorized representative; and
- (vi) Entry into the permit space under the terms of paragraph §1926.1203(e)(1) is performed in accordance with the requirements of paragraph §1926.1203(e)(2).

Note to paragraph §1926.1203(e)(1). See paragraph §1926.1203(g) for reclassification of a permit space after all hazards within the space have been eliminated.

- (2) The following requirements apply to entry into permit spaces that meet the conditions set forth in paragraph §1926.1203(e)(1):
  - (i) Any conditions making it unsafe to remove an entrance cover must be eliminated before the cover is removed.
  - (ii) When entrance covers are removed, the opening must be immediately guarded by a railing, temporary cover, or other temporary barrier that will prevent an accidental fall through the opening and that will protect each employee working in the space from foreign objects entering the space.
  - (iii) Before an employee enters the space, the internal atmosphere must be tested, with a calibrated direct-reading instrument, for oxygen content, for flammable gases and vapors, and for potential toxic air contaminants, in that order. Any employee who enters the space, or that employee's authorized representative, must be provided an opportunity to observe the pre-entry testing required by this paragraph.

- (iv) No hazardous atmosphere is permitted within the space whenever any employee is inside the space.
- (v) Continuous forced air ventilation must be used, as follows:
  - (A) An employee must not enter the space until the forced air ventilation has eliminated any hazardous atmosphere;
  - (B) The forced air ventilation must be so directed as to ventilate the immediate areas where an employee is or will be present within the space and must continue until all employees have left the space;
  - (C) The air supply for the forced air ventilation must be from a clean source and must not increase the hazards in the space.
- (vi) The atmosphere within the space must be continuously monitored unless the entry employer can demonstrate that equipment for continuous monitoring is not commercially available or periodic monitoring is sufficient. If continuous monitoring is used, the employer must ensure that the monitoring equipment has an alarm that will notify all entrants if a specified atmospheric threshold is achieved, or that an employee will check the monitor with sufficient frequency to ensure that entrants have adequate time to escape. If continuous monitoring is not used, periodic monitoring is required. All monitoring must ensure that the continuous forced air ventilation is preventing the accumulation of a hazardous atmosphere. Any employee who enters the space, or that employee's authorized representative, must be provided with an opportunity to observe the testing required by this paragraph.
- (vii) If a hazard is detected during entry:
  - (A) Each employee must leave the space immediately;
  - (B) The space must be evaluated to determine how the hazard developed; and
  - (C) The employer must implement measures to protect employees from the hazard before any subsequent entry takes place.
- (viii) The employer must ensure a safe method of entering and exiting the space. If a hoisting system is used, it must be designed and manufactured for personnel hoisting; however, a job-made hoisting system is permissible if it is approved for personnel hoisting by a registered professional engineer, in writing, prior to use.
- (ix) The employer must verify that the space is safe for entry and that the pre-entry measures required by paragraph §1926.1203(e)(2) have been taken, through a written certification that contains the date, the location of the space, and the signature of the person

providing the certification. The certification must be made before entry and must be made available to each employee entering the space or to that employee's authorized representative.

(f) When there are changes in the use or configuration of a non-permit confined space that might increase the hazards to entrants, or some indication that the initial evaluation of the space may not have been adequate, each entry employer must have a competent person reevaluate that space and, if necessary, reclassify it as a permit- required confined space.

(g) A space classified by an employer as a permit-required confined space may only be reclassified as a non-permit confined space when a competent person determines that all of the applicable requirements in paragraphs §1926.1203(g)(1) through (g)(4) have been met:

(1) If the permit space poses no actual or potential atmospheric hazards and if all hazards within the space are eliminated or isolated without entry into the space (unless the employer can demonstrate that doing so without entry is infeasible), the permit space may be reclassified as a non-permit confined space for as long as the non-atmospheric hazards remain eliminated or isolated;

(2) The entry employer must eliminate or isolate the hazards without entering the space, unless it can demonstrate that this is infeasible. If it is necessary to enter the permit space to eliminate or isolate hazards, such entry must be performed under §§1926.1204 through 1211 of this Standard. If testing and inspection during that entry demonstrate that the hazards within the permit space have been eliminated or isolated, the permit space may be reclassified as a non-permit confined space for as long as the hazards remain eliminated or isolated;

Note to paragraph §1926.1203(g)(2). Control of atmospheric hazards through forced air ventilation does not constitute elimination or isolation of the hazards. Paragraph §1926.1203(e) covers permit space entry where the employer can demonstrate that forced air ventilation alone will control all hazards in the space.

(3) The entry employer must document the basis for determining that all hazards in a permit space have been eliminated or isolated, through a certification that contains the date, the location of the space, and the signature of the person making the determination. The certification must be made available to each employee entering the space or to that employee's authorized representative; and

(4) If hazards arise within a permit space that has been reclassified as a non-permit space under paragraph §1926.1203(g), each employee in the space must exit the space. The entry employer must then reevaluate the space and reclassify it as a permit space as appropriate in accordance with all other applicable provisions of this Standard.

(h) Permit Space Entry Communication and Coordination:

- (1) Before entry operations begin, the host employer must provide the following information, if it has it, to the controlling contractor:
- (i) The location of each known permit space;
  - (ii) The hazards or potential hazards in each space or the reason it is a permit space; and
  - (iii) Any precautions that the host employer or any previous controlling contractor or entry employer implemented for the protection of employees in the permit space.
- (2) Before entry operations begin, the controlling contractor must:
- (i) Obtain the host employer's information about the permit space hazards and previous entry operations; and
  - (ii) Provide the following information to each entity entering a permit space and any other entity at the worksite whose activities could foreseeably result in a hazard in the permit space:
    - (A) The information received from the host employer;
    - (B) Any additional information the controlling contractor has about the subjects listed in paragraph (h)(1) of this section; and
    - (C) The precautions that the host employer, controlling contractor, or other entry employers implemented for the protection of employees in the permit spaces.
- (3) Before entry operations begin, each entry employer must:
- (i) Obtain all of the controlling contractor's information regarding permit space hazards and entry operations; and
  - (ii) Inform the controlling contractor of the permit space program that the entry employer will follow, including any hazards likely to be confronted or created in each permit space.
- (4) The controlling contractor and entry employer(s) must coordinate entry operations when:
- (i) More than one entity performs permit space entry at the same time; or
  - (ii) Permit space entry is performed at the same time that any activities that could foreseeably result in a hazard in the permit space are performed.
- (5) After entry operations:
- (i) The controlling contractor must debrief each entity that entered a permit space regarding the permit space program followed and any hazards confronted or created in the permit space(s) during entry operations;

(ii) The entry employer must inform the controlling contractor in a timely manner of the permit space program followed and of any hazards confronted or created in the permit space(s) during entry operations; and

(iii) The controlling contractor must apprise the host employer of the information exchanged with the entry entities pursuant to this subparagraph.

Note to paragraph §1926.1203(h). Unless a host employer or controlling contractor has or will have employees in a confined space, it is not required to enter any confined space to collect the information specified in this paragraph (h).

(iv) If there is no controlling contractor present at the worksite, the requirements for, and role of, controlling contractors in §1926.1203 must be fulfilled by the host employer or other employer who arranges to have employees of another employer perform work that involves permit space entry.

#### §1926.1204 Permit-Required Confined Space Program.

Each entry employer must:

- (a) Implement the measures necessary to prevent unauthorized entry;
- (b) Identify and evaluate the hazards of permit spaces before employees enter them;
- (c) Develop and implement the means, procedures, and practices necessary for safe permit space entry operations, including, but not limited to, the following:
  - (1) Specifying acceptable entry conditions;
  - (2) Providing each authorized entrant or that employee's authorized representative with the opportunity to observe any monitoring or testing of permit spaces;
  - (3) Isolating the permit space and physical hazard(s) within the space;
  - (4) Purgung, inerting, flushing, or ventilating the permit space as necessary to eliminate or control atmospheric hazards;

Note to paragraph §1204(c)(4). When an employer is unable to reduce the atmosphere below 10 percent LFL, the employer may only enter if the employer inert the space so as to render the entire atmosphere in the space noncombustible, and the employees use PPE to address any other atmospheric hazards (such as oxygen deficiency), and the employer eliminates or isolates all physical hazards in the space.

- (5) Determining that, in the event the ventilation system stops working, the monitoring procedures will detect an increase in atmospheric hazard levels in sufficient time for the entrants to safely exit the permit space;
  - (6) Providing pedestrian, vehicle, or other barriers as necessary to protect entrants from external hazards;
  - (7) Verifying that conditions in the permit space are acceptable for entry throughout the duration of an authorized entry, and ensuring that employees are not allowed to enter into, or remain in, a permit space with a hazardous atmosphere unless the employer can demonstrate that personal protective equipment (PPE) will provide effective protection for each employee in the permit space and provides the appropriate PPE to each employee; and
  - (8) Eliminating any conditions (for example, high pressure) that could make it unsafe to remove an entrance cover.
- (d) Provide the following equipment (specified in paragraphs §1926.1204(d)(1) through (d)(9)) at no cost to each employee, maintain that equipment properly, and ensure that each employee uses that equipment properly:
    - (1) Testing and monitoring equipment needed to comply with paragraph §1926.1204(e);
    - (2) Ventilating equipment needed to obtain acceptable entry conditions;
    - (3) Communications equipment necessary for compliance with paragraphs §1926.1208(c) and §1926.1209(e), including any necessary electronic communication equipment for attendants assessing entrants' status in multiple spaces;
    - (4) Personal protective equipment insofar as feasible engineering and work-practice controls do not adequately protect employees;
- Note to paragraph §1926.1204(d)(4). The requirements of subpart E of this part and other PPE requirements continue to apply to the use of PPE in a permit space. For example, if employees use respirators, then the respirator requirements in §1926.103 (Respiratory protection) must be met.
- (5) Lighting equipment that meets the minimum illumination requirements in §1926.56, that is approved for the ignitable or combustible properties of the specific gas, vapor, dust, or fiber that will be present, and that is sufficient to enable employees to see well enough to work safely and to exit the space quickly in an emergency;
  - (6) Barriers and shields as required by paragraph §1926.1204(c)(4);
  - (7) Equipment, such as ladders, needed for safe ingress and egress by authorized entrants;

(8) Rescue and emergency equipment needed to comply with paragraph §1926.1204(i), except to the extent that the equipment is provided by rescue services; and

(9) Any other equipment necessary for safe entry into, safe exit from, and rescue from, permit spaces.

(e) Evaluate permit space conditions in accordance with the following paragraphs (e)(1) through (6) of this section when entry operations are conducted:

(1) Test conditions in the permit space to determine if acceptable entry conditions exist before changes to the space's natural ventilation are made, and before entry is authorized to begin, except that, if an employer demonstrates that isolation of the space is infeasible because the space is large or is part of a continuous system (such as a sewer), the employer must:

(i) Perform pre-entry testing to the extent feasible before entry is authorized; and,

(ii) If entry is authorized, continuously monitor entry conditions in the areas where authorized entrants are working, except that employers may use periodic monitoring in accordance with paragraph §1926.1204(e)(2) for monitoring an atmospheric hazard if they can demonstrate that equipment for continuously monitoring that hazard is not commercially available;

(iii) Provide an early-warning system that continuously monitors for non-isolated engulfment hazards. The system must alert authorized entrants and attendants in sufficient time for the authorized entrants to safely exit the space.

(2) Continuously monitor atmospheric hazards unless the employer can demonstrate that the equipment for continuously monitoring a hazard is not commercially available or that periodic monitoring is of sufficient frequency to ensure that the atmospheric hazard is being controlled at safe levels. If continuous monitoring is not used, periodic monitoring is required with sufficient frequency to ensure that acceptable entry conditions are being maintained during the course of entry operations;

(3) When testing for atmospheric hazards, test first for oxygen, then for combustible gases and vapors, and then for toxic gases and vapors;

(4) Provide each authorized entrant or that employee's authorized representative an opportunity to observe the pre-entry and any subsequent testing or monitoring of permit spaces;

(5) Reevaluate the permit space in the presence of any authorized entrant or that employee's authorized representative who requests that the employer conduct such reevaluation because there is some indication that the evaluation of that space may not have been adequate; and

(6) Immediately provide each authorized entrant or that employee's authorized representative with the results of any testing conducted in accordance with §1926.1204 of this Standard.

(f) Provide at least one attendant outside the permit space into which entry is authorized for the duration of entry operations;

(1) Attendants may be assigned to more than one permit space provided the duties described in §1926.1209 of this Standard can be effectively performed for each permit space.

(2) Attendants may be stationed at any location outside the permit space as long as the duties described in §1926.1209 of this Standard can be effectively performed for each permit space to which the attendant is assigned.

(g) If multiple spaces are to be assigned to a single attendant, include in the permit program the means and procedures to enable the attendant to respond to an emergency affecting one or more of those permit spaces without distraction from the attendant's responsibilities under §1926.1209 of this Standard;

(h) Designate each person who is to have an active role (as, for example, authorized entrants, attendants, entry supervisors, or persons who test or monitor the atmosphere in a permit space) in entry operations, identify the duties of each such employee, and provide each such employee with the training required by §1926.1207 of this Standard;

(i) Develop and implement procedures for summoning rescue and emergency services (including procedures for summoning emergency assistance in the event of a failed non-entry rescue), for rescuing entrants from permit spaces, for providing necessary emergency services to rescued employees, and for preventing unauthorized personnel from attempting a rescue;

(j) Develop and implement a system for the preparation, issuance, use, and cancellation of entry permits as required by this Standard, including the safe termination of entry operations under both planned and emergency conditions;

(k) Develop and implement procedures to coordinate entry operations, in consultation with the controlling contractor, when employees of more than one employer are working simultaneously in a permit space or elsewhere on the worksite where their activities could, either alone or in conjunction with the activities within a permit space, foreseeably result in a hazard within the confined space, so that employees of one employer do not endanger the employees of any other employer;

(l) Develop and implement procedures (such as closing off a permit space and canceling the permit) necessary for concluding the entry after entry operations have been completed;

(m) Review entry operations when the measures taken under the permit space program may not protect employees and revise the program to correct deficiencies found to exist before subsequent entries are authorized; and the occurrence of an injury or near-miss during entry, a change in the use or configuration of a permit space, and employee complaints about the effectiveness of the program.

(n) Review the permit space program, using the canceled permits retained under paragraph §1926.1205(f), within 1 year after each entry and revise the program as necessary to ensure that employees participating in entry operations are protected from permit space hazards.

Note to paragraph §1926.1204(m). Examples of circumstances requiring the review of the permit space program include, but are not limited to: any unauthorized entry of a permit space, the detection of a permit space hazard not covered by the permit, the detection of a condition prohibited by the permit,

Note to paragraph §1926.1204(n). Employers may perform a single annual review covering all entries performed during a 12-month period. If no entry is performed during a 12-month period, no review is necessary.

#### §1926.1205 Permitting Process.

(a) Before entry is authorized, each entry employer must document the completion of measures required by paragraph §1926.1204(c) of this Standard by preparing an entry permit.

(b) Before entry begins, the entry supervisor identified on the permit must sign the entry permit to authorize entry.

(c) The completed permit must be made available at the time of entry to all authorized entrants or their authorized representatives, by posting it at the entry portal or by any other equally effective means, so that the entrants can confirm that pre-entry preparations have been completed.

(d) The duration of the permit may not exceed the time required to complete the assigned task or job identified on the permit in accordance with paragraph §1926.1206(b) of this Standard.

(e) The entry supervisor must terminate entry and take the following action when any of the following apply:

(1) Cancel the entry permit when the entry operations covered by the entry permit have been completed; or

(2) Suspend or cancel the entry permit and fully reassess the space before allowing reentry when a condition that is not allowed under the entry permit arises in or near the permit space

and that condition is temporary in nature and does not change the configuration of the space or create any new hazards within it; and

(3) Cancel the entry permit when a condition that is not allowed under the entry permit arises in or near the permit space and that condition is not covered by subparagraph (e)(2) of this section.

(f) The entry employer must retain each canceled entry permit for at least 1 year to facilitate the review of the permit-required confined space program required by paragraph §1926.1204(n) of this Standard. Any problems encountered during an entry operation must be noted on the pertinent permit so that appropriate revisions to the permit space program can be made.

#### §1926.1206 Entry permit.

The entry permit that documents compliance with this section and authorizes entry to a permit space must identify:

- (a) The permit space to be entered;
- (b) The purpose of the entry;
- (c) The date and the authorized duration of the entry permit;
- (d) The authorized entrants within the permit space, by name or by such other means (for example, through the use of rosters or tracking systems) as will enable the attendant to determine quickly and accurately, for the duration of the permit, which authorized entrants are inside the permit space;

Note to paragraph §1926.1206(d). This requirement may be met by inserting a reference on the entry permit as to the means used, such as a roster or tracking system, to keep track of the authorized entrants within the permit space.

- (e) Means of detecting an increase in atmospheric hazard levels in the event the ventilation system stops working;
- (f) Each person, by name, currently serving as an attendant;
- (g) The individual, by name, currently serving as entry supervisor, and the signature or initials of each entry supervisor who authorizes entry;
- (h) The hazards of the permit space to be entered;
- (i) The measures used to isolate the permit space and to eliminate or control permit space hazards before entry;

Note to paragraph §1926.1206(i). Those measures can include, but are not limited to, the lockout or tagging of equipment and procedures for purging, inerting, ventilating, and flushing permit spaces.

- (j) The acceptable entry conditions;
- (k) The results of tests and monitoring performed under paragraph §1926.1204(e) of this Standard, accompanied by the names or initials of the testers and by an indication of when the tests were performed;
- (l) The rescue and emergency services that can be summoned and the means (such as the equipment to use and the numbers to call) for summoning those services;
- (m) The communication procedures used by authorized entrants and attendants to maintain contact during the entry;
  
- (n) Equipment, such as personal protective equipment, testing equipment, communications equipment, alarm systems, and rescue equipment, to be provided for compliance with this Standard;
- (o) Any other information necessary, given the circumstances of the particular confined space, to ensure employee safety; and
- (p) Any additional permits, such as for hot work, that have been issued to authorize work in the permit space.

#### §1926.1207 Training.

- (a) The employer must provide training to each employee whose work is regulated by this Standard, at no cost to the employee, and ensure that the employee possesses the understanding, knowledge, and skills necessary for the safe performance of the duties assigned under this Standard. This training must result in an understanding of the hazards in the permit space and the methods used to isolate, control or in other ways protect employees from these hazards, and for those employees not authorized to perform entry rescues, in the dangers of attempting such rescues.
- (b) Training required by this section must be provided to each affected employee:
  - (1) In both a language and vocabulary that the employee can understand;
  - (2) Before the employee is first assigned duties under this Standard;
  - (3) Before there is a change in assigned duties;

- (4) Whenever there is a change in permit space entry operations that presents a hazard about which an employee has not previously been trained; and
  - (5) Whenever there is any evidence of a deviation from the permit space entry procedures required by paragraph §1926.1204(c) of this Standard or there are inadequacies in the employee's knowledge or use of these procedures.
- (c) The training must establish employee proficiency in the duties required by this Standard and must introduce new or revised procedures, as necessary, for compliance with this Standard.
  - (d) The employer must maintain training records to show that the training required by paragraphs §1926.1207(a) through (c) of this Standard has been accomplished. The training records must contain each employee's name, the name of the trainers, and the dates of training. The documentation must be available for inspection by employees and their authorized representatives, for the period of time the employee is employed by that employer.

#### §1926.1208 Duties of authorized entrants.

The entry employer must ensure that all authorized entrants:

- (a) Are familiar with and understand the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;
- (b) Properly use equipment as required by paragraph §1926.1204(d) of this Standard;
- (c) Communicate with the attendant as necessary to enable the attendant to assess entrant status and to enable the attendant to alert entrants of the need to evacuate the space as required by paragraph §1926.1209(f) of this Standard;
- (d) Alert the attendant whenever:
  - (1) There is any warning sign or symptom of exposure to a dangerous situation; or
  - (2) The entrant detects a prohibited condition; and
- (e) Exit from the permit space as quickly as possible whenever:
  - (1) An order to evacuate is given by the attendant or the entry supervisor;
  - (2) There is any warning sign or symptom of exposure to a dangerous situation;
  - (3) The entrant detects a prohibited condition; or
  - (4) An evacuation alarm is activated.

#### §1926.1209 Duties of attendants.

The entry employer must ensure that each attendant:

- (a) Is familiar with and understands the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;
- (b) Is aware of possible behavioral effects of hazard exposure in authorized entrants;
- (c) Continuously maintains an accurate count of authorized entrants in the permit space and ensures that the means used to identify authorized entrants under paragraph 1926.1206(d) of this Standard accurately identifies who is in the permit space;
- (d) Remains outside the permit space during entry operations until relieved by another attendant;

Note to paragraph §1926.1209(d). Once an attendant has been relieved by another attendant, the relieved attendant may enter a permit space to attempt a rescue when the employer's permit space program allows attendant entry for rescue and the attendant has been trained and equipped for rescue operations as required by paragraph §1926.1211(a).

- (e) Communicates with authorized entrants as necessary to assess entrant status and to alert entrants of the need to evacuate the space under paragraph §1926.1208(e);
- (f) Assesses activities and conditions inside and outside the space to determine if it is safe for entrants to remain in the space and orders the authorized entrants to evacuate the permit space immediately under any of the following conditions:
  - (1) If there is a prohibited condition;
  - (2) If the behavioral effects of hazard exposure are apparent in an authorized entrant;
  - (3) If there is a situation outside the space that could endanger the authorized entrants; or
  - (4) If the attendant cannot effectively and safely perform all the duties required under §1926.1209 of this Standard;
- (g) Summons rescue and other emergency services as soon as the attendant determines that authorized entrants may need assistance to escape from permit space hazards;
- (h) Takes the following actions when unauthorized persons approach or enter a permit space while entry is underway:
  - (1) Warns the unauthorized persons that they must stay away from the permit space;
  - (2) Advises the unauthorized persons that they must exit immediately if they have entered the permit space; and

- (3) Informs the authorized entrants and the entry supervisor if unauthorized persons have entered the permit space;
  - (i) Performs non-entry rescues as specified by the employer's rescue procedure; and
  - (j) Performs no duties that might interfere with the attendant's primary duty to assess and protect the authorized entrants.

**§1926.1210 Duties of entry supervisors.**

The entry employer must ensure that each entry supervisor:

- (a) Is familiar with and understands the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;
- (b) Verifies, by checking that the appropriate entries have been made on the permit, that all tests specified by the permit have been conducted and that all procedures and equipment specified by the permit are in place before endorsing the permit and allowing entry to begin;
- (c) Terminates the entry and cancels or suspends the permit as required by paragraph 1926.1205(e) of this Standard;
- (d) Verifies that rescue services are available and that the means for summoning them are operable, and that the employer will be notified as soon as the services become unavailable;
- (e) Removes unauthorized individuals who enter or who attempt to enter the permit space during entry operations; and
- (f) Determines, whenever responsibility for a permit space entry operation is transferred, and at intervals dictated by the hazards and operations performed within the space, that entry operations remain consistent with terms of the entry permit and that acceptable entry conditions are maintained.

**§1926.1211 Rescue and emergency services.**

- (a) An employer who designates rescue and emergency services, pursuant to paragraph §1926.1204(i) of this Standard, must:
  - (1) Evaluate a prospective rescuer's ability to respond to a rescue summons in a timely manner, considering the hazard(s) identified;

Note to paragraph §1926.1211(a)(1). What will be considered timely will vary according to the specific hazards involved in each entry. For example,

§1926.103—Respiratory Protection requires that employers provide a standby person or persons capable of immediate action to rescue employee(s) wearing respiratory protection while in work areas defined as IDLH atmospheres.

- (2) Evaluate a prospective rescue service's ability, in terms of proficiency with rescue-related tasks and equipment, to function appropriately while rescuing entrants from the particular permit space or types of permit spaces identified;
  - (3) Select a rescue team or service from those evaluated that:
    - (i) Has the capability to reach the victim(s) within a time frame that is appropriate for the permit space hazard(s) identified;
    - (ii) Is equipped for, and proficient in, performing the needed rescue services;
    - (iii) Agrees to notify the employer immediately in the event that the rescue service becomes unavailable;
  - (4) Inform each rescue team or service of the hazards they may confront when called on to perform rescue at the site; and
  - (5) Provide the rescue team or service selected with access to all permit spaces from which rescue may be necessary so that the rescue team or service can develop appropriate rescue plans and practice rescue operations.
- (b) An employer whose employees have been designated to provide permit space rescue and/or emergency services must take the following measures and provide all equipment and training at no cost to those employees:
- (1) Provide each affected employee with the personal protective equipment (PPE) needed to conduct permit space rescues safely and train each affected employee so the employee is proficient in the use of that PPE;
  - (2) Train each affected employee to perform assigned rescue duties. The employer must ensure that such employees successfully complete the training required and establish proficiency as authorized entrants, as provided by §§1926.1207 and 1926.1208 of this Standard;
  - (3) Train each affected employee in basic first aid and cardiopulmonary resuscitation (CPR). The employer must ensure that at least one member of the rescue team or service holding a current certification in basic first aid and CPR is available; and
  - (4) Ensure that affected employees practice making permit space rescues before attempting an actual rescue, and at least once every 12 months, by means of simulated rescue operations in which they remove dummies, manikins, or actual persons from the actual permit

spaces or from representative permit spaces, except practice rescue is not required where the affected employees properly performed a rescue operation during the last 12 months in the same permit space the authorized entrant will enter, or in a similar permit space.

Representative permit spaces must, with respect to opening size, configuration, and accessibility, simulate the types of permit spaces from which rescue is to be performed.

(c) Non-entry rescue is required unless the retrieval equipment would increase the overall risk of entry or would not contribute to the rescue of the entrant. The employer must designate an entry rescue service whenever non-entry rescue is not selected. Whenever non-entry rescue is selected, the entry employer must ensure that retrieval systems or methods are used whenever an authorized entrant enters a permit space, and must confirm, prior to entry, that emergency assistance would be available in the event that non-entry rescue fails. Retrieval systems must meet the following requirements:

(1) Each authorized entrant must use a chest or full body harness, with a retrieval line attached at the center of the entrant's back near shoulder level, above the entrant's head, or at another point which the employer can establish presents a profile small enough for the successful removal of the entrant. Wristlets or anklets may be used in lieu of the chest or full body harness if the employer can demonstrate that the use of a chest or full body harness is infeasible or creates a greater hazard and that the use of wristlets or anklets is the safest and most effective alternative.

(2) The other end of the retrieval line must be attached to a mechanical device or fixed point outside the permit space in such a manner that rescue can begin as soon as the rescuer becomes aware that rescue is necessary. A mechanical device must be available to retrieve personnel from vertical type permit spaces more than 5 feet (1.52 meters) deep.

(3) Equipment that is unsuitable for retrieval must not be used, including, but not limited to, retrieval lines that have a reasonable probability of becoming entangled with the retrieval lines used by other authorized entrants, or retrieval lines that will not work due to the internal configuration of the permit space.

(d) If an injured entrant is exposed to a substance for which a Safety Data Sheet (SDS) or other similar written information is required to be kept at the worksite, that SDS or written information must be made available to the medical facility treating the exposed entrant.

#### §1926.1212 Employee participation.

(a) Employers must consult with affected employees and their authorized representatives on the development and implementation of all aspects of the permit space program required by §1926.1203 of this Standard.

(b) Employers must make available to each affected employee and his/her authorized representatives all information required to be developed by this Standard.

§1926.1213 Provision of documents to Secretary.

For each document required to be retained in this Standard, the retaining employer must make the document available on request to the Secretary of Labor or the Secretary's designee.

## **Appendix B: Sample SDS**

## Appendix C: Confined Space Basics

**Question: What is a Confined Space?**

**Answer: A confined space means a space that:**

- (1) Is large enough and so configured that an employee can bodily enter it;
- (2) Has limited or restricted means for entry and exit; and
- (3) Is not designed for continuous employee occupancy.

**Examples of typical Confined Spaces:**



**Pipes and pipelines**

**Possible Hazards:**

Engulfment

Atmospheric

Configuration



**Attics**

**Possible Hazards:**

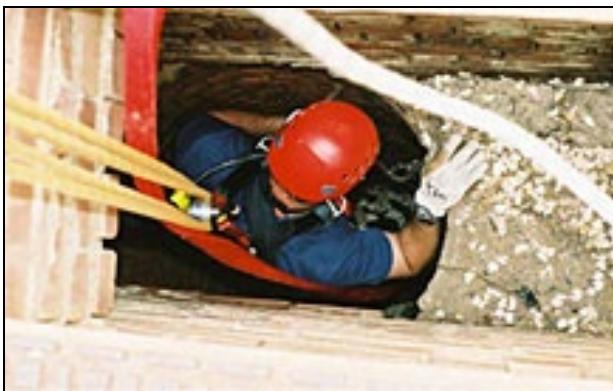
Extreme Temperature

Configuration

Electrical

Falls

Animals



### **Vaults**

**Possible Hazards:**  
**Engulfment**  
**Atmospheric**  
**Configuration**  
**Electrical**  
**Explosion**  
**Stored Energy**  
**Struck-by**



### **Crawspaces and Ducts**

**Possible Hazards:**  
**Configuration**  
**Atmospheric**  
**Electrical**  
**Animals**  
**Enfulgment**



### **Pits and Shafts**

**Possible Hazards:**  
**Engulfment**  
**Atmospheric**  
**Struk-by**  
**Electrical**  
**Explosion**  
**Stored Energy**  
**Falls**

### **Manholes**

**Possible Hazards:**  
**Configuration**  
**Atmospheric**  
**Electrical**  
**Enfulgment**  
**Stored Energy**  
**Struck-by**  
**Falls**



Tanks Vesseal

**Possible Hazards:**

Engulfment

Atmospheric

Explosion

Stored Energy



Concrete Mixers

**Possible Hazards:**

Configuration

Atmospheric

Stored Energy

Configuration

**Question: In a permit required confined space, what is a hazard?**

**Answer: A hazard in permit required confined space means a physical hazard or hazardous atmosphere:**

**Question: What is a physical hazard?**

**Answer: A physical hazard means an existing or potential hazard that can cause death or serious physical damage. Examples include, but are not limited to: explosives (as defined by paragraph (n) of §1926.914, definition of “explosive”); mechanical, electrical, hydraulic and pneumatic energy; radiation; temperature extremes; engulfment; noise; and inwardly converging surfaces. Physical hazard also includes chemicals that can cause death or serious physical damage through skin or eye contact (rather than through inhalation).**

**Question: What is a Hazardous Atmosphere?**

**Answer: A Hazardous atmosphere means an atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (that is, escape unaided from a permit space), injury, or acute illness from one or more of the following causes:**

- (1) Flammable gas, vapor, or mist in excess of 10 percent of its lower flammable limit (LFL);

- (2) Airborne combustible dust at a concentration that meets or exceeds its LFL;
- (3) Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent;
- (4) Atmospheric concentration of any substance for which a dose or a permissible exposure limit is published in Subpart D—Occupational Health and Environmental Control, or in Subpart Z—Toxic and Hazardous Substances, of this part and which could result in employee exposure in excess of its dose or permissible exposure limit;

**Note.** An atmospheric concentration of any substance that is not capable of causing death, incapacitation, impairment of ability to self-rescue, injury, or acute illness due to its health effects is not covered by this definition.

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

**Host employer** means the employer that owns or manages the property where the construction work is taking place.

**Examples of Permit Required Confined Space Hazards:**



**Physical:** Hazards include moving parts and uncontrolled energy.



Physical: Hazards exposed electrical



Physical: Paint mixing/spray booths/chemicals



Atmospheric: Hazards may include a toxic or flammable atmosphere or an atmosphere that is oxygen enriched or oxygen deficient.

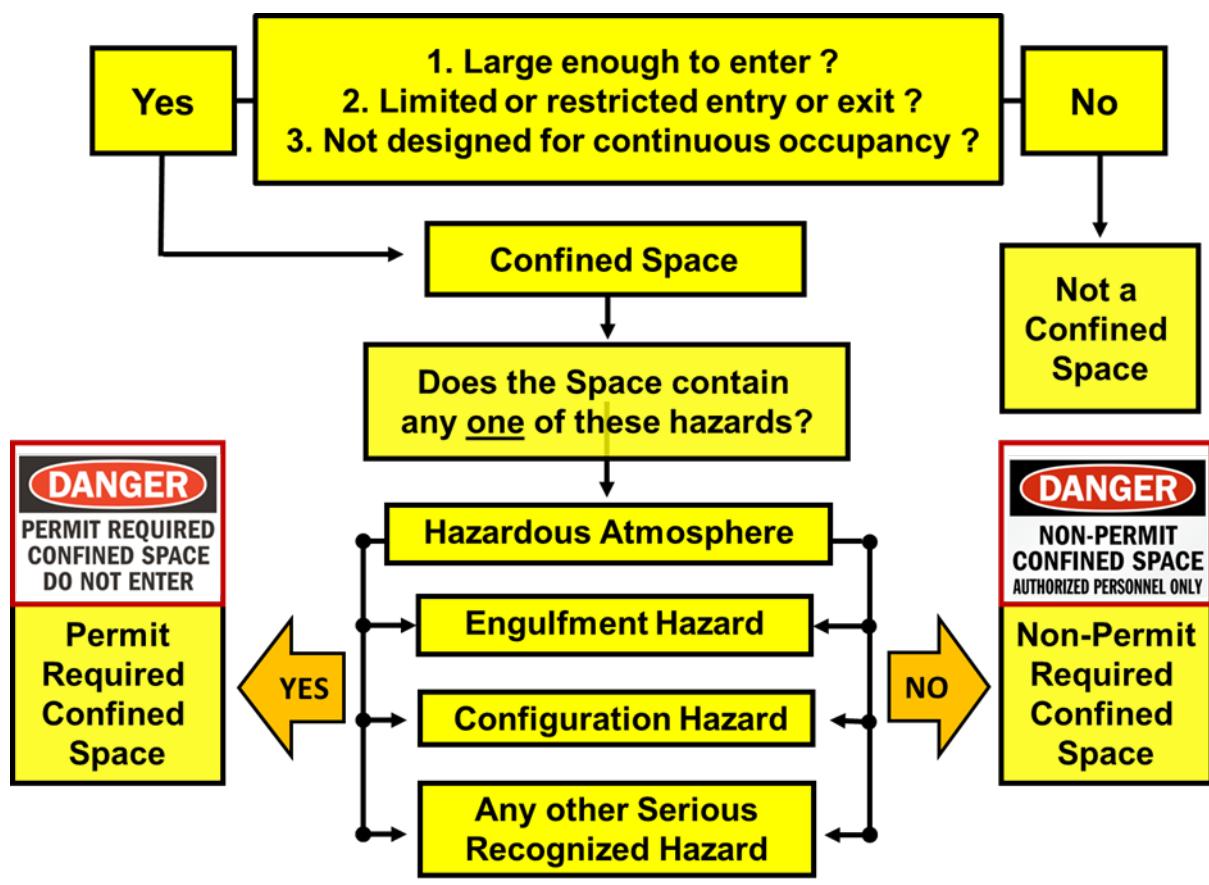
Question: What is a permit required confined space?

Answer: A permit-required confined space (permit space) means a confined space that has one or more of the following characteristics:

- (1) Contains or has a potential to contain a hazardous atmosphere;

- (2) Contains a material that has the potential for engulfing an entrant;
- (3) Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or
- (4) Contains any other recognized serious safety or health hazard.

Physical hazard means an existing or potential hazard that can cause death or serious physical damage. Examples include, but are not limited to: explosives (as defined by paragraph (n) of §1926.914, definition of “explosive”); mechanical, electrical, hydraulic and pneumatic energy; radiation; temperature extremes; engulfment; noise; and inwardly converging surfaces. Physical hazard also includes chemicals that can cause death or serious physical damage through skin or eye contact (rather than through inhalation).



**Assessing, Controlling and Managing Dynamic Hazards  
Associated with Confined Spaces in Construction**

**Workbook**

**7.5 Hour**

**First Edition**

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School of Public Health**

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- Quick Definitions
- The Construction Industry verses the General Industry
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**Federal Disclaimer**

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## **Section One: Introduction: Construction Industry Confined Space**

“The Confined spaces rule could protect nearly 800 construction workers a year from serious injuries and reduce life-threatening hazards. Construction protections now match those in manufacturing and general industry”

OSHA National News Release  
U.S. Department of Labor, May 1, 2015

In May of 2015, OSHA issued a new Standard for construction work in confined spaces, which became effective on August 3, 2015. Once in effect and followed, government research projects that the new Standard will protect nearly 800 construction workers a year from serious injuries and reduce life-threatening hazards associated with confined spaces found and created on construction sites. This grant was created to help both employers and employees learn about the new standard and understand more about confined spaces and permit required confined spaces (PRCS). Employers and those who manage construction related activities, where confined spaces and PRCS may be found, will find helpful guides to control hazards associated with confined spaces and learn their regulatory expectations and how to coordinate their respective activities with other entities. This grant will help assist employers with typical documentation, communication and coordination necessary for compliance. It includes helpful training modules, and other resources OSHA provides to help employers and workers understand the rule and create their own effective adherence.

This new Standard, Subpart AA of 29 CFR 1926 now provides protections for construction workers similar to those in other industries. Construction protections now match those in manufacturing and general industry, where construction activities often occur. Now, no matter where workers perform construction activities, such as toxic substances, electrocutions, explosions, and asphyxiation, there is a code to help specifically protect them. Typical construction related confined spaces include places such as manholes, crawl spaces, tanks, vessels, vaults, pipes that are not designed for continuous occupancy and are difficult to exit in the event of an emergency.

### **Planning, Coordination and Communication: Managing the Construction Industry Confined Space Program**

Since planning and coordination between various employers and or entities is essential to implementing an effective confined space program, this grant contains material that will help trainees learn how to plan work activity with multiple employers and share vital safety

information and monitor hazards. The sharing of responsibility between various entities to protect workers is not a new concept in the OSHA standards and in compliance. Precedent exists that requires multiple employers to multilaterally communicate and coordinate their respective activities and share information, concerning the safety and wellbeing, with associated employers. You may recognize such precedent in these areas (not comprehensive):

- Subpart R- Steel Erection: Controlling Contractor, Concrete Employer, Steel Erector.
- 
- 

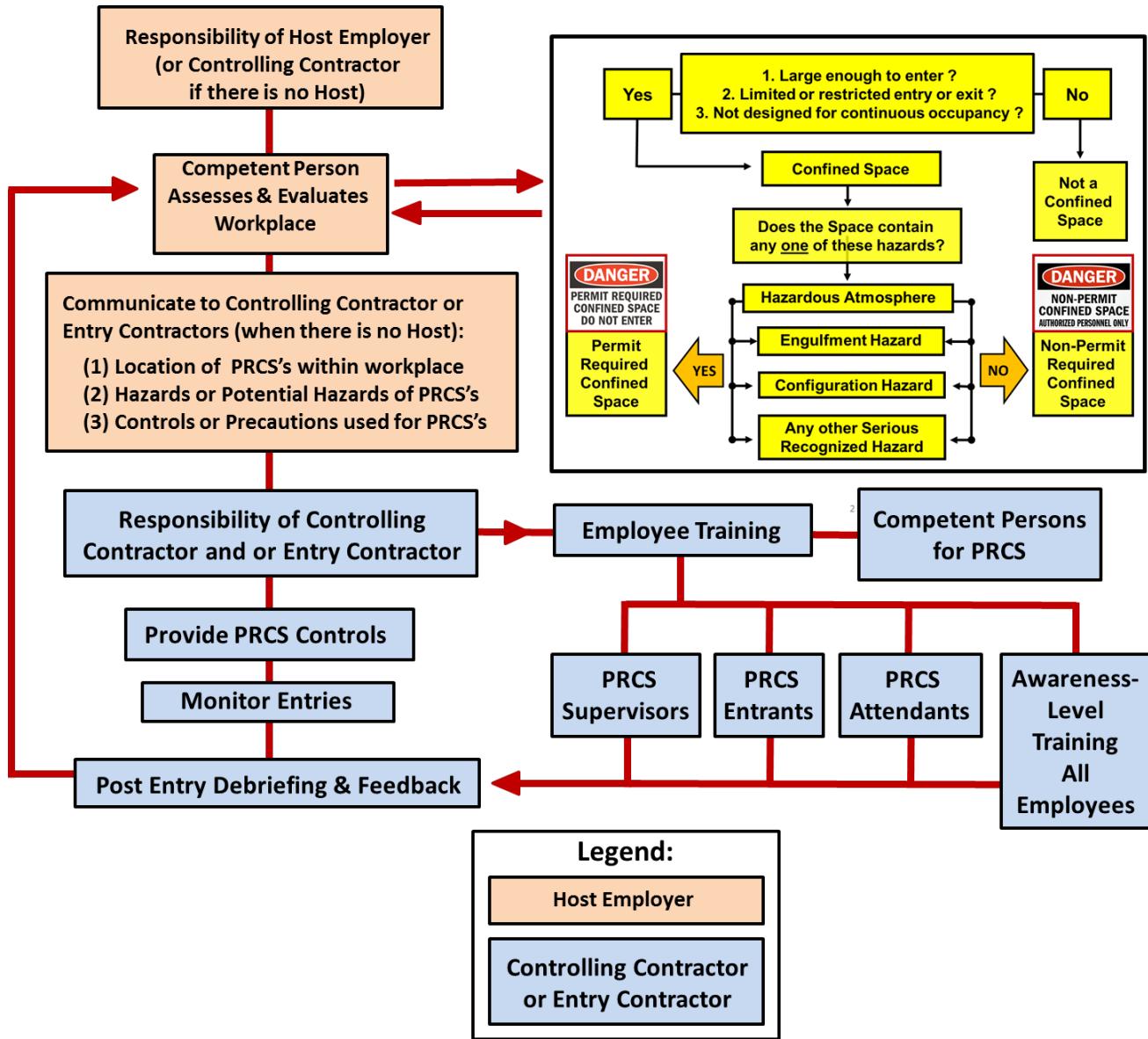
- 1910.1200 Hazard Communications: Controlling contractor will share information about chemicals with multiple employers.
- 
- 

- Site-wide control of so called general conditions and the respective delegated responsibilities of controlling contractors on multiple employer worksites.
- 
- 

- Subpart CC- host, controlling Contractor, Crane Employer has the responsibility to inform contractors of existing underground hazards
- 
- 

- NFPA 70E: Host shares locations and specific electrical hazard information.
- 
-

## Relationship and Responsibility Flow Chart



### Exceptions to the new Confined Space Rule

It should be noted that this new standard has three exemptions where the standard does not apply. In cases where the standard applies and there is a provision that addresses a confined space hazard in another applicable OSHA standard, the employer must comply with both that requirement and the applicable provisions of the following standards.

- Construction work regulated by §1926 subpart P—Excavations.

- Construction work regulated by §1926 subpart S—Underground Construction, Caissons, Cofferdams and Compressed Air.
- Construction work regulated by §1926 subpart Y—Diving.

## **Some Quick Definitions**

*Competent person* means one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has the authorization to take prompt corrective measures to eliminate them.

Confined space means a space that:

- (1) Is large enough and so configured that an employee can bodily enter it;
- (2) Has limited or restricted means for entry and exit; and
- (3) Is not designed for continuous employee occupancy.

*Control* means the action taken to reduce the level of any hazard inside a confined space using engineering methods (for example, by ventilation), and then using these methods to maintain the reduced hazard level. Control also refers to the engineering methods used for this purpose. Personal protective equipment is not a control.

*Controlling Contractor* is the employer that has overall responsibility for construction at the worksite.

*Entry* means the action by which any part of a person passes through an opening into a permit-required confined space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space, whether or not such action is intentional or any work activities are actually performed in the space.

*Entry Employer* means any employer who decides that an employee it directs will enter a permit space.

Hazard means a physical hazard or hazardous atmosphere.

Hazardous atmosphere means an atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (that is, escape unaided from a permit space), injury, or acute illness from one or more of the following causes:

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

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

Note. An atmospheric concentration of any substance that is not capable of causing death, incapacitation, impairment of ability to self-rescue, injury, or acute illness due to its health effects is not covered by this definition.

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

*Host employer* means the employer that owns or manages the property where the construction work is taking place.

Note. If the owner of the property on which the construction activity occurs has contracted with an entity for the general management of that property, and has transferred to that entity the information specified in §1203(h)(1), OSHA will treat the contracted management entity as the host employer for as long as that entity manages the property. Otherwise, OSHA will treat the owner of the property as the host employer. In no case will there be more than one host employer.

*Hot work* means operations capable of providing a source of ignition (for example, riveting, welding, cutting, burning, and heating).

*Immediately dangerous to life or health (IDLH)* means any condition that would interfere with an individual's ability to escape unaided from a permit space and that poses a threat to life or that would cause irreversible adverse health effects.

Note. Some materials—hydrogen fluoride gas and cadmium vapor, for example—may produce immediate transient effects that, even if severe, may pass without medical attention, but are followed by sudden, possibly fatal collapse 12-72 hours after exposure. The victim "feels normal" after recovery from transient effects until collapse. Such materials in hazardous quantities are considered to be "immediately" dangerous to life or health.

*Limited or restricted means for entry or exit* means a condition that has a potential to impede an employee's movement into or out of a confined space. Such conditions include, but are not limited to, trip hazards, poor illumination, slippery floors, inclining surfaces and ladders.

*Line breaking* means the intentional opening of a pipe, line, or duct that is or has been carrying flammable, corrosive, or toxic material, an inert gas, or any fluid at a volume, pressure, or temperature capable of causing injury.

Lockout means the placement of a lockout device on an energy isolating device, in accordance with an established procedure, ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

Lower \_ flammable limit or lower explosive limit means the minimum concentration of a substance in air needed for an ignition source to cause a flame or explosion.

Monitor or monitoring means the process used to identify and evaluate the hazards after an authorized entrant enters the space. This is a process of checking for changes that is performed in a periodic or continuous manner after the completion of the initial testing or evaluation of that space.

Non-entry rescue occurs when a rescue service, usually the attendant, retrieves employees in a permit space without entering the permit space.

Non-permit confined space means a confined space that meets the definition of a confined space but does not meet the requirements for a permit-required confined space, as defined in this subpart.

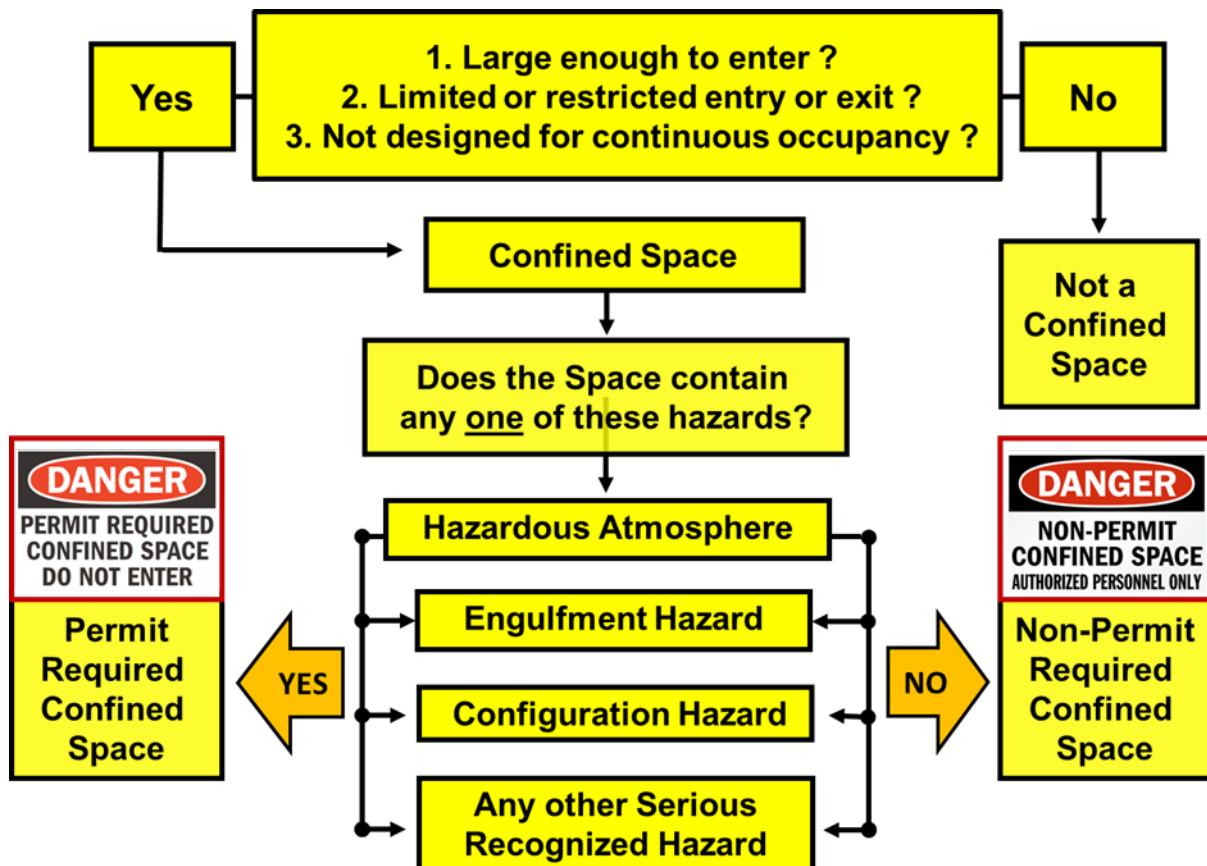
Permit-required confined space (permit space) means a confined space that has one or more of the following characteristics: (1) Contains or has a potential to contain a hazardous atmosphere; (2) Contains a material that has the potential for engulfing an entrant; (3) Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or (4) Contains any other recognized serious safety or health hazard.

Physical hazard means an existing or potential hazard that can cause death or serious physical damage. Examples include, but are not limited to: explosives (as defined by paragraph (n) of §1926.914, definition of "explosive"); mechanical, electrical, hydraulic and pneumatic energy; radiation; temperature extremes; engulfment; noise; and inwardly converging surfaces. Physical hazard also includes chemicals that can cause death or serious physical damage through skin or eye contact (rather than through inhalation).

Qualified person means one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his ability to solve or resolve problems relating to the subject matter, the work, or the project.

Serious physical damage means an impairment or illness in which a body part is made functionally useless or is substantially reduced in efficiency. Such impairment or illness may be permanent or temporary and includes, but is not limited to, loss of consciousness, disorientation, or other immediate and substantial reduction in mental efficiency. Injuries

involving such impairment would usually require treatment by a physician or other licensed health-care professional.



Note: The hazards that would trigger the permit-required confined space provisions: (1) contains or has the potential to contain a hazardous atmosphere; (2) contains a material that has the potential for engulfing an entrant; (3) has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or (4) contains any other recognized serious safety or health hazard (see 1926.1202).

### **Construction Industry Confined Spaces vs. General Industry Confined Spaces**

If you are familiar with the general industry standard regarding confined spaces you should know that there are several key differences between the construction confined space codes. Some of these key differences include:

1. More detailed provisions requiring coordinated activities when there are multiple employers at the worksite (for more detail, see question 16, below). This will ensure hazards are not introduced into a confined space by workers performing tasks outside the space. An example would be a generator running near the entrance of a confined space causing a buildup of carbon monoxide within the space.

2. Requiring a competent person to evaluate the work site and identify confined spaces, including permit spaces.
3. Requiring continuous atmospheric monitoring whenever possible.
4. Requiring continuous monitoring of engulfment hazards. For example, when workers are performing work in a storm sewer, a storm upstream from the workers could cause flash flooding. An electronic sensor or observer posted upstream from the work site could alert workers in the space at the first sign of the hazard, giving the workers time to evacuate the space safely.
5. Allowing for the suspension of a permit, instead of cancellation, in the event of changes from the entry conditions list on the permit or an unexpected event requiring evacuation of the space. The space must be returned to the entry conditions listed on the permit before re-entry.
6. Requiring that employers who are relying on local entities for emergency services to arrange for those responders to give the employer advance notice if they will be unable to respond for a period of time
7. Requiring employers to provide training in a language and vocabulary that the employee understand

Some Clarifications to the new rule;

In addition, OSHA has added provisions to the new rule that clarifies existing requirements in the General Industry Standard. These include:

1. Requiring that employers who direct workers to enter a space without using a complete permit system prevent workers' exposure to physical hazards through elimination of the hazard or isolation methods such as lockout/tagout.
2. Requiring that employers who are relying on local emergency services for emergency services arrange for responders to give the employer advance notice if they will be unable to respond for a period of time (because they are responding to another emergency, attending department-wide training, etc.).
3. Requiring employers to provide training in a language and vocabulary that the worker understands.
4. Finally, several terms have been added to the definitions for the construction rule, such as "entry employer" to describe the employer who directs workers to enter a space, and "entry rescue", added to clarify the differences in the types of rescue employers can use

### **Determining the Code to Follow: General Industry or Construction Industry**

The difference between construction and maintenance is the activity to be performed. "Maintenance" means keeping equipment or a structure in proper condition through routine, scheduled or anticipated measures without having to significantly alter the structure or

equipment in the process. For equipment, this generally means keeping the equipment working properly by taking steps to prevent its failure or degradation. Here are respective examples of maintenance and construction:

**Example No. 1: Maintenance**

A common household water shut-off valve in a home heating system is removed and replaced. Its replacement is part of the routine maintenance of the system and removing and replacing the valve is done without making major alterations to the heating system. The removal and replacement of the valve would be considered maintenance.

**Example No. 2: Construction**

A 36 inch valve that is one of three major components in a processing system is removed and replaced. To do the job, 50 percent of all parts in the system have to be cut, unbolted, moved, or otherwise altered or replaced. Removing and replacing this valve would be considered construction because the valve constitutes a major portion of the equipment it is in and much of the rest of the system's parts must be moved or altered in the process of doing the jo

## **Section Two: Rights and Responsibilities**

### **Responsibilities under the OSH Act: General Duty Clause**

It is both wise and mandatory for an employer to start any undertaking with some reasonable anticipation of what hazards and obstacles you may likely encounter because it is essential that in each workplace an employer provides the means of assessing and identifying potential hazards and where applicable utilize measures that seek to eliminate, prevent and protect such hazards from causing harm. It is critical that you perform an assessment of your existing Temporary Worker Safety & Health Program to see if you can benchmark it against, code, best practice and industry Standards.

We must always keep in mind the mandatory nature of program management flows directly from The Williams-Steiger Occupational Safety and Health Act of 1970, which can also be referred to as, "The Occupational Safety and Health Act of 1970" (OSH Act). The primary purpose of the OSH Act is to assure, so far as possible, safe and healthful working conditions for every working man and woman, but in various places the OSH Act or OSHA regulations clearly spells out the responsibility of an employer and employees:

The Occupational Safety and Health Act of 1970: "General Duty Clause"

5. General Duties
  - (a) Each employer
    - (1) shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees;
    - (2) Shall comply with occupational safety and health Standards promulgated under this Act.
  - (b) Each employee shall comply with occupational safety and health Standards and all rules, regulations, and orders issued pursuant to this Act which are applicable to his own actions and conduct.

### **Additional Worker Rights**

- Among other employer responsibilities a worker also has the right to:
- Be trained in a language the worker understands
- Work on machines, tools and equipment that are in safe working condition
- Be provided required safety gear, such as gloves or a harness and lifeline for falls
- Be trained and protected from hazardous and toxic chemicals
- Request an OSHA inspection, and speak to the inspector
- Report an injury or illness, and receive copies of their medical records

- See and examine copies of the workplace injury and illness log for the employer
- Review records of work-related injuries and illnesses
- Get copies of test results done to find hazards in the workplace

### **Employer Responsibility**

- Under the OSH law, employers have a responsibility to provide a safe workplace. This is a short summary of key employer responsibilities:
- Provide a workplace free from serious recognized hazards and comply with standards, rules and regulations issued under the OSH Act.
- Examine workplace conditions to make sure they conform to applicable OSHA standards.
- Make sure employees have and use safe tools and equipment and properly maintain this equipment.
- Use color codes, posters, labels or signs to warn employees of potential hazards.
- Establish or update operating procedures and communicate them so that employees follow safety and health requirements.
- Provide safety training in a language and vocabulary workers can understand.
- Employers with hazardous chemicals in the workplace must develop and implement a written hazard communication program and train employees on the hazards they are exposed to and proper precautions (and a copy of safety data sheets must be readily available). See the OSHA page on Hazard Communication.
- Provide medical examinations and training when required by OSHA standards.
- Post, at a prominent location within the workplace, the OSHA poster (or the state-plan equivalent) informing employees of their rights and responsibilities.
- Report to the nearest OSHA office all work-related fatalities within 8 hours, and all work-related inpatient hospitalizations, all amputations and all losses of an eye within 24 hours. Call our toll-free number: 1-800-321-OSHA (6742); TTY 1-877-889-5627.  
[Employers under federal OSHA's jurisdiction were required to begin reporting by Jan. 1, 2015. Establishments in a state with a state-run OSHA program should contact their state plan for the implementation date].
- Keep records of work-related injuries and illnesses. (Note: Employers with 10 or fewer employees and employers in certain low-hazard industries are exempt from this requirement.)
- Provide employees, former employees and their representatives access to the Log of Work-Related Injuries and Illnesses (OSHA Form 300). On February 1, and for three months, covered employers must post the summary of the OSHA log of injuries and illnesses (OSHA Form 300A).
- Provide access to employee medical records and exposure records to employees or their authorized representatives.
- Provide to the OSHA compliance officer the names of authorized employee representatives who may be asked to accompany the compliance officer during an inspection.
- Not discriminate against employees who exercise their rights under the Act. See our "Whistleblower Protection" webpage.

- Post OSHA citations at or near the work area involved. Each citation must remain posted until the violation has been corrected, or for three working days, whichever is longer. Post abatement verification documents or tags.
- Correct cited violations by the deadline set in the OSHA citation and submit required abatement verification documentation.

### The Whistleblower Protection Programs: How to File a Discrimination Complaint

File a discrimination complaint if your employer has retaliated against you for exercising your rights as an employee. If you have been punished or retaliated against for exercising your rights under the OSH Act, **you must file a complaint with OSHA within 30 days of the alleged reprisal.** In states with approved state plans, employees may file a complaint under the OSH Act (Section 11(c)) with both the State and Federal OSHA.

- Complaints need to be filed within 30 days after an alleged retaliation.
- You may file complaints by: telephone calling (800) 321-OSHA for situations where you believe there is an immediate risk that threatens life or injury or call a local area office (number listed below), you can also go online at <http://www.osha.gov/as/opa/worker/complain.html> and download forms for faxing OSHA at: <http://www.osha.gov/oshforms/osha7.pdf> Contact your local OSHA office as soon as possible, because you must file your complaint within the legal time limits. New York (212) 337-2378
- OSHA will conduct an in-depth interview with each complainant.  
The investigation must reveal that:
  - The employee engaged in protected activity;
  - The employer knew about the protected activity;
  - The employer took an adverse action; and
  - The protected activity was the motivating factor, or under some laws, a contributing factor in the decision to take the adverse action against the employee.
- Letter - You may also send a letter describing your complaint to your local OSHA Regional or Area Office. Please include your name, address and telephone number so we can contact you to follow up.
- OSHA will accept your complaint in any language.
- OSHA conducts an interview with each complainant to determine the need for an investigation. If evidence supports the worker's claim of discrimination, OSHA will ask the employer to restore the worker's job, earnings and benefits.



### A Right to Be Hard: Your Rights as a Whistleblower

OSHA's Whistleblower Protection Program enforces the whistleblower provisions of more than twenty whistleblower statutes. Rights afforded by these whistleblower acts include, but are not limited to, worker participation in safety and health activities, reporting a work related injury, illness or fatality, or reporting a violation of the statutes.

Protection from discrimination means that an employer cannot retaliate by taking "adverse action" against workers, such as:

- |  |   |
|--|---|
| <input type="checkbox"/> Firing or laying off          | <input type="checkbox"/> Failure to hire or rehire                      |
| <input type="checkbox"/> Blacklisting                  | <input type="checkbox"/> Intimidation                                   |
| <input type="checkbox"/> Demoting                      | <input type="checkbox"/> Making threats                                 |
| <input type="checkbox"/> Denying overtime or promotion | <input type="checkbox"/> Reassignment affecting prospects for promotion |
| <input type="checkbox"/> Disciplining                  |   |
| <input type="checkbox"/> Denial of benefits            | <input type="checkbox"/> Reducing pay or hours                          |

### Limited Right to Refuse to Work

REFUSING WORK IS PROTECTED IF: Your right to refuse to do a task is protected if ALL of the following conditions are met:

- Where possible, you have asked the employer to eliminate the danger, and the employer failed to do so; and
- You refused to work in "good faith." This means that you must genuinely believe that an imminent danger exists. Your refusal cannot be a disguised attempt to harass your employer or disrupt business; and
- A reasonable person would agree that there is a real danger of death or serious injury; and
- There isn't enough time, due to the urgency of the hazard, to get it corrected through regular enforcement channels, such as requesting an OSHA inspection.

WHEN CONDITIONS ARE MET, NEXT STEPS: When all of the above conditions are met, you can take the following steps:

- Ask your employer to correct the hazard;
- Ask your employer if there is other work you can perform that is free from hazards;
- Tell your employer that you won't perform the work unless and until the hazard is corrected; and
- Remain at the worksite until ordered to leave by your employer. (If the worksite is unsafe and poses an imminent risk of danger you should remove yourself from the worksite)

## **How to File a Safety and Health Complaint**

The Occupational Safety and Health Act of 1970 gives employees and their representatives the right to file a complaint and request an OSHA inspection of their workplace if they believe there is a serious hazard or their employer is not following OSHA standards. Workers do not have to know whether a specific OSHA standard has been violated in order to file a complaint. The complaint should be filed as soon as possible after noticing the hazard or lack of compliance because OSHA citations may only be issued for violations that currently exist or existed in the past 6 months.

. Do Not Report an emergency, fatality, or imminent life threatening using a Complaint Form or Email. To report an emergency, fatality, or imminent life threatening situation please contact toll free number 1-800-321-OSHA (6742) TTY 1-877-889-5627 immediately.

The worker also has the right to file a complaint with OSHA if the employer retaliates against them or takes unfavorable personnel action because the employee engaged in protected activity relating to workplace safety and health (See whistleblower program above).

- Online – Go to the Online Complaint Form: Written complaints that are signed by workers or their representative and submitted to an OSHA Area or Regional office are more likely to result in onsite OSHA inspections. Complaints received on line from workers in OSHA-approved state plan states will be forwarded to the appropriate state plan for response.
- Fax/Mail - Download the OSHA complaint form [En Espanol] (or request a copy from your local OSHA Regional or Area Office): Complete it and then fax or mail it back to your local OSHA Regional or Area Office. Written complaints that are signed by a worker or representative and submitted to the closest OSHA Area Office are more likely to result in onsite OSHA inspections. Please include your name, address and telephone number so we can contact you to follow up.
- Telephone – your local OSHA Regional or Area Office: OSHA staff can discuss your complaint and respond to any questions you have. If there is an emergency or the hazard is immediately life-threatening, call your local OSHA Regional or Area Office or 1-800-321-OSHA.

Note: Complaints from workers or their representatives are taken seriously by OSHA. OSHA will keep your information confidential.

### **Section Three: Selected Questions and Answers About Confined Spaces in Construction**

1. **Question:** When does the Standard go into effect?

**Answer:** It went into effect on August 3, 2015

2. **Question:** What must employers do regarding confined spaces?

Employers MUST:

1. Identify the spaces their workers work
2. Identify hazards could be within such spaces,
3. Control such hazards
4. Training workers should receive
5. Monitor activities
6. How to rescue those workers if anything goes wrong.

3. **Question:** Does employer still need to do anything if there are permit spaces at a worksite, but my employees will not enter the permit space(s)?

**Answer:** Yes, the employer must train employees to recognized confined spaces hazards and take effective steps to prevent employees from entering the space such as placing signage.

4. **Question:** If a controlling contractor or host hires contractors or subcontractor (or subcontractor) to do work in a confined space do I have any responsibilities?

**Answer:** Yes, Controlling contractors and host employers must discuss spaces on the site and their hazards with entry employers and each other before and after entry

5. **Question:** Who is the primary point of contact at a work site concerning permit confined spaces?

**Answer:** The rule makes the controlling contractor, rather than the host employer, the primary point of contact for information about permit spaces at the work site.

6. **Question:** What must the host employer do?

**Answer:**

1. Provide information it has about permit spaces at the work site to the controlling contractor, who then passes it on to the employers whose employees will enter the spaces (entry employers).
  2. Receive information back, through the controlling contractor, about entry program and the hazards encountered in the space.
  3. Assist the controlling contractor with making sure others outside a space know not to create hazards in the space, and that entry employers working in a space at the same time do not create hazards for one another's workers.
  4. Act as the controlling contractor If there is no controlling contractor present at the worksite during entries into permit required confined spaces.
7. **Question:** What code does an employer follow if employees are performing both construction and general industry activities in of confined spaces?

**Answer:** 29 CFR 1926 Subpart AA - Confined Spaces in Construction.

8. **Question:** Paragraph 1926.1203(a) requires that each employer ensure that a competent person identifies all confined spaces in which one or more of the employees it directs may work, and identifies each space that is a permit space, through consideration and evaluation of the elements of that space, including testing as necessary. If the competent person must enter the space to assess its characteristics and potential hazards, must the competent person treat the space as a permit-required confined space?

**Answer:** If the competent person can reasonably foresee the presence of a hazard or potential hazard that would make the space a permit-required confined space, the competent person must treat the space as a permit-required confined space when entering the space to assess. However, if the competent person cannot reasonably foresee the presence of such a hazard, the competent person would not need to treat the space as a permit-required confined space when entering the space to assess. Of course, if the competent person encounters such a hazard when assessing the space, whether or not the hazard was reasonably foreseeable, the competent person must treat the space as a permit-required space after identifying the hazard.

9. **Question:** Does the Standard impose additional requirements on "permit-required confined spaces" beyond those imposed for "confined spaces"?

**Answer:** Yes. In fact, the vast majority of the Standard's requirements only apply to permit-required confined spaces, and attics, basements, and crawl spaces in a residential home will not typically trigger these requirements. Once the employer's competent person<sup>1</sup> performs an initial evaluation and determines that a confined space does not require a permit (1926.1203(a)), the employer's only further obligations under the Standard are to have a competent person reevaluate the space and, if necessary, reclassify it as a permit-required confined space if changes in the use or configuration of the space occur that could increase the hazards or potential hazards to entrants or if the employer has any indication that the initial evaluation may have been inadequate (1926.1203(f)).

10. **Question:** What parts of code would an employer follow if a Competent Person determines a space to require an entry permit?

**Answer:** If the employer's competent person determines that the space is a permit-required confined space, the following provisions also apply:

1. Entry communication and coordination (1926.1203(h)),
2. Permit-required confined space program (1926.1204),
3. Permitting process (1926.1205),
4. Entry permit (1926.1206),
5. Training (1926.1207),
6. duties of authorized entrants, attendants, and entry supervisors (1926.1208-1210),
7. Rescue and emergency services (1926.1211).

11. **Question:** Does the characteristic "contains or has the potential to contain a hazardous atmosphere" in the definition of "permit-required confined space" refer only to those atmospheres which pose an acute hazard?

**Answer:** Yes. Where employees are exposed to hazardous atmospheres that do not present an immediate danger of death or impairment that could impede the employee's ability to exit the confined space without assistance, OSHA's health Standards for those hazards apply, rather than the Confined Spaces in Construction Standard (see 1926.1202 definition of "hazardous atmosphere").

**12. Question:** In some residential home building<sup>2</sup> projects, the home builder constructs multiple homes with the same or similar basic configuration. If the presence or absence of any potential hazard in an attic, crawl space, or basement is known, does the Standard require a competent person to examine each attic, crawl space, or basement in each home to make a determination as to whether the space is a permit-required confined space?

**Answer:** No. The Standard requires a competent person to identify all permit-required confined spaces in which employees may work "through consideration and evaluation of the elements of that space, including testing as necessary."

**13. Question:** Does a Competent Person have to enter attics, crawl spaces, or basements with the same or similar configuration?

**Answer:** 1926.1203(a). If a competent person can reliably determine whether attics, crawl spaces, or basements with the same or similar configuration contain one of the hazards or potential hazards without physically inspecting each of the spaces, the competent person need not physically examine each space to make the identification required under 1926.1203(a).

**14. Question:** What does OSHA mean when referencing "residential home building?"

**Answer:** For the purposes of this Standard "residential home building" or "residential home construction" refers to work on any residence being built using traditional wood frame construction materials, methods, and procedures that are typical to single-family home or townhouse construction. Traditional wood frame construction materials and methods include (1) framing materials – wood (or equivalent cold-formed sheet metal stud) framing (not steel or concrete), wooden floor joists and roof structures; (2) exterior wall structure – wood (or equivalent cold-formed sheet metal stud) framing or masonry brick or block; and (3) methods – traditional wood frame construction techniques (see OSHA's Compliance Guidance for Residential Construction, STD 03-11-002 (June 6, 2011), available on OSHA's website). Work on multi-family residences may also be considered "residential home building" or "residential home construction" provided that the work similarly meets the criteria set forth above.

**15. Question:** Does the mere presence of a physical hazard in an attic, crawl space, or basement (before steps are installed) make the space a permit-required confined space under the Standard?

**Answer:** No. However, if the attic, crawl space, or basement (before steps are installed) is a confined space, the presence of a physical hazard in the space would trigger the permit-required confined space requirements if the physical hazard is not isolated (see 1926.1203(g)) or if there is potential employee exposure to the physical hazard.

16. **Question:** Do all unsafe conditions in a confined space constitute a “physical hazard?”

**Answer:** Not all unsafe conditions constitute "physical hazards," which the Standard defines as only those conditions that could impede an entrant's ability to exit the space without assistance.

17. **Question:** When the Standard refers to isolation of physical hazards, what does it mean?

**Answer:** For physical hazards, the Standard defines the term "isolate" as "the process by which employees are completely protected against . . . contact with a physical hazard, by means such as Blanking or blinding; misaligning or removing sections of lines, pipes, or ducts; a double block and bleed system; lockout or tagout of all sources of energy; blocking or disconnecting all mechanical linkages; or placement of barriers to eliminate the potential for employee contact with a physical hazard." 1926.1202. Guarding by location is also an acceptable means of isolation under the Standard (see response to Question 61).

18. **Question:** Does the presence of electrical equipment in an attic, crawl space, or basement (before steps are installed) automatically make the attic, crawl space, or basement (before steps are installed) a permit-required confined space?

Answer: No. Only if an entrant has exposure to a serious hazard associated with the electrical equipment, such as an exposed live conductor, and the exposure could impede the entrant's ability to exit the space without assistance, would the presence of electrical equipment make the attic, crawl space, or basement (before steps are installed) a permit-required confined space

19. **Question:** Does the mere presence of animals in an attic, crawl space, or basement (before steps are installed) that is a confined space automatically make the attic, crawl space, or basement (before steps are installed) a permit-required confined space?

**Answer:** No. The presence of animals would only make a confined space a permit-required confined space if the animals posed a physical hazard, as defined by the Standard.

20. **Question:** Are all attics in a residential home considered confined spaces under the Standard?

**Answer:** No. A confined space is a space that (1) is large enough and so configured that an employee can bodily enter it; (2) has limited or restricted means for entry and exit; and (3) is not designed for continuous employee occupancy. All three criteria must be met for an attic to be considered a confined space. In many instances, an attic will not be considered a confined space because there is not limited or restricted means for entry and exit. For example, attics with a permanent, full-size doorway and/or stairwell access would rarely meet the definition of a confined space, provided there are no other impediments to egress. An attic under construction where there is no drywall in place would also not have limited or restricted means for entry or exit and would not be considered a confined space.

21. **Question:** Many new residential homes are constructed with pull down stair access to the attics, often referred to as "disappearing attic stairways." For attics that use this type of stair access, would OSHA consider the attics to be confined spaces?

**Answer:** Whether an attic with pull down stair access would be considered a confined space depends on whether the configuration of the stairs impedes the ability of employees to exit the space. Ladder-like pull down stairs that require employees to ascend/descend hand-over-hand, limit egress and could therefore render an attic a confined space. An attic that can be accessed via pull down stairs that resemble the structure of a stationary stairway and do not require an employee to ascend/descend hand-over-hand would not be considered a confined space if there are no impediments to egress.

22. **Question:** Does the presence of asbestos in an attic make the attic a permit-required confined space?

**Answer:** No. Asbestos would not trigger the permit-required confined space requirements of the Standard. However, if asbestos were present in an attic, an employer would need to follow any applicable requirements of OSHA's asbestos Standards.

**23. Question:** When does an employee perform an "entry" into an attic for purposes of the Standard?

**Answer:** The Standard defines "entry" as the action by which any part of a person passes through an opening into a permit-required confined space. Thus, if any body part of an entrant breaks the plane of an attic opening, that would constitute an entry under the Standard, provided that the attic also meets the requirements of a permit-required confined space.

**24. Question:** How hot must it be in an attic that is a confined space for the attic to be considered a permit-required confined space under the Standard?

**Answer:** Extreme heat can be considered a serious physical hazard in attics such that the attics could be considered permit-required confined spaces.

**25. Question:** Is there a temperature that OSHA considers extreme heat?

**Answer:** OSHA has not quantified how hot it must be to trigger the permit-required confined space requirements. However, the heat must be so extreme that it could potentially impede an entrant's ability to exit the attic without assistance.

**26. Question:** What factors would OSHA consider in determining if heat qualifies as a physical hazard rendering an attic or other confined space a permit required confined space.

**Answer:** Factors that the Agency would consider are:

1. Temperature of the space while work is performed,
2. The nature and duration of the tasks performed in the heat
3. Whether the entrant is acclimatized to work in extreme heat.

Note: A short-duration, light-duty task performed in a hot attic would typically not constitute a physical hazard triggering the permit-required confined space requirements. In addition, measures to control the heat in an attic (e.g., use of a fan) will be considered by the Agency in determining whether a serious hazard exists in the first instance.

**27. Question:** Do employees performing this initial assessment of a space have to follow the permit-required confined space requirements of the Standard?

**Answer:** A competent person must assess these spaces to determine whether they are permit-required confined spaces prior to any entry. The employer will only need to follow the requirements of a permit-required confined space program if, based on the competent person's assessment, the employer has reason to believe the space is a permit-required confined space.

28. **Question:** Is the contractor who creates a permit-required confined space responsible for placing a warning sign on or around the entrance to the space warning of the existence of a permit-required confined space?
29. **Answer:** Only an employer that should reasonably anticipate that the employees it directs may enter a permit-required confined space is required to post a sign or other equally effective means to warn employees of the location of and danger posed by the permit-required confined space. For example, if a contractor affixes drywall to the roof trusses of a residential home and creates a confined space, that contractor is not required to post a warning sign that the attic constitutes a permit-required confined space, unless (1) the attic meets the criteria of a permit-required confined space, and (2) the contractor should reasonably anticipate that the employees it directs may enter the attic.
30. **Question:** Is the permit for a permit-required confined space required to be posted

**Answer:** No. However, the permit must be "made available" at the time of entry to all authorized entrants or their authorized representatives. This requirement to make the permit available could be met by posting the permit or by "any other equally effective means" (see 1926.1205(c))

31. **Question:** In some homes, before a set of stairs is installed into a basement, home builders may access the space through a basement egress window that complies with Section R310 of the 2012 or 2009 International Residential Code. Under these circumstances, would the basement be considered a confined space?

**Answer:** No. If the basement has an egress window that meets the specifications of Section R310 of the 2012 or 2009 International Residential Code, the basement would not be considered a confined space as there would not be limited or restricted means of egress to and from the basement.

32. **Question:** Paragraph 1926.1203(h)(1) of the Standard includes requirements for permit space entry communication and coordination. It requires that before entry operations begin, the host employer must provide the following information, if it has it, to the controlling contractor: (1) the location of each known permit space; (2) the hazards or potential hazards in each space or the reason it is a permit space; and (3) any precautions that the host employer or any previous controlling contractor or entry employer implemented for the protection of employees in the permit space. Under the Standard, is the host employer required to perform a separate assessment of all spaces to gather the information required by this paragraph?

**Answer:** No. The Standard only requires the host employer to communicate the information in paragraph (h)(1) if it is known by the host employer. The Standard does not require the host employer to perform a separate assessment to gather the information. In addition, the communication provisions only require host employers to convey the information to the controlling contractor through reasonable means. There is no requirement in the Standard for the host employer to verify that the information has been received by the controlling contractor or transmitted to entry employers by the controlling contractor. A host employer that has the information in paragraph (h)(1) need only communicate the information to the controlling contractor one time to satisfy the requirements of the Standard. Additional communications will only be required if the host employer gains additional such information not included in the original communication.

33. **Question:** Are host employers/controlling contractors responsible for compliance with the permit-required confined space program provisions of the Standard if they have no reason to anticipate that the employees they direct will enter a permit-required confined space?

**Answer:** No. However, these employers must nonetheless (1) take effective measures to ensure that the employees they direct do not enter any known permit spaces (see 1926.1203(c)), and (2) comply with 1926.1203(h). Otherwise, only employers that should reasonably anticipate that the employees they direct may enter a permit space are responsible for compliance with the permit-required confined space requirements of the Standard. For example, employers that will not direct any employees to enter a confined space are not required to comply with the following provisions of the rule: permit-required confined space program (1926.1204), permitting process (1926.1205), entry permit (1926.1206), training (1926.1207), duties of authorized entrants, attendants, and entry supervisors (1926.1208-1210), and rescue and emergency services (1926.1211).

34. **Question:** Does 1926.1203(h) necessarily require entry employers to communicate the specified information before and after each time an employee goes into an attic, basement, or crawl space that is a permit-required confined space?

**Answer:** No. An entry employer must communicate the information required under 1926.1203(h)(3) before "entry operations" begin, and it must communicate the information required under 1926.1203(h)(5) after "entry operations" have ended. Entry employees may go into and out of the space multiple times while completing the tasks identified on the permit without making additional communications as long as the entry employer maintains control over the space between the pre-entry and post-entry communications required under 1926.1203(h)(3) and (h)(5). In addition, a single pre-entry communication could address entry operations in multiple spaces under 1926.1203(h)(3) and a single post-entry communication could address multiple entry operations under 1926.1203(h)(5), provided each space has its own permit and is addressed in the communication

35. **Question:** Does the exchange of information set forth between employers in 1926.1203(h) have to be in writing?

**Answer:** No. OSHA does not specify how the information is to be exchanged. The Agency will deem it sufficient for each employer to provide the necessary information through any appropriate mechanism. The information exchange requirements can be oral. There is no requirement in the Standard for written communications between employers on multi-employer worksites.

36. **Question:** If an employer chooses to exchange the required information in writing under 1926.1203(h), can the written communication be informal?

**Answer:** Yes. While the exchange of information does not have to be in writing, some employers may choose to establish a mechanism for a written exchange. The written exchange does not have to be formal. It can be performed through email, text message, or other informal means, so long as the required information is provided

37. **Question:** On multi-employer worksites, is every employer responsible under 1926.1203(a) to assess the worksite to determine the location and presence of confined spaces and information about permit-required confined spaces?

**Answer:** No. Only employers that should reasonably anticipate that the employees they direct may enter confined spaces are required to perform this assessment. For host employers and controlling contractors that have no reason to anticipate that the employees they direct may enter confined spaces, there is no obligation to perform this initial assessment of the worksite.

38. **Question:** OSHA has identified "noise" as a potential physical hazard. What noise level must be reached in order to constitute a physical hazard such that the permit-required confined space requirements apply?

**Answer:** There is no specific threshold noise level that must be reached in order for noise to constitute a physical hazard triggering the permit-required confined space requirements. However, the noise must be so extreme that it could impede an entrant's ability to safely exit the space without assistance. In most instances, noise levels below the eight-hour TWA permissible exposure limit for noise in construction of 90 dBA would not constitute a physical hazard triggering the permit-required confined space requirements.

39. **Question:** Can OSHA cite an employer for not documenting the initial evaluation of the workplace required by 1926.1203(a)?

**Answer:** No. The initial evaluation need not be documented. The employer, however, must be able to explain how the evaluation was conducted and describe the results. Thus, any citation will be for failure to evaluate the workplace as required by the Standard, rather than for failure to create a record of the evaluation.

40. **Question:** Does the initial evaluation for determining if a confined space is a permit space, required by 1926.1203(a) mandate a specific physical survey of each space?

**Answer:** No. The evaluation requirement may be met through existing experience and knowledge of the space, provided this information is adequate to make the determination required by the Standard. For example, a competent person may have information which shows that the hazards or potential hazards of all attics, crawl spaces, and basements (before steps are installed) will not impede an entrant's ability to exit the space without assistance. Therefore, these spaces would not need to be evaluated individually before each entry. This same approach can be used for any entry employer which has a number of identical spaces and information to support its determination(s).

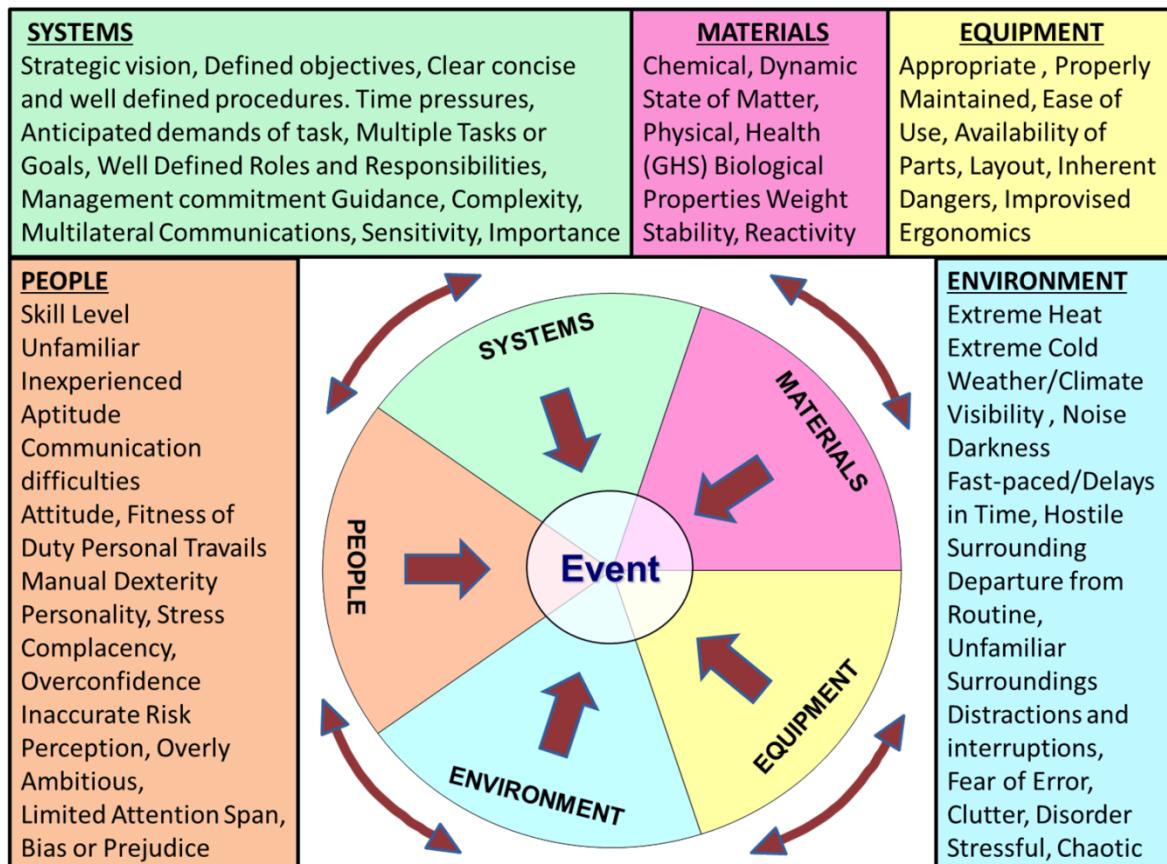
41. **Question:** If an employer establishes a policy prohibiting the employees it directs from working in a permit-required confined space and effectively communicates the policy to those employees, does that employer still need to have a rescue harness on site and train the employees it directs in rescue operations?

**Answer:** No. Only employers that can reasonably anticipate that the employees they direct may enter permit-required confined spaces are subject to the requirement to develop and implement procedures for rescue and emergency services under 1926.1204(i) and 1926.1211

42. **Question:** What constitutes serious physical damage under the Standard?

**Answer:** Section 1926.1202 defines serious physical damage as an impairment or illness in which a body part is made functionally useless or is substantially reduced in efficiency. Injuries involving such impairment would usually require treatment by a physician or other licensed health-care professional. In general, injuries requiring only first-aid treatment would not be considered serious physical damage because they would not impair an employee's ability to safely exit a confined space without assistance.

## Section Four: Sample “Starter-kit” for Confined Space Safety Training Program



The following sample training modules are for workers to help them better understand what confined spaces are and the nature of hazards associated with these spaces. This training should be provided to all employees who will be exposed to confined spaces and permit required confined spaces. This training is a sample of core elements to cover and must be trained in a language and a aptitude that workers can readily understand so they can readily apply their knowledge and skill in the field. This training is NOT intended for workers who will enter permit required confined spaces, such training must be much more involved and completely specific to the hazards associated with the permit required spaces they will enter.

**Construction Industry Confined Space Training Program (SAMPLE)**

**Key Elements to Training Employees who will be exposed to Confined Spaces**

- 1. General Awareness-level Confined Space Training Module**
- 2. Flammable Atmospheres Module**
- 3. Oxygen Deficient and Enriched Atmospheres Module**
- 4. Vapor Density and Specific Gravity Module**
- 5. The Control of Hazardous Energy Module**
- 6. Oxidizing Agents Module**
- 7. Rescue Module**

**1. General Awareness-level Confined Space Training Module**

In keeping with recent additions to the United States Department of Labor's Occupational Safety and Health Administration (OSHA) Standards concerning confined spaces in construction, our team at YOUR COMPANY NAME HERE has compiled a self-guided lesson for our workforce and administrators to ensure that we are all aware of what constitutes a confined space and a permit required confined space and how such spaces can be or can become hazardous to your safety and health. Review this exercise with your competent persons. It's important to know that this awareness-level training is intended to make you generally aware of the existence and terms associated with confined spaces, but it DOES NOT provide enough training to make you able to enter such spaces. Worker entry into such spaces requires additional more rigorous space-specific training. The intent here is to teach our team to be able to "RAP," that is, RECOGNIZE, AVOID and PREVENT exposures to these hazardous spaces.

This change in Standard is designed to save lives of construction workers. Unlike most general industry worksites, construction sites are continually evolving, with the number and characteristics of confined spaces changing as work progresses. Occasionally, the materials we work with or the work activities we perform can create dangerous conditions that would classify our working environment as a confined space or worse a permit required confined space. This new OSHA rule emphasizes the necessity of training as well as continuous worksite evaluation and communication. The Standard also holds various entities accountable for our worksites including controlling contractors, hosts and owners of facilities. These entities are required by OSHA to share information of known or foreseeable confined space and the respective hazards that we may encounter while at work.

We should know that the host, controlling contractor (often referred to as the General Contractor) along with YOUR COMPANY NAME HERE competent person MUST make you aware

of specific confined spaces at our worksites. They must brief you on the location of specific confined spaces and respective associated hazards in your work environment. If no confined or permit required confined spaces exist at your worksite then the absence of such spaces must be communicated to you.

It's important to know terms surrounding confined spaces. There are exceptionally hazardous confined spaces that OSHA terms Permit Required Confined Spaces that possess, or could possess, conditions within that can cause or possibly cause death, serious injury or illness. The host/owner of the facility you are working at is responsible to maintain a Confined Space Program that inventories these spaces and their respective hazards.

It is critical that we understand the terms and hazards associated with confined spaces in our working environments. This tutorial will be followed by a 20 question exercise.



Confined Space examples: vaults, pipes, ducts, crawl spaces, attics, ceiling plenums, pits, tanks.

### **What Is a Confined Space?**

It's vital that we all know what is meant by a Confined Space. In order for a space to be classified as a confined space it must possess ALL OF THE FOLLOWING 3 CRITERIA.

1. The space must be large enough for a worker to enter that is, it must have a diameter of at least 18 inches round. Keep in mind any opening smaller than an 18 inch diameter round is considered too small to ever enter and shall not ever be entered.

2. The space must have a limited or restricted means of entry and exit. This typically means that a worker has to contort their body to enter, such as crouching, bending, crawling and kneeling to enter the space. A non-Standard doorway a hatchway, scuttle, manhole, inspection port including spaces only accessible by ladders, concrete-mounted rungs or hoisting devices. A space with a limited number of means of egress, such as single way in and out may constitute a limited means of entry and exit.

3. The space was not designed for continuous occupancy. Even if occasionally workers will enter the space for inspection, repair, clean-up and maintenance the space may still not be designed for continuous occupancy. Product storage areas, enclosed machinery, vessel tanks, ceiling plenums, attics and crawl spaces are NOT designed for continuous occupancy and hence

fulfill this prohibiting design criterion. Other typical confined spaces are boilers, furnaces, ceilings, pipelines, ducts, pits, pumping stations, process vessels, septic tanks, trenches, excavations, silos, storage tanks, barges, sewers, utility vaults, shafts and caissons. Such spaces may include areas above ceilings, catwalks, catacomb or maze-like paths or areas below a raised stage or electronic floor, cubbyholes or sub-basements. Our activity or the materials we use may also affect our working environment and create confined spaces or permit required confined spaces. When accessing certain areas to work, we must be deliberate when staging where we work and how we are going to access such work. For example if we were to have to work, as Michelangelo did on the Sistine Chapel, lying on our backs, this area can conceivably become a confined space. Use this as a basis of consideration; if you have to work in a position or location where it would become difficult for rescuers to extricate you from that space in an emergency, then you are probably in a confined space.

We as a team, through our competent persons, must also say something if we see something, that is, if we recognize various spaces in our work environments that resemble what we have described here, we must tell our competent persons and avoid entry until the space is assessed and classified accordingly.

### **What is a Permit Required Confined Space?**

While we can ordinarily deal with typical confined spaces in the workplace the stakes get much greater if the confined spaces possess additional hazards that can cause Immediate Danger of Life or Health, known as an IDLH. These extremely dangerous spaces can only be entered with extreme precautions and under the permission of a permit created specifically for the hazards associated with the space. In these cases, entrants, attendants, supervisors and competent persons must receive extensive site and hazard specific training that effectively teaches workers about the specific hazards and the planning to control the hazard from doing harm. Training will also include how to monitor hazards and emergency measures to be taken to rescue entrants.

In order for a confined space to be classified as a permit required confined space it must ONLY need to possess or have the potential to possess ONE of the following criteria.

1. The space contains or has the potential to contain a hazardous atmosphere. This means the space may have or possess the potential to have an enriched or depleted oxygen atmosphere, a toxic atmosphere containing a harmful substance or chemical, a combustible or harmful dust atmosphere or a flammable atmosphere.
2. The space contains or has the potential to contain a material that can engulf an entrant such as steam, water, sewage, grain or soil.

3. The space contains has a design that possess a configuration that could trap or asphyxiate an entrant. Such configuration may include internal walls or baffles, nooks, ducts or obstructions to egress that would make emergency extrication difficult or time consuming.

4. The forth criteria is intentionally open-ended and includes any serious safety or health concern that may be within a space or can potentially come into existence in the space. These hazards pose a threat to life or health (IDLH) and can be electrical hazards, pests, animals, ionizing radiation, impalements, punctures, falls, caught-in-between and struck-by hazards and various non-atmospheric chemicals.

A permit documents the steps taken to control or eliminate the hazard before entry is made, and serves as a guideline for acceptable entry conditions.

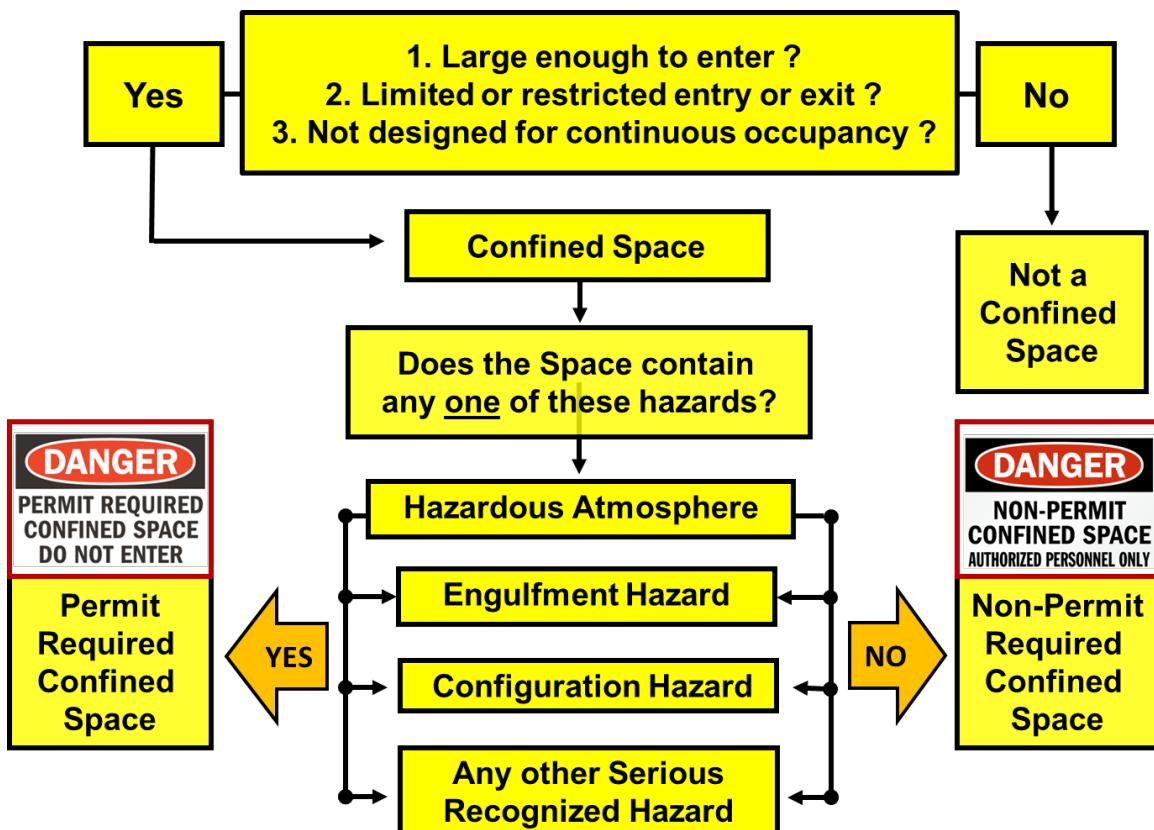
**Here are some key points and important definitions you MUST remember:**

- Before you begin working at a worksite you must be informed by your competent person about confined spaces that you may be directed to work in or near. These spaces must be identified by specific hazards.
- If there are permit required confined spaces at your site they must possess signage or other means of prohibiting unauthorized entry the sign may say “DANGER -- PERMIT- REQUIRED CONFINED SPACE, DO NOT ENTER” or use other similar language.
- Remember the chemicals we us or the activities we perform in a space can introduce a new hazard that would make that space into a confined space or a permit required confined space. For example hot work, which is any task that produces a spark, arc, or any other ignition source such as molten metal.
- Permit required confined spaces possess or can possibly possess hazards that can immediately cause death or serious sickness or injury. We refer to such hazards as “IDLH’s,” which stands for “Immediate Danger of Life or Health.”
- Entry into a confined or permit required confined space means any body part that breaks the plane or opening to the space. Reaching into a space with your hand or arm would constitute and entry.
- A Competent person means one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has the authorization to take prompt corrective measures to eliminate them. You MUST have a competent person at your site at all times.
- The Controlling Contractor is the employer that has overall responsibility for construction at the worksite. This is typically the General Contractor. If the controlling contractor owns or manages the property, then it is both a controlling employer and a host employer.

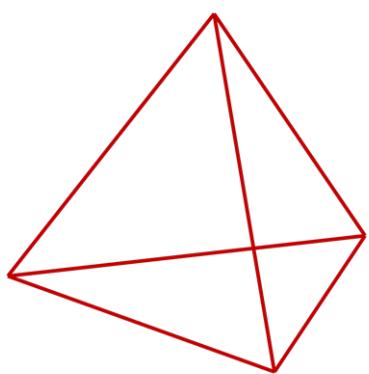
- The Host employer means the employer that owns or manages the property where you are working.
- A Hazardous atmosphere means an atmosphere that may expose employees to the risk of death, incapacitation, impairment, injury, or illness from such hazards as flammable gases, combustible dusts, atmospheric oxygen concentration below 19.5 percent or above 23.5 percent and concentrations of recognized toxic and hazardous substance or any other atmospheric condition that is immediately dangerous to life or health.

### Confined Space Identification Flow Chart

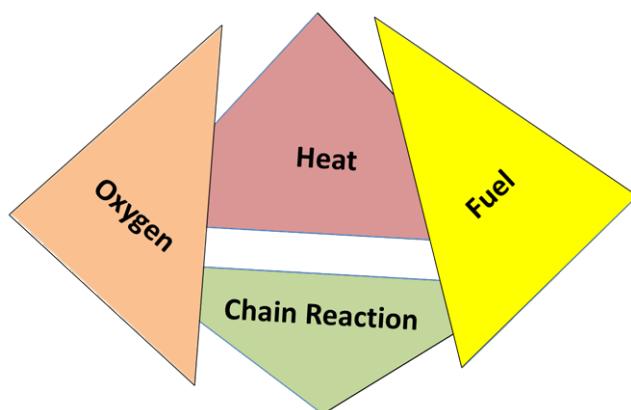
Here is a simple flow chart that can help you better understand how we classify confined and permit required confined spaces. If you have any questions please ask your competent person.



## 2. Flammable Atmospheres Module



A Tetrahedron



The Fire Tetrahedron

The fire tetrahedron include 4 necessary components

1. Fuel (something that will burn)
2. Heat (enough to make the fuel burn)
3. Oxygen (enough to support combustion)
4. Uninhibited chain reaction

Formerly the use of the fire triangle included on three components fuel, heat, oxygen. These three components must be present to have a fire but an uninhibited chain reaction must also be present. According to the National Fire Protection Association (NFPA) a fire tetrahedron more accurately describes the mechanism of a fire. In a real sense a fire is actually an event.

## Fire Classifications

Fires are classified according to the type of fuel that is burning

Class A - ordinary combustibles



Class B - flammable liquids



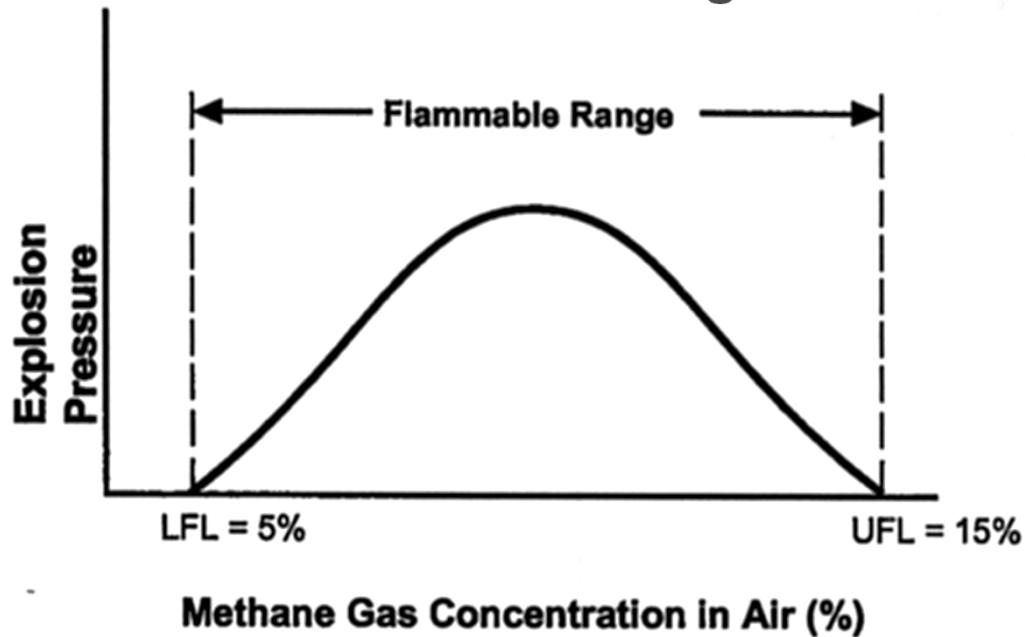
Class C - electrical fires



Class D - metals fires



## The LFL and UFL and The Flammable Range



### 3. Oxygen Deficient and Enriched Atmospheres Module

An oxygen deficient atmosphere means an atmosphere containing less than 19.5 percent oxygen by volume and an oxygen enriched atmosphere means an atmosphere containing more than 23.5 percent oxygen by volume. These two states of concentration have pose different hazards to entrants inside of confined spaces. Oxygen enrichment increase volatility inside the space meaning the atmosphere could become explosive. Oxygen deficient atmospheres impair our breathing and can lead to asphyxiation. Oxygen is a very most important element and is also a fundamental part of combustion.

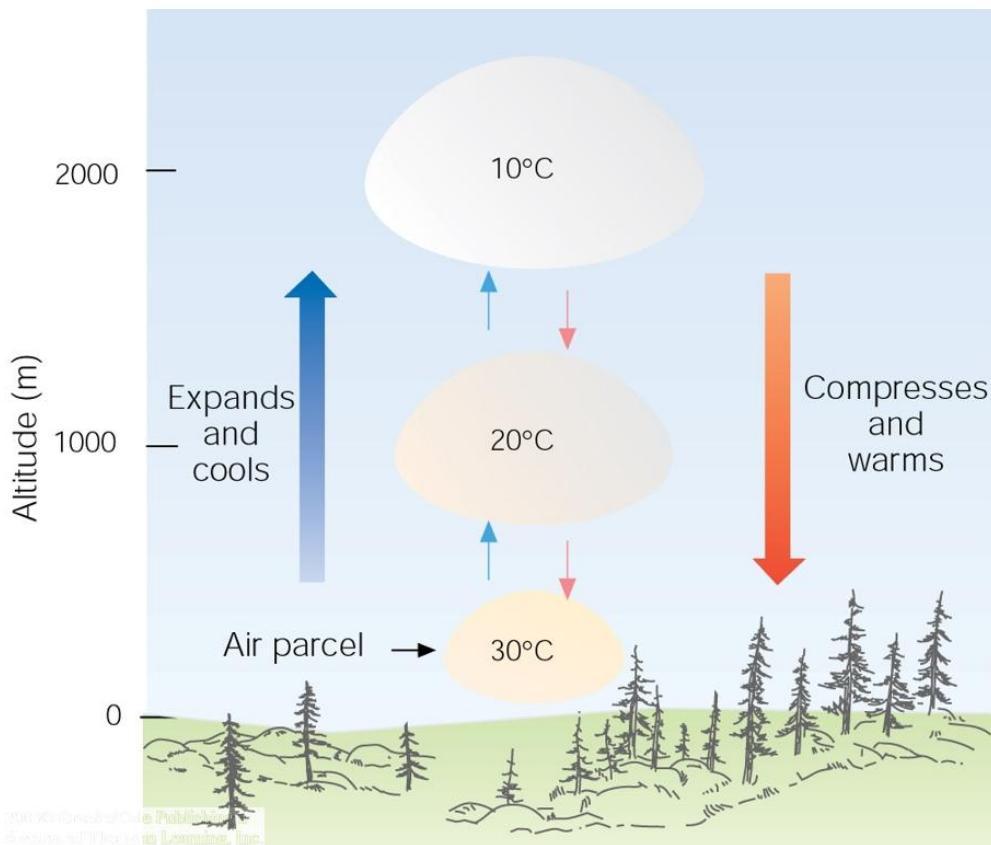
- Oxygen is essential to life. Its normal concentration in the air we breathe is approximately 21 % (20.9%)
  - OSHA 19.5 % to 23.5 %
  - We can breathe in a 50-60% oxygen enriched atmosphere for several hours under medical care (oxygen therapy)
  - Oxygen is not flammable but supports combustion.
  - Most materials burn fiercely sometimes explosively in oxygen.
  - As the oxygen concentration in air increases, the potential fire risk increases. Oxygen enrichment cannot be detected by the human senses
  - At concentrations above 23.5 % in air, the situation becomes dangerous due to the increased fire hazard.
  - Oxygen is colourless, tasteless and has no odour.
  - Oxygen is heavier than air, oxygen can accumulate in low lying areas. such as pits or underground rooms especially in cases of liquid spillage.
  - 3 Means of losing oxygen
    - Displacement
    - Consumption
    - Reaction
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#### **4. Vapor Density and Specific Gravity Module**

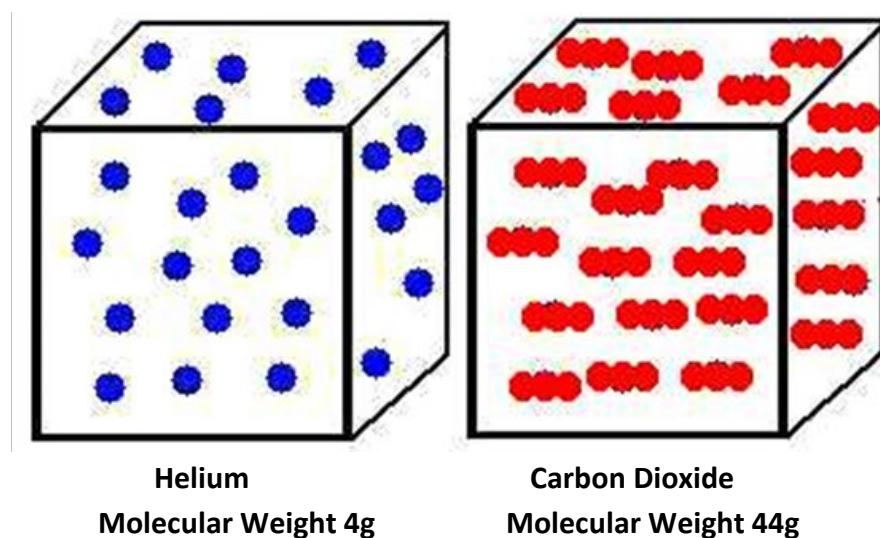
##### **Specific gravity and relative vapor density**

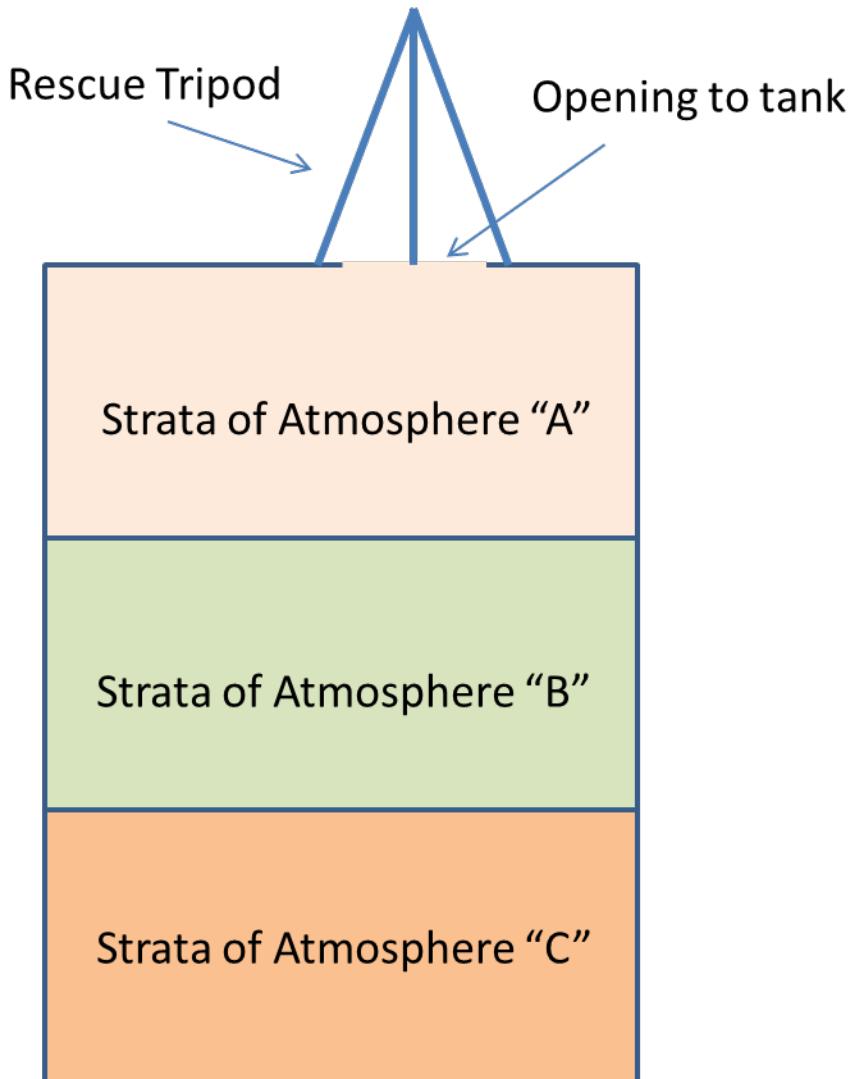
Specific gravity and vapor density comparative measurements based on the respective relative weight of a liquid and a gas or vapor compared to water or air. This “weight” of water or air is an arbitrary value of one (1). If a gas has a vapor density of less than one it will generally rise in air. If the vapor density is greater than one the gas will generally sink in air. Propane for example has a vapor density of 1.554, so it will sink in air, the vapor density of helium is 0.145 so it is significantly lighter than air so it will rise. Acetone is twice as heavy as air so its vapor density is 2. Mercury vapor is nearly seven times heavier than air. As you would imagine, the

density of a chemical has great safety and health implications for example storage of chemicals especially flammables, oxidizers or other highly reactive chemicals that can displace air, possibly presenting hazard to employees.



Vapor Density and Specific Gravity are subject to environmental conditions.





Different Vapor Densities  
in a PRCS Tank Entry

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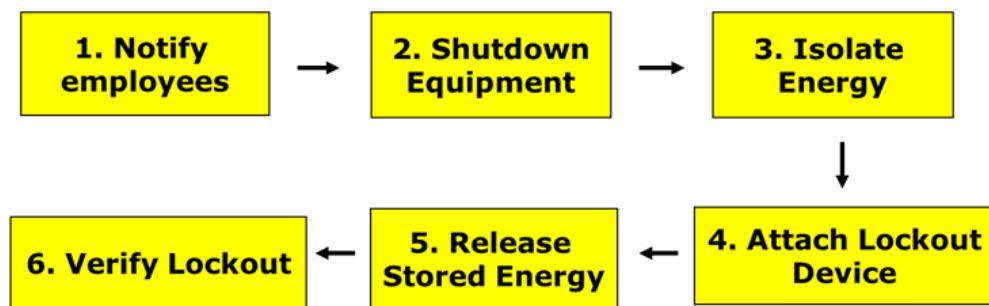
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## 5. The Control of Hazardous Energy Module

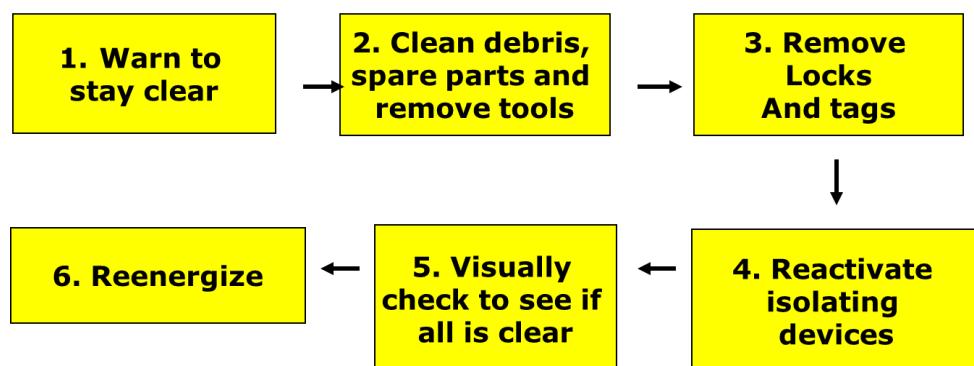
Dr. William Haddon Jr. a physician with degrees from the Massachusetts Institute of Technology, Harvard Medical School and Harvard School of Public Health and the first director of the National Highway Traffic Safety Administration, proposed a general idea that accidents and injuries involve the transfer of energy. His theory is known as the Energy Release Theory, it poses that objects, events, or environments interaction with people cause harm. Many sources of energy are obvious to us such as the moving parts of a machine, motor vehicles, projectiles, gravity, or even wind and weather systems yet we often overlook the tremendous energy found in chemicals simply because we cannot see the energy. To control hazardous energy we have developed procedures commonly referred to as Lock-out Tag-out or LOTO for short.

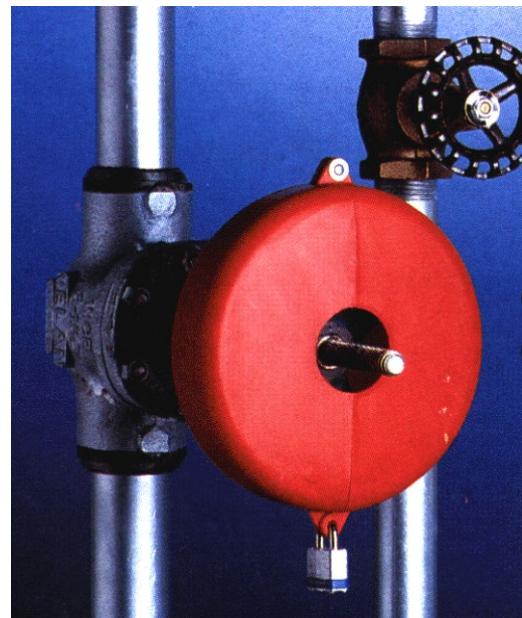
**Other Physical Hazards Module** Isolate or isolation means the process by which employees in a confined space are completely protected against the release of energy and material into the space, and contact with a physical hazard, by such means as: blanking or blinding; misaligning or removing sections of lines, pipes, or ducts; a double block and bleed system; lockout or tagout of all sources of energy; blocking or disconnecting all mechanical linkages; or placement of barriers to eliminate the potential for employee contact with a physical hazard.

### Typical Steps to Lockout Tagout Procedure



### Typical Steps to Remove Lockout Tagout and Reenergize





Examples of Isolation Devices

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## **6. Oxidizing Agents Module**

An oxidizing agent is a chemical substance that reacts with another chemical called the reactant and results in the removal electrons. This reaction is referred to as a redox chemical reaction and can in some oxidizers release a great deal of chemical energy, which has the potential to cause injury, illness and damage.

### Common Oxidizing Agents

Oxygen ( $O_2$ )

Ozone ( $O_3$ )

Hydrogen peroxide ( $H_2O_2$ ) and other inorganic peroxides

Fluorine ( $F_2$ ), chlorine ( $Cl_2$ ), and other halogens

Hexavalent chromium compounds such as chromic and dichromic acids and chromium trioxide, pyridinium chlorochromate (PCC), and chromate/dichromate compounds

Permanganate compounds such as  $KMnO_4$

Sodium perborate

Nitric acid ( $HNO_3$ ) and nitrate compounds

Sulfuric acid ( $H_2SO_4$ )

Peroxydisulfuric acid ( $H_2S_2O_8$ )

Peroxymonosulfuric acid ( $H_2SO_5$ )

Chlorite, chlorate, perchlorate, and other analogous halogen compounds

Hypochlorite and other hypohalite compounds, including household bleach ( $NaClO$ )

Nitrous oxide ( $N_2O$ )

Silver oxide ( $Ag_2O$ )

Osmium tetroxide ( $OsO_4$ )

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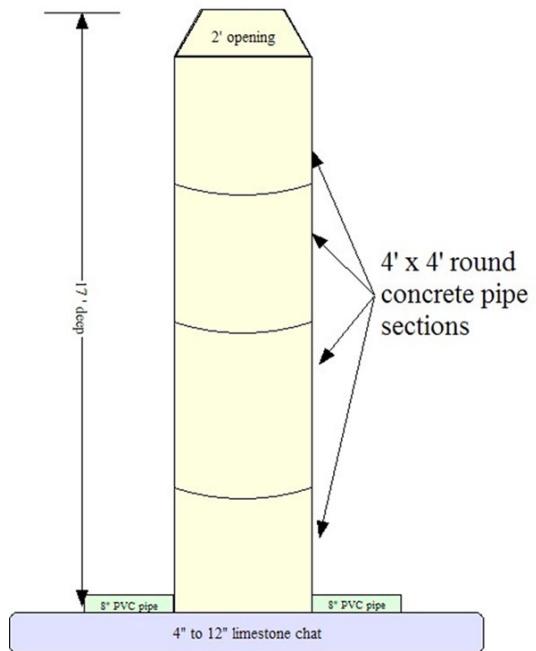
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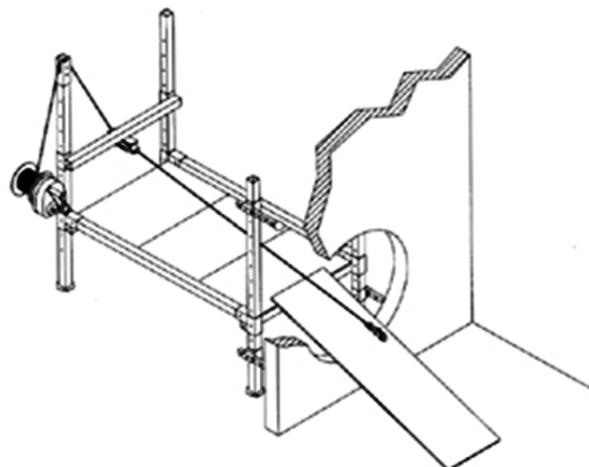
## **7. Rescue Module**

There are three types of rescues for a PRCS. Let's discuss the implications of rescue.

1. Self-Rescue
2. Non-Entry Rescue
3. Entry Rescue



**Vertical PRCS**



**Horizontal PRCS**

## Section Five: The Checklist

Using checklists has become standard Other critical industries have made aviation, healthcare, hospitals and other critical industries, managers have turned to utilizing checklists to ensure and hedge against human error. Sometimes there are just too many moving parts to remember so deliberate checklist help keep everyone on the right track.

### Make a CHECKLIST based upon code and best practice

Communication and Coordination Checklist		Yes	No
1.	Has the host provided controlling contractor the location of the PRCS?	✓	
2.	Has the host provided controlling contractor with the specific nature of the hazard(s) within the PRCS?	✓	
3.	Has the host employer provided controlling contractor with precautions and controls previously utilized in the PRCS by other controlling and entry contractors?	✓	
4.	Has the host communicated and coordinated with controlling contractor on emergency action plan and provided facility orientation protocol?	✓	
5.	Has controlling contractor received, reviewed and consulted with host on above items 1 through 4?	✓	
6.	Has controlling contractor provided and reviewed the information from the host in items 1 through 4 with entry employer?	✓	
7.	Does the entry employer fully understand the information provided by the controlling contractor?	✓	
8.	Have all workers on site been trained to recognize and avoid permit confined spaces?	✓	
9.	Has a plan of communication during entry been established?	✓	
10.	Are there any barriers of communications between workers i.e. language, impairment etc.?		✓
11.	Have all workers been trained in recognition and avoidance of PRCS?	✓	
12.	Has a qualified rescue team been provided a briefing of facility, hazards and procedures?	✓	
13.	Has a bilateral debriefing between the controlling contractor and the entry employer taken place regarding the performance of the PRCS program followed and any hazards confronted or created in the permit space(s) during entry operations?	✓	
14.	Has the controlling contractor apprised the host employer of the information exchanged with the entry entities pursuant to this subparagraph	✓	
15.	Has the host reviewed and archived debriefing notes and information within permit?	✓	

When we perform tasks as a matter of routine, such as completing a checklist day after day, sometimes we move too quickly, less deliberate than we should that can lead to making an error or overlooking something important. This is the reason why in a hospital before a surgery medical professionals will ask a series of the same questions often worded a bit differently. Notice the checklist above has one dissimilar answer. This checklist is developed that each of these questions must have the “correct answer” to help guide the applicant through code and best practice compliance. Yet the validating question, which is different from the others, tells us if the checklist was deliberately completed. If a checklist is used often enough, an employer may change the validating question, just to keep everyone on their toes since we tend to take shortcuts.



College student takes shortcut off the campus planned path.

Make a CHECKLIST based upon code and best practice

This is a “validating” question because it can gauge if the person who performed the checklist paid close attention to each individual question. Atypical answers to validating questions may suggest further review. Employers can periodically shuffle the validating question so competent persons don’t become too comfortable with the format.

		Yes	No
Has the entry employer fully understood the purpose of the PRCS?	✓		
Is the specific nature of the hazard(s) within the facility known?	✓		
Are all workers trained with precautions and controls prior to entry?	✓		
Is the controlling contractor aware of emergency procedures?	✓		
Has the host consulted with host on above items 1 through 4?	✓		
Has the host been provided information from the host in items 1 through 4?	✓		
7. Does the entry employer fully understand the information provided by the controlling contractor?	✓		
8. Have all workers onsite been trained to recognize and avoid permit confined spaces?	✓		
9. Has a plan of communication during entry been established?	✓		
10. Are there any barriers of communications between workers i.e. language, impairment etc.?	✓		
11. Have all workers been trained in recognition and avoidance of PRCS?	✓		
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13. Has a bilateral debriefing between the controlling contractor and the entry employer taken place regarding the performance of the PRCS program followed and any hazards confronted or created in the permit space(s) during entry operations?	✓		
14. Has the controlling contractor apprised the host employer of the information exchanged with the entry entities pursuant to this subparagraph?	✓		
15. Has the host reviewed and archived debriefing notes and information within permit?	✓		

**Exercise: Can you think of some specific questions for your own checklist and a few validating questions?**

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_
8. \_\_\_\_\_
9. \_\_\_\_\_
10. \_\_\_\_\_

## **Section Six: Confined Spaces in Construction Group Exercise**

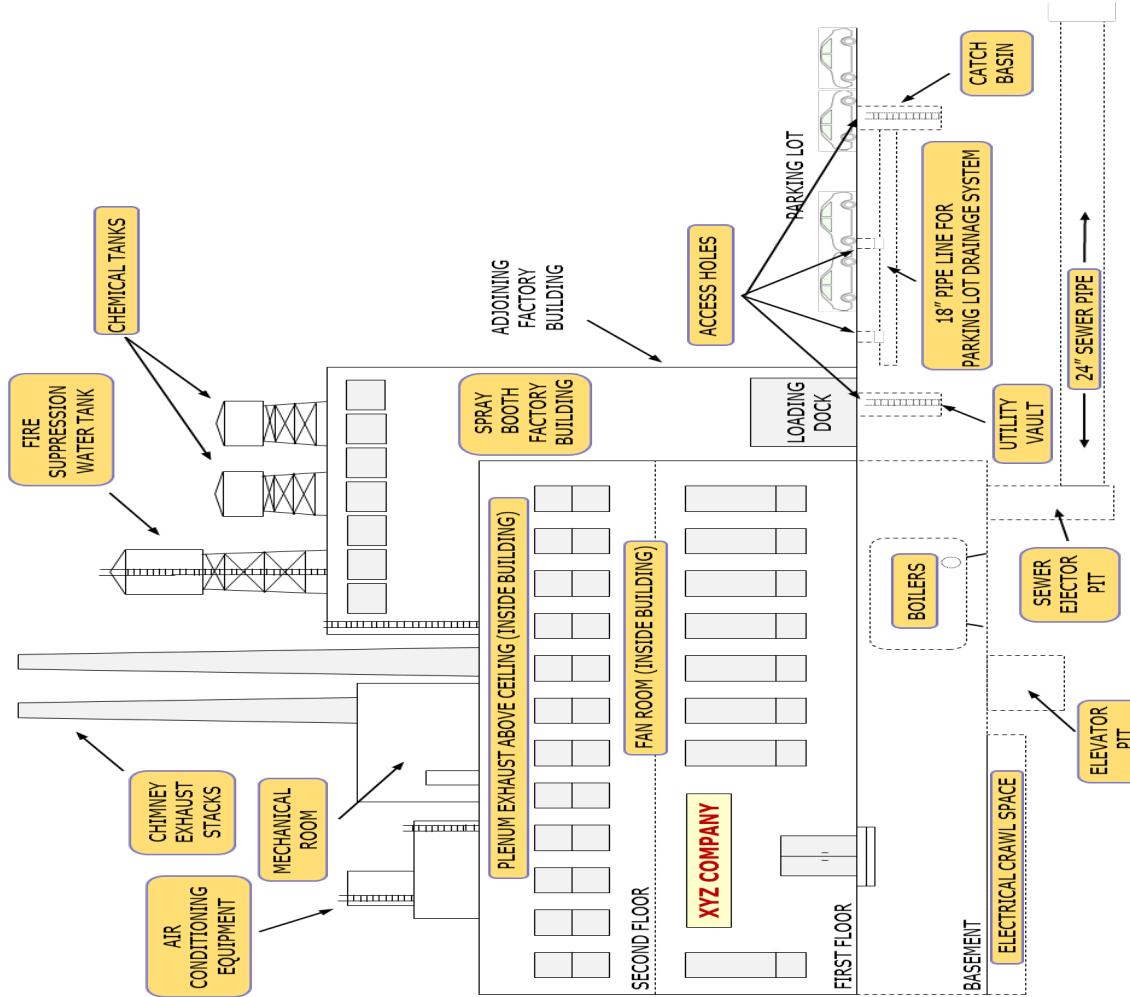
1. Create your own permit required confined space. Congratulations! You just received a contract for the XYZ Company located in Queens, New York. Each group will act as a different entity in this exercise; the host employer, the controlling contractor, the entry employers, rescue team and others. As a group discuss a means of coordination from "your" perspective and plan a course of action.
2. Choose a PRCS and includes as many hazards as you wish; you can be creative here, this is an exercise.
3. Describe the communications that you will use not only for the entry by throughout the facility and beyond.
4. Describe what means you would use to ensure full coordination.
5. Describe the controls you will utilize and complete a Job Hazard Analysis
6. Describe your emergency action plan and rescue procedures.
7. Describe your debriefing procedures.

### **Job Hazard/Safety Analysis Matrix**

<b>Task</b>	<b>Hazard</b>	<b>Control</b>	<b>Means of Implementation</b>
Break tasks down to smaller sub-tasks.	List all possible associated hazards preferably in an order of severity	Use the Hierarchy of Controls 1. Elimination 2. Engineering 3. Mitigation	Should set out procedures that are easy to understand and accomplish in the field. Include the use equipment and requisite training and administrative

A job hazard analysis is a technique that focuses on job tasks as a way to identify hazards before they occur. It focuses on the relationship between the worker, the task, the tools, the work environment and the necessary steps to control a hazard. In a permit required confined space Job Hazard Analysis class to control hazards by eliminating them or engineering them away.

Job Hazard Analysis (JHA) for XYZ Company Queens New York				
#	Step/Task	Hazards	Control	Means of Implementation



### Section Seven Debriefing:

As is proper with any form of training or education, there should be a means of evaluating the experience and assessing its effectiveness. Let us take a few moments and talk about what this program has achieved and where it can be made better. Also, let's take notes so we can look back on our notes say in the months to come and see if, at all, has this training and what we accomplished today had some longer-term effect on our workplace.

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## Appendix A: Sample Confined Program

**YOUR COMPANY NAME HERE**

# Construction Industry Confined Space Training

In keeping with recent additions to the United States Department of Labor's Occupational Safety and Health Administration (OSHA) Standards concerning confined spaces in construction, our team at YOUR COMPANY NAME HERE has compiled a self-guided lesson for our workforce and administrators to ensure that we are all aware of what constitutes a confined space and a permit required confined space and how such spaces can be or can become hazardous to your safety and health. Review this exercise with your competent persons. It's important to know that this awareness-level training is intended to make you generally aware of the existence and terms associated with confined spaces, but it DOES NOT provide enough training to make you able to enter such spaces. Worker entry into such spaces requires additional more rigorous

space-specific training. The intent here is to teach our team to be able to “RAP,” that is, RECOGNIZE, AVOID and PREVENT exposures to these hazardous spaces.

This change in Standard is designed to save lives of construction workers. Unlike most general industry worksites, construction sites are continually evolving, with the number and characteristics of confined spaces changing as work progresses. Occasionally, the materials we work with or the work activities we perform can create dangerous conditions that would classify our working environment as a confined space or worse a permit required confined space. This new OSHA rule emphasizes the necessity of training as well as continuous worksite evaluation and communication. The Standard also holds various entities accountable for our worksites including controlling contractors, hosts and owners of facilities. These entities are required by OSHA to share information of known or foreseeable confined space and the respective hazards that we may encounter while at work.

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It is critical that we understand the terms and hazards associated with confined spaces in our working environments. This tutorial will be followed by a 20 question exercise.



Confined Space examples: vaults, pipes, ducts, crawl spaces, attics, ceiling plenums, pits, tanks.

### **What Is a Confined Space?**

It's vital that we all know what is meant by a Confined Space. In order for a space to be classified as a confined space it must possess ALL OF THE FOLLOWING 3 CRITERIA.

1. The space must be large enough for a worker to enter that is, it must have a diameter of at least 18 inches round. Keep in mind any opening smaller than an 18 inch diameter round is considered too small to ever enter and shall not ever be entered.
2. The space must have a limited or restricted means of entry and exit. This typically means that a worker has to contort their body to enter, such as crouching, bending, crawling and kneeling to enter the space. A non-Standard doorway a hatchway, scuttle, manhole, inspection port including spaces only accessible by ladders, concrete-mounted rungs or hoisting devices. A space with a limited number of means of egress, such as single way in and out may constitute a limited means of entry and exit.
3. The space was not designed for continuous occupancy. Even if occasionally workers will enter the space for inspection, repair, clean-up and maintenance the space may still not be designed for continuous occupancy. Product storage areas, enclosed machinery, vessel tanks, ceiling plenums, attics and crawl spaces are NOT designed for continuous occupancy and hence fulfill this prohibiting design criterion. Other typical confined spaces are boilers, furnaces, ceilings, pipelines, ducts, pits, pumping stations, process vessels, septic tanks, trenches, excavations, silos, storage tanks, barges, sewers, utility vaults, shafts and caissons. Such spaces may include areas above ceilings, catwalks, catacomb or maze-like paths or areas below a raised stage or electronic floor, cubbyholes or sub-basements. Our activity or the materials we use may also affect our working environment and create confined spaces or permit required confined spaces. When accessing certain areas to work, we must be deliberate when staging where we work and how we are going to access such work. For example if we were to have to work, as Michelangelo did on the Sistine Chapel, lying on our backs, this area can conceivably become a confined space. Use this as a basis of consideration; if you have to work in a position or location where it would become difficult for rescuers to extricate you from that space in an emergency, then you are probably in a confined space.

We as a team, through our competent persons, must also say something if we see something, that is, if we recognize various spaces in our work environments that resemble what we have described here, we must tell our competent persons and avoid entry until the space is assessed and classified accordingly.

### **What is a Permit Required Confined Space?**

While we can ordinarily deal with typical confined spaces in the workplace the stakes get much greater if the confined spaces possess additional hazards that can cause Immediate Danger of Life or Health, known as an IDLH. These extremely dangerous spaces can only be entered with extreme precautions and under the permission of a permit created specifically for the hazards

associated with the space. In these cases, entrants, attendants, supervisors and competent persons must receive extensive site and hazard specific training that effectively teaches workers about the specific hazards and the planning to control the hazard from doing harm. Training will also include how to monitor hazards and emergency measures to be taken to rescue entrants.

In order for a confined space to be classified as a permit required confined space it must ONLY need to possess or have the potential to possess ONE of the following criteria.

1. The space contains or has the potential to contain a hazardous atmosphere. This means the space may have or possess the potential to have an enriched or depleted oxygen atmosphere, a toxic atmosphere containing a harmful substance or chemical, a combustible or harmful dust atmosphere or a flammable atmosphere.
2. The space contains or has the potential to contain a material that can engulf an entrant such as steam, water, sewage, grain or soil.
3. The space contains has a design that possess a configuration that could trap or asphyxiate an entrant. Such configuration may include internal walls or baffles, nooks, ducts or obstructions to egress that would make emergency extrication difficult or time consuming.
4. The forth criteria is intentionally open-ended and includes any serious safety or health concern that may be within a space or can potentially come into existence in the space. These hazards pose a threat to life or health (IDLH) and can be electrical hazards, pests, animals, ionizing radiation, impalements, punctures, falls, caught-in-between and struck-by hazards and various non-atmospheric chemicals.

A permit documents the steps taken to control or eliminate the hazard before entry is made, and serves as a guideline for acceptable entry conditions.

**Here are some key points and important definitions you MUST remember:**

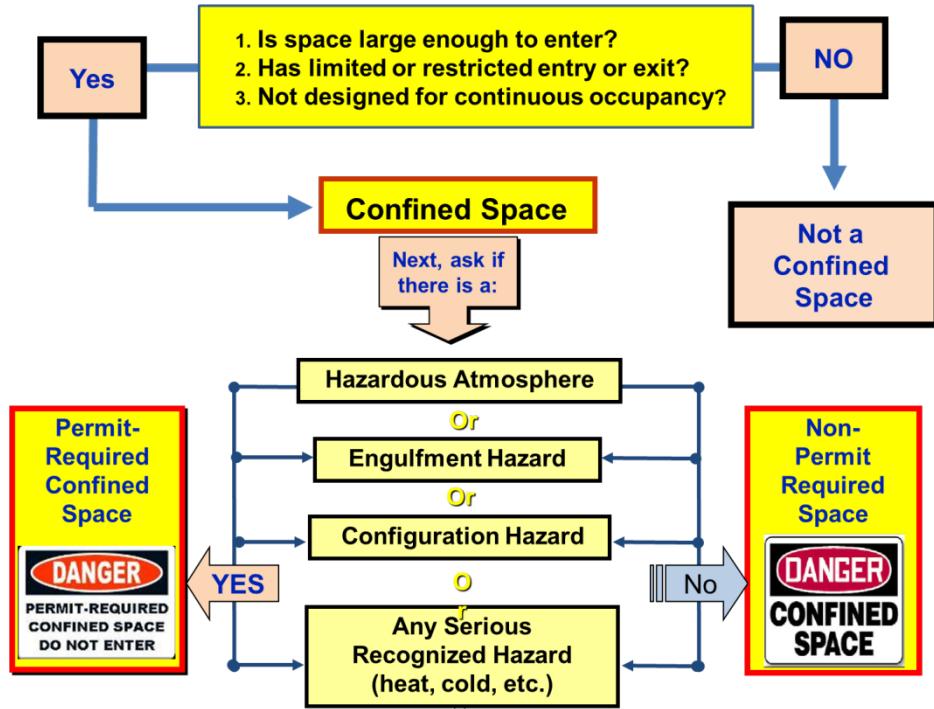
- Before you begin working at a worksite you must be informed by your competent person about confined spaces that you may be directed to work in or near. These spaces must be identified by specific hazards.
- If there are permit required confined spaces at your site they must possess signage or other means of prohibiting unauthorized entry the sign may say “DANGER -- PERMIT- REQUIRED CONFINED SPACE, DO NOT ENTER” or use other similar language.
- Remember the chemicals we us or the activities we perform in a space can introduce a new hazard that would make that space into a confined space or a permit required confined space. For example hot work, which is any task that produces a spark, arc, or any other ignition source such as molten metal.

- Permit required confined spaces possess or can possibly possess hazards that can immediately cause death or serious sickness or injury. We refer to such hazards as "IDLH's," which stands for "Immediate Danger of Life or Health."
- Entry into a confined or permit required confined space means any body part that breaks the plane or opening to the space. Reaching into a space with your hand or arm would constitute an entry.
- A Competent person means one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has the authorization to take prompt corrective measures to eliminate them. You MUST have a competent person at your site at all times.
- The Controlling Contractor is the employer that has overall responsibility for construction at the worksite. This is typically the General Contractor. If the controlling contractor owns or manages the property, then it is both a controlling employer and a host employer.
- The Host employer means the employer that owns or manages the property where you are working.
- A Hazardous atmosphere means an atmosphere that may expose employees to the risk of death, incapacitation, impairment, injury, or illness from such hazards as flammable gases, combustible dusts, atmospheric oxygen concentration below 19.5 percent or above 23.5 percent and concentrations of recognized toxic and hazardous substance or any other atmospheric condition that is immediately dangerous to life or health.

### **Confined Space Identification Flow Chart**

Here is a simple flow chart that can help you better understand how we classify confined and permit required confined spaces. If you have any questions please ask your competent person.

## Confined Space Identification Flow Chart



## **Appendix B: Subpart AA Confined Spaces in Construction**

- 1926.1200 Reserved
- 1926.1201 Scope
- 1926.1202 Definitions
- 1926.1203 General requirements
- 1926.1204 Permit-required confined space program
- 1926.1205 Permitting process
- 1926.1206 Entry permit
- 1926.1207 Training
- 1926.1208 Duties of authorized entrants
- 1926.1209 Duties of attendants
- 1926.1210 Duties of entry supervisors
- 1926.1211 Rescue and emergency services
- 1926.1212 Employee participation
- 1926.1213 Provision of documents to Secretary

§1926.1201 Scope.

(a) This Standard sets forth requirements for practices and procedures to protect employees engaged in construction activities at a worksite with one or more confined spaces, subject to the exceptions in paragraph (b) of this section.

Note to paragraph §1926.1201(a). Examples of locations where confined spaces may occur include, but are not limited to, the following: Bins; boilers; pits (such as elevator, escalator, pump, valve or other equipment); manholes (such as sewer, storm drain, electrical, communication, or other utility); tanks (such as fuel, chemical, water, or other liquid, solid or gas); incinerators; scrubbers; concrete pier columns; sewers; transformer vaults; heating, ventilation, and air-conditioning (HVAC) ducts; storm drains; water mains; precast concrete and other pre-formed manhole units; drilled shafts; enclosed beams; vessels; digesters; lift stations; cesspools; silos; air receivers; sludge gates; air preheaters; step up transformers; turbines; chillers; bag houses; and/or mixers/reactors.

(b) Exceptions. This Standard does not apply to: (1) Construction work regulated by §1926 subpart P—Excavations. (2) Construction work regulated by §1926 subpart S—Underground Construction, Caissons, Cofferdams and Compressed Air. (3) Construction work regulated by §1926 subpart Y—Diving.

(c) Where this Standard applies and there is a provision that addresses a confined space hazard in another applicable OSHA Standard, the employer must comply with both that requirement and the applicable provisions of this Standard.

#### §1926.1202 Definitions.

The following terms are defined for the purposes of this subpart only:

Acceptable entry conditions means the conditions that must exist in a permit space, before an employee may enter that space, to ensure that employees can safely enter into, and safely work within, the space.

Attendant means an individual stationed outside one or more permit spaces who assesses the status of authorized entrants and who must perform the duties specified in §1926.1209.

Authorized entrant means an employee who is authorized by the entry supervisor to enter a permit space.

Barrier means a physical obstruction that blocks or limits access.

Blanking or blinding means the absolute closure of a pipe, line, or duct by the fastening of a solid plate (such as a spectacle blind or a skillet blind) that completely covers the bore and that is capable of withstanding the maximum pressure of the pipe, line, or duct with no leakage beyond the plate.

Competent person means one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has the authorization to take prompt corrective measures to eliminate them.

Confined space means a space that:

- (1) Is large enough and so configured that an employee can bodily enter it;
- (2) Has limited or restricted means for entry and exit; and
- (3) Is not designed for continuous employee occupancy.

Control means the action taken to reduce the level of any hazard inside a confined space using engineering methods (for example, by ventilation), and then using these methods to maintain

the reduced hazard level. Control also refers to the engineering methods used for this purpose. Personal protective equipment is not a control.

Controlling Contractor is the employer that has overall responsibility for construction at the worksite.

Note. If the controlling contractor owns or manages the property, then it is both a controlling employer and a host employer.

Double block and bleed means the closure of a line, duct, or pipe by closing and locking or tagging two in-line valves and by opening and locking or tagging a drain or vent valve in the line between the two closed valves.

Early-warning system means the method used to alert authorized entrants and attendants that an engulfment hazard may be developing. Examples of early-warning systems include, but are not limited to: alarms activated by remote sensors; and lookouts with equipment for immediately communicating with the authorized entrants and attendants.

Emergency means any occurrence (including any failure of power, hazard control or monitoring equipment) or event, internal or external, to the permit space that could endanger entrants.

Engulfment means the surrounding and effective capture of a person by a liquid or finely divided (flowable) solid substance that can be aspirated to cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction, crushing, or suffocation.

Entry means the action by which any part of a person passes through an opening into a permit-required confined space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space, whether or not such action is intentional or any work activities are actually performed in the space.

Entry Employer means any employer who decides that an employee it directs will enter a permit space.

Note. An employer cannot avoid the duties of the Standard merely by refusing to decide whether its employees will enter a permit space, and OSHA will consider the failure to so decide to be an implicit decision to allow employees to enter those spaces if they are working in the proximity of the space.

Entry permit (permit) means the written or printed document that is provided by the employer who designated the space a permit space to allow and control entry into a permit space and that contains the information specified in §1926.1206 of this Standard.

Entry rescue occurs when a rescue service enters a permit space to rescue one or more employees.

Entry supervisor means the qualified person (such as the employer, foreman, or crew chief) responsible for determining if acceptable entry conditions are present at a permit space where entry is planned, for authorizing entry and overseeing entry operations, and for terminating entry as required by this Standard.

Note. An entry supervisor also may serve as an attendant or as an authorized entrant, as long as that person is trained and equipped as required by this Standard for each role he or she fills. Also, the duties of entry supervisor may be passed from one individual to another during the course of an entry operation.

Hazard means a physical hazard or hazardous atmosphere. See definitions below.

Hazardous atmosphere means an atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (that is, escape unaided from a permit space), injury, or acute illness from one or more of the following causes:

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

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

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

Note. An atmospheric concentration of any substance that is not capable of causing death, incapacitation, impairment of ability to self-rescue, injury, or acute illness due to its health effects is not covered by this definition.

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

Note. For air contaminants for which OSHA has not determined a dose or permissible exposure limit, other sources of information, such as Safety Data Sheets that comply with the Hazard

Communication Standard, §1926.59 of this part, published information, and internal documents can provide guidance in establishing acceptable atmospheric conditions.

Host employer means the employer that owns or manages the property where the construction work is taking place.

Note. If the owner of the property on which the construction activity occurs has contracted with an entity for the general management of that property, and has transferred to that entity the information specified in §1203(h)(1), OSHA will treat the contracted management entity as the host employer for as long as that entity manages the property. Otherwise, OSHA will treat the owner of the property as the host employer. In no case will there be more than one host employer.

Hot work means operations capable of providing a source of ignition (for example, riveting, welding, cutting, burning, and heating).

Immediately dangerous to life or health (IDLH) means any condition that would interfere with an individual's ability to escape unaided from a permit space and that poses a threat to life or that would cause irreversible adverse health effects.

Note. Some materials—hydrogen fluoride gas and cadmium vapor, for example—may produce immediate transient effects that, even if severe, may pass without medical attention, but are followed by sudden, possibly fatal collapse 12-72 hours after exposure. The victim "feels normal" after recovery from transient effects until collapse. Such materials in hazardous quantities are considered to be "immediately" dangerous to life or health.

Inerting means displacing the atmosphere in a permit space by a noncombustible gas (such as nitrogen) to such an extent that the resulting atmosphere is noncombustible.

Note. This procedure produces an IDLH oxygen-deficient atmosphere.

Isolate or isolation means the process by which employees in a confined space are completely protected against the release of energy and material into the space, and contact with a physical hazard, by such means as: blanking or blinding; misaligning or removing sections of lines, pipes, or ducts; a double block and bleed system; lockout or tagout of all sources of energy; blocking or disconnecting all mechanical linkages; or placement of barriers to eliminate the potential for employee contact with a physical hazard.

Limited or restricted means for entry or exit means a condition that has a potential to impede an employee's movement into or out of a confined space. Such conditions include, but are not limited to, trip hazards, poor illumination, slippery floors, inclining surfaces and ladders.

Line breaking means the intentional opening of a pipe, line, or duct that is or has been carrying flammable, corrosive, or toxic material, an inert gas, or any fluid at a volume, pressure, or temperature capable of causing injury.

Lockout means the placement of a lockout device on an energy isolating device, in accordance with an established procedure, ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

Lower \_ flammable limit or lower explosive limit means the minimum concentration of a substance in air needed for an ignition source to cause a flame or explosion.

Monitor or monitoring means the process used to identify and evaluate the hazards after an authorized entrant enters the space. This is a process of checking for changes that is performed in a periodic or continuous manner after the completion of the initial testing or evaluation of that space.

Non-entry rescue occurs when a rescue service, usually the attendant, retrieves employees in a permit space without entering the permit space.

Non-permit confined space means a confined space that meets the definition of a confined space but does not meet the requirements for a permit-required confined space, as defined in this subpart.

Oxygen deficient atmosphere means an atmosphere containing less than 19.5 percent oxygen by volume.

Oxygen enriched atmosphere means an atmosphere containing more than 23.5 percent oxygen by volume.

Permit-required confined space (permit space) means a confined space that has one or more of the following characteristics: (1) Contains or has a potential to contain a hazardous atmosphere; (2) Contains a material that has the potential for engulfing an entrant; (3) Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or (4) Contains any other recognized serious safety or health hazard.

Permit-required confined space program (permit space program) means the employer's overall program for controlling, and, where appropriate, for protecting employees from, permit space hazards and for regulating employee entry into permit spaces.

Physical hazard means an existing or potential hazard that can cause death or serious physical damage. Examples include, but are not limited to: explosives (as defined by paragraph (n) of §1926.914, definition of "explosive"); mechanical, electrical, hydraulic and pneumatic energy; radiation; temperature extremes; engulfment; noise; and inwardly converging surfaces.

Physical hazard also includes chemicals that can cause death or serious physical damage through skin or eye contact (rather than through inhalation).

Prohibited condition means any condition in a permit space that is not allowed by the permit during the period when entry is authorized. A hazardous atmosphere is a prohibited condition unless the employer can demonstrate that personal protective equipment (PPE) will provide effective protection for each employee in the permit space and provides the appropriate PPE to each employee.

Qualified person means one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his ability to solve or resolve problems relating to the subject matter, the work, or the project.

Representative \_permit space means a mock-up of a confined space that has entrance openings that are similar to, and is of similar size, configuration, and accessibility to, the permit space that authorized entrants enter.

Rescue means retrieving, and providing medical assistance to, one or more employees who are in a permit space.

Rescue service means the personnel designated to rescue employees from permit spaces.

Retrieval system means the equipment (including a retrieval line, chest or full body harness, wristlets or anklets, if appropriate, and a lifting device or anchor) used for non-entry rescue of persons from permit spaces.

Serious physical damage means an impairment or illness in which a body part is made functionally useless or is substantially reduced in efficiency. Such impairment or illness may be permanent or temporary and includes, but is not limited to, loss of consciousness, disorientation, or other immediate and substantial reduction in mental efficiency. Injuries involving such impairment would usually require treatment by a physician or other licensed health-care professional.

Tagout means:(1) Placement of a tagout device on a circuit or equipment that has been deenergized, in accordance with an established procedure, to indicate that the circuit or equipment being controlled may not be operated until the tagout device is removed; and (2) The employer ensures that (i) tagout provides equivalent protection to lockout, or (ii) that lockout is infeasible and the employer has relieved, disconnected, restrained and otherwise rendered safe stored (residual) energy.

Test or testing means the process by which the hazards that may confront entrants of a permit space are identified and evaluated. Testing includes specifying the tests that are to be performed in the permit space.

Note. Testing enables employers both to devise and implement adequate control measures for the protection of authorized entrants and to determine if acceptable entry conditions are present immediately prior to, and during, entry.

Ventilate or ventilation means controlling a hazardous atmosphere using continuous forced-air mechanical systems that meet the requirements of §1926.57—Ventilation.

§1926.1203 General requirements.

(a) Before it begins work at a worksite, each employer must ensure that a competent person identifies all confined spaces in which one or more of the employees it directs may work, and identifies each space that is a permit space, through consideration and evaluation of the elements of that space, including testing as necessary.

(b) If the workplace contains one or more permit spaces, the employer who identifies, or who receives notice of, a permit space must:

(1) Inform exposed employees by posting danger signs or by any other equally effective means, of the existence and location of, and the danger posed by, each permit space; and

Note to paragraph §1926.1203(b)(1). A sign reading “DANGER -- PERMIT- REQUIRED CONFINED SPACE, DO NOT ENTER” or using other similar language would satisfy the requirement for a sign.

(2) Inform, in a timely manner and in a manner other than posting, its employees' authorized representatives and the controlling contractor of the existence and location of, and the danger posed by, each permit space.

(c) Each employer who identifies, or receives notice of, a permit space and has not authorized employees it directs to work in that space must take effective measures to prevent those employees from entering that permit space, in addition to complying with all other applicable requirements of this Standard.

(d) If any employer decides that employees it directs will enter a permit space, that employer must have a written permit space program that complies with §1926.1204 implemented at the construction site. The written program must be made available prior to and during entry operations for inspection by employees and their authorized representatives.

(e) An employer may use the alternate procedures specified in paragraph §1926.1203(e)(2) for entering a permit space only under the conditions set forth in paragraph §1926.1203(e)(1).

(1) An employer whose employees enter a permit space need not comply with §§1926.1204 through 1206 and §§1926.1208 through 1211, provided that all of the following conditions are met:

- (i) The employer can demonstrate that all physical hazards in the space are eliminated or isolated through engineering controls so that the only hazard posed by the permit space is an actual or potential hazardous atmosphere;
- (ii) The employer can demonstrate that continuous forced air ventilation alone is sufficient to maintain that permit space safe for entry, and that, in the event the ventilation system stops working, entrants can exit the space safely;
- (iii) The employer develops monitoring and inspection data that supports the demonstrations required by paragraphs §1926.1203(e)(1)(i) and §1926.1203(e)(1)(ii);
- (iv) If an initial entry of the permit space is necessary to obtain the data required by paragraph §1926.1203(e)(1)(iii), the entry is performed in compliance with §§1926.1204 through 1211 of this Standard;
- (v) The determinations and supporting data required by paragraphs §1926.1203(e)(1)(i), (e)(1)(ii), and (e)(1)(iii) are documented by the employer and are made available to each employee who enters the permit space under the terms of paragraph §1926.1203(e) or to that employee's authorized representative; and
- (vi) Entry into the permit space under the terms of paragraph §1926.1203(e)(1) is performed in accordance with the requirements of paragraph §1926.1203(e)(2).

Note to paragraph §1926.1203(e)(1). See paragraph §1926.1203(g) for reclassification of a permit space after all hazards within the space have been eliminated.

- (2) The following requirements apply to entry into permit spaces that meet the conditions set forth in paragraph §1926.1203(e)(1):
  - (i) Any conditions making it unsafe to remove an entrance cover must be eliminated before the cover is removed.
  - (ii) When entrance covers are removed, the opening must be immediately guarded by a railing, temporary cover, or other temporary barrier that will prevent an accidental fall through the opening and that will protect each employee working in the space from foreign objects entering the space.
  - (iii) Before an employee enters the space, the internal atmosphere must be tested, with a calibrated direct-reading instrument, for oxygen content, for flammable gases and vapors, and for potential toxic air contaminants, in that order. Any employee who enters the space, or that employee's authorized representative, must be provided an opportunity to observe the pre-entry testing required by this paragraph.

- (iv) No hazardous atmosphere is permitted within the space whenever any employee is inside the space.
- (v) Continuous forced air ventilation must be used, as follows:
  - (A) An employee must not enter the space until the forced air ventilation has eliminated any hazardous atmosphere;
  - (B) The forced air ventilation must be so directed as to ventilate the immediate areas where an employee is or will be present within the space and must continue until all employees have left the space;
  - (C) The air supply for the forced air ventilation must be from a clean source and must not increase the hazards in the space.
- (vi) The atmosphere within the space must be continuously monitored unless the entry employer can demonstrate that equipment for continuous monitoring is not commercially available or periodic monitoring is sufficient. If continuous monitoring is used, the employer must ensure that the monitoring equipment has an alarm that will notify all entrants if a specified atmospheric threshold is achieved, or that an employee will check the monitor with sufficient frequency to ensure that entrants have adequate time to escape. If continuous monitoring is not used, periodic monitoring is required. All monitoring must ensure that the continuous forced air ventilation is preventing the accumulation of a hazardous atmosphere. Any employee who enters the space, or that employee's authorized representative, must be provided with an opportunity to observe the testing required by this paragraph.
- (vii) If a hazard is detected during entry:
  - (A) Each employee must leave the space immediately;
  - (B) The space must be evaluated to determine how the hazard developed; and
  - (C) The employer must implement measures to protect employees from the hazard before any subsequent entry takes place.
- (viii) The employer must ensure a safe method of entering and exiting the space. If a hoisting system is used, it must be designed and manufactured for personnel hoisting; however, a job-made hoisting system is permissible if it is approved for personnel hoisting by a registered professional engineer, in writing, prior to use.
- (ix) The employer must verify that the space is safe for entry and that the pre-entry measures required by paragraph §1926.1203(e)(2) have been taken, through a written certification that contains the date, the location of the space, and the signature of the person

providing the certification. The certification must be made before entry and must be made available to each employee entering the space or to that employee's authorized representative.

(f) When there are changes in the use or configuration of a non-permit confined space that might increase the hazards to entrants, or some indication that the initial evaluation of the space may not have been adequate, each entry employer must have a competent person reevaluate that space and, if necessary, reclassify it as a permit- required confined space.

(g) A space classified by an employer as a permit-required confined space may only be reclassified as a non-permit confined space when a competent person determines that all of the applicable requirements in paragraphs §1926.1203(g)(1) through (g)(4) have been met:

(1) If the permit space poses no actual or potential atmospheric hazards and if all hazards within the space are eliminated or isolated without entry into the space (unless the employer can demonstrate that doing so without entry is infeasible), the permit space may be reclassified as a non-permit confined space for as long as the non-atmospheric hazards remain eliminated or isolated;

(2) The entry employer must eliminate or isolate the hazards without entering the space, unless it can demonstrate that this is infeasible. If it is necessary to enter the permit space to eliminate or isolate hazards, such entry must be performed under §§1926.1204 through 1211 of this Standard. If testing and inspection during that entry demonstrate that the hazards within the permit space have been eliminated or isolated, the permit space may be reclassified as a non-permit confined space for as long as the hazards remain eliminated or isolated;

Note to paragraph §1926.1203(g)(2). Control of atmospheric hazards through forced air ventilation does not constitute elimination or isolation of the hazards. Paragraph §1926.1203(e) covers permit space entry where the employer can demonstrate that forced air ventilation alone will control all hazards in the space.

(3) The entry employer must document the basis for determining that all hazards in a permit space have been eliminated or isolated, through a certification that contains the date, the location of the space, and the signature of the person making the determination. The certification must be made available to each employee entering the space or to that employee's authorized representative; and

(4) If hazards arise within a permit space that has been reclassified as a non-permit space under paragraph §1926.1203(g), each employee in the space must exit the space. The entry employer must then reevaluate the space and reclassify it as a permit space as appropriate in accordance with all other applicable provisions of this Standard.

(h) Permit Space Entry Communication and Coordination:

- (1) Before entry operations begin, the host employer must provide the following information, if it has it, to the controlling contractor:
- (i) The location of each known permit space;
  - (ii) The hazards or potential hazards in each space or the reason it is a permit space; and
  - (iii) Any precautions that the host employer or any previous controlling contractor or entry employer implemented for the protection of employees in the permit space.
- (2) Before entry operations begin, the controlling contractor must:
- (i) Obtain the host employer's information about the permit space hazards and previous entry operations; and
  - (ii) Provide the following information to each entity entering a permit space and any other entity at the worksite whose activities could foreseeably result in a hazard in the permit space:
    - (A) The information received from the host employer;
    - (B) Any additional information the controlling contractor has about the subjects listed in paragraph (h)(1) of this section; and
    - (C) The precautions that the host employer, controlling contractor, or other entry employers implemented for the protection of employees in the permit spaces.
- (3) Before entry operations begin, each entry employer must:
- (i) Obtain all of the controlling contractor's information regarding permit space hazards and entry operations; and
  - (ii) Inform the controlling contractor of the permit space program that the entry employer will follow, including any hazards likely to be confronted or created in each permit space.
- (4) The controlling contractor and entry employer(s) must coordinate entry operations when:
- (i) More than one entity performs permit space entry at the same time; or
  - (ii) Permit space entry is performed at the same time that any activities that could foreseeably result in a hazard in the permit space are performed.
- (5) After entry operations:
- (i) The controlling contractor must debrief each entity that entered a permit space regarding the permit space program followed and any hazards confronted or created in the permit space(s) during entry operations;

(ii) The entry employer must inform the controlling contractor in a timely manner of the permit space program followed and of any hazards confronted or created in the permit space(s) during entry operations; and

(iii) The controlling contractor must apprise the host employer of the information exchanged with the entry entities pursuant to this subparagraph.

Note to paragraph §1926.1203(h). Unless a host employer or controlling contractor has or will have employees in a confined space, it is not required to enter any confined space to collect the information specified in this paragraph (h).

(iv) If there is no controlling contractor present at the worksite, the requirements for, and role of, controlling contractors in §1926.1203 must be fulfilled by the host employer or other employer who arranges to have employees of another employer perform work that involves permit space entry.

#### §1926.1204 Permit-Required Confined Space Program.

Each entry employer must:

- (a) Implement the measures necessary to prevent unauthorized entry;
- (b) Identify and evaluate the hazards of permit spaces before employees enter them;
- (c) Develop and implement the means, procedures, and practices necessary for safe permit space entry operations, including, but not limited to, the following:
  - (1) Specifying acceptable entry conditions;
  - (2) Providing each authorized entrant or that employee's authorized representative with the opportunity to observe any monitoring or testing of permit spaces;
  - (3) Isolating the permit space and physical hazard(s) within the space;
  - (4) Purgung, inerting, flushing, or ventilating the permit space as necessary to eliminate or control atmospheric hazards;

Note to paragraph §1204(c)(4). When an employer is unable to reduce the atmosphere below 10 percent LFL, the employer may only enter if the employer inert the space so as to render the entire atmosphere in the space noncombustible, and the employees use PPE to address any other atmospheric hazards (such as oxygen deficiency), and the employer eliminates or isolates all physical hazards in the space.

- (5) Determining that, in the event the ventilation system stops working, the monitoring procedures will detect an increase in atmospheric hazard levels in sufficient time for the entrants to safely exit the permit space;
  - (6) Providing pedestrian, vehicle, or other barriers as necessary to protect entrants from external hazards;
  - (7) Verifying that conditions in the permit space are acceptable for entry throughout the duration of an authorized entry, and ensuring that employees are not allowed to enter into, or remain in, a permit space with a hazardous atmosphere unless the employer can demonstrate that personal protective equipment (PPE) will provide effective protection for each employee in the permit space and provides the appropriate PPE to each employee; and
  - (8) Eliminating any conditions (for example, high pressure) that could make it unsafe to remove an entrance cover.
- (d) Provide the following equipment (specified in paragraphs §1926.1204(d)(1) through (d)(9)) at no cost to each employee, maintain that equipment properly, and ensure that each employee uses that equipment properly:

- (1) Testing and monitoring equipment needed to comply with paragraph §1926.1204(e);
- (2) Ventilating equipment needed to obtain acceptable entry conditions;
- (3) Communications equipment necessary for compliance with paragraphs §1926.1208(c) and §1926.1209(e), including any necessary electronic communication equipment for attendants assessing entrants' status in multiple spaces;
- (4) Personal protective equipment insofar as feasible engineering and work-practice controls do not adequately protect employees;

Note to paragraph §1926.1204(d)(4). The requirements of subpart E of this part and other PPE requirements continue to apply to the use of PPE in a permit space. For example, if employees use respirators, then the respirator requirements in §1926.103 (Respiratory protection) must be met.

- (5) Lighting equipment that meets the minimum illumination requirements in §1926.56, that is approved for the ignitable or combustible properties of the specific gas, vapor, dust, or fiber that will be present, and that is sufficient to enable employees to see well enough to work safely and to exit the space quickly in an emergency;
- (6) Barriers and shields as required by paragraph §1926.1204(c)(4);
- (7) Equipment, such as ladders, needed for safe ingress and egress by authorized entrants;

- (8) Rescue and emergency equipment needed to comply with paragraph §1926.1204(i), except to the extent that the equipment is provided by rescue services; and
- (9) Any other equipment necessary for safe entry into, safe exit from, and rescue from, permit spaces.
- (e) Evaluate permit space conditions in accordance with the following paragraphs (e)(1) through (6) of this section when entry operations are conducted:
- (1) Test conditions in the permit space to determine if acceptable entry conditions exist before changes to the space's natural ventilation are made, and before entry is authorized to begin, except that, if an employer demonstrates that isolation of the space is infeasible because the space is large or is part of a continuous system (such as a sewer), the employer must:
- (i) Perform pre-entry testing to the extent feasible before entry is authorized; and,
- (ii) If entry is authorized, continuously monitor entry conditions in the areas where authorized entrants are working, except that employers may use periodic monitoring in accordance with paragraph §1926.1204(e)(2) for monitoring an atmospheric hazard if they can demonstrate that equipment for continuously monitoring that hazard is not commercially available;
- (iii) Provide an early-warning system that continuously monitors for non-isolated engulfment hazards. The system must alert authorized entrants and attendants in sufficient time for the authorized entrants to safely exit the space.
- (2) Continuously monitor atmospheric hazards unless the employer can demonstrate that the equipment for continuously monitoring a hazard is not commercially available or that periodic monitoring is of sufficient frequency to ensure that the atmospheric hazard is being controlled at safe levels. If continuous monitoring is not used, periodic monitoring is required with sufficient frequency to ensure that acceptable entry conditions are being maintained during the course of entry operations;
- (3) When testing for atmospheric hazards, test first for oxygen, then for combustible gases and vapors, and then for toxic gases and vapors;
- (4) Provide each authorized entrant or that employee's authorized representative an opportunity to observe the pre-entry and any subsequent testing or monitoring of permit spaces;
- (5) Reevaluate the permit space in the presence of any authorized entrant or that employee's authorized representative who requests that the employer conduct such reevaluation because there is some indication that the evaluation of that space may not have been adequate; and

- (6) Immediately provide each authorized entrant or that employee's authorized representative with the results of any testing conducted in accordance with §1926.1204 of this Standard.
- (f) Provide at least one attendant outside the permit space into which entry is authorized for the duration of entry operations;
- (1) Attendants may be assigned to more than one permit space provided the duties described in §1926.1209 of this Standard can be effectively performed for each permit space.
- (2) Attendants may be stationed at any location outside the permit space as long as the duties described in §1926.1209 of this Standard can be effectively performed for each permit space to which the attendant is assigned.
- (g) If multiple spaces are to be assigned to a single attendant, include in the permit program the means and procedures to enable the attendant to respond to an emergency affecting one or more of those permit spaces without distraction from the attendant's responsibilities under §1926.1209 of this Standard;
- (h) Designate each person who is to have an active role (as, for example, authorized entrants, attendants, entry supervisors, or persons who test or monitor the atmosphere in a permit space) in entry operations, identify the duties of each such employee, and provide each such employee with the training required by §1926.1207 of this Standard;
- (i) Develop and implement procedures for summoning rescue and emergency services (including procedures for summoning emergency assistance in the event of a failed non-entry rescue), for rescuing entrants from permit spaces, for providing necessary emergency services to rescued employees, and for preventing unauthorized personnel from attempting a rescue;
- (j) Develop and implement a system for the preparation, issuance, use, and cancellation of entry permits as required by this Standard, including the safe termination of entry operations under both planned and emergency conditions;
- (k) Develop and implement procedures to coordinate entry operations, in consultation with the controlling contractor, when employees of more than one employer are working simultaneously in a permit space or elsewhere on the worksite where their activities could, either alone or in conjunction with the activities within a permit space, foreseeably result in a hazard within the confined space, so that employees of one employer do not endanger the employees of any other employer;
- (l) Develop and implement procedures (such as closing off a permit space and canceling the permit) necessary for concluding the entry after entry operations have been completed;

(m) Review entry operations when the measures taken under the permit space program may not protect employees and revise the program to correct deficiencies found to exist before subsequent entries are authorized; and the occurrence of an injury or near-miss during entry, a change in the use or configuration of a permit space, and employee complaints about the effectiveness of the program.

(n) Review the permit space program, using the canceled permits retained under paragraph §1926.1205(f), within 1 year after each entry and revise the program as necessary to ensure that employees participating in entry operations are protected from permit space hazards.

Note to paragraph §1926.1204(m). Examples of circumstances requiring the review of the permit space program include, but are not limited to: any unauthorized entry of a permit space, the detection of a permit space hazard not covered by the permit, the detection of a condition prohibited by the permit,

Note to paragraph §1926.1204(n). Employers may perform a single annual review covering all entries performed during a 12-month period. If no entry is performed during a 12-month period, no review is necessary.

#### §1926.1205 Permitting Process.

(a) Before entry is authorized, each entry employer must document the completion of measures required by paragraph §1926.1204(c) of this Standard by preparing an entry permit.

(b) Before entry begins, the entry supervisor identified on the permit must sign the entry permit to authorize entry.

(c) The completed permit must be made available at the time of entry to all authorized entrants or their authorized representatives, by posting it at the entry portal or by any other equally effective means, so that the entrants can confirm that pre-entry preparations have been completed.

(d) The duration of the permit may not exceed the time required to complete the assigned task or job identified on the permit in accordance with paragraph §1926.1206(b) of this Standard.

(e) The entry supervisor must terminate entry and take the following action when any of the following apply:

(1) Cancel the entry permit when the entry operations covered by the entry permit have been completed; or

(2) Suspend or cancel the entry permit and fully reassess the space before allowing reentry when a condition that is not allowed under the entry permit arises in or near the permit space

and that condition is temporary in nature and does not change the configuration of the space or create any new hazards within it; and

(3) Cancel the entry permit when a condition that is not allowed under the entry permit arises in or near the permit space and that condition is not covered by subparagraph (e)(2) of this section.

(f) The entry employer must retain each canceled entry permit for at least 1 year to facilitate the review of the permit-required confined space program required by paragraph §1926.1204(n) of this Standard. Any problems encountered during an entry operation must be noted on the pertinent permit so that appropriate revisions to the permit space program can be made.

#### §1926.1206 Entry permit.

The entry permit that documents compliance with this section and authorizes entry to a permit space must identify:

- (a) The permit space to be entered;
- (b) The purpose of the entry;
- (c) The date and the authorized duration of the entry permit;
- (d) The authorized entrants within the permit space, by name or by such other means (for example, through the use of rosters or tracking systems) as will enable the attendant to determine quickly and accurately, for the duration of the permit, which authorized entrants are inside the permit space;

Note to paragraph §1926.1206(d). This requirement may be met by inserting a reference on the entry permit as to the means used, such as a roster or tracking system, to keep track of the authorized entrants within the permit space.

- (e) Means of detecting an increase in atmospheric hazard levels in the event the ventilation system stops working;
- (f) Each person, by name, currently serving as an attendant;
- (g) The individual, by name, currently serving as entry supervisor, and the signature or initials of each entry supervisor who authorizes entry;
- (h) The hazards of the permit space to be entered;
- (i) The measures used to isolate the permit space and to eliminate or control permit space hazards before entry;

Note to paragraph §1926.1206(i). Those measures can include, but are not limited to, the lockout or tagging of equipment and procedures for purging, inerting, ventilating, and flushing permit spaces.

- (j) The acceptable entry conditions;
- (k) The results of tests and monitoring performed under paragraph §1926.1204(e) of this Standard, accompanied by the names or initials of the testers and by an indication of when the tests were performed;
- (l) The rescue and emergency services that can be summoned and the means (such as the equipment to use and the numbers to call) for summoning those services;
- (m) The communication procedures used by authorized entrants and attendants to maintain contact during the entry;
  
- (n) Equipment, such as personal protective equipment, testing equipment, communications equipment, alarm systems, and rescue equipment, to be provided for compliance with this Standard;
- (o) Any other information necessary, given the circumstances of the particular confined space, to ensure employee safety; and
- (p) Any additional permits, such as for hot work, that have been issued to authorize work in the permit space.

#### §1926.1207 Training.

- (a) The employer must provide training to each employee whose work is regulated by this Standard, at no cost to the employee, and ensure that the employee possesses the understanding, knowledge, and skills necessary for the safe performance of the duties assigned under this Standard. This training must result in an understanding of the hazards in the permit space and the methods used to isolate, control or in other ways protect employees from these hazards, and for those employees not authorized to perform entry rescues, in the dangers of attempting such rescues.
- (b) Training required by this section must be provided to each affected employee:
  - (1) In both a language and vocabulary that the employee can understand;
  - (2) Before the employee is first assigned duties under this Standard;
  - (3) Before there is a change in assigned duties;

- (4) Whenever there is a change in permit space entry operations that presents a hazard about which an employee has not previously been trained; and
  - (5) Whenever there is any evidence of a deviation from the permit space entry procedures required by paragraph §1926.1204(c) of this Standard or there are inadequacies in the employee's knowledge or use of these procedures.
- (c) The training must establish employee proficiency in the duties required by this Standard and must introduce new or revised procedures, as necessary, for compliance with this Standard.
  - (d) The employer must maintain training records to show that the training required by paragraphs §1926.1207(a) through (c) of this Standard has been accomplished. The training records must contain each employee's name, the name of the trainers, and the dates of training. The documentation must be available for inspection by employees and their authorized representatives, for the period of time the employee is employed by that employer.

#### §1926.1208 Duties of authorized entrants.

The entry employer must ensure that all authorized entrants:

- (a) Are familiar with and understand the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;
- (b) Properly use equipment as required by paragraph §1926.1204(d) of this Standard;
- (c) Communicate with the attendant as necessary to enable the attendant to assess entrant status and to enable the attendant to alert entrants of the need to evacuate the space as required by paragraph §1926.1209(f) of this Standard;
- (d) Alert the attendant whenever:
  - (1) There is any warning sign or symptom of exposure to a dangerous situation; or
  - (2) The entrant detects a prohibited condition; and
- (e) Exit from the permit space as quickly as possible whenever:
  - (1) An order to evacuate is given by the attendant or the entry supervisor;
  - (2) There is any warning sign or symptom of exposure to a dangerous situation;
  - (3) The entrant detects a prohibited condition; or
  - (4) An evacuation alarm is activated.

#### §1926.1209 Duties of attendants.

The entry employer must ensure that each attendant:

- (a) Is familiar with and understands the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;
- (b) Is aware of possible behavioral effects of hazard exposure in authorized entrants;
- (c) Continuously maintains an accurate count of authorized entrants in the permit space and ensures that the means used to identify authorized entrants under paragraph 1926.1206(d) of this Standard accurately identifies who is in the permit space;
- (d) Remains outside the permit space during entry operations until relieved by another attendant;

Note to paragraph §1926.1209(d). Once an attendant has been relieved by another attendant, the relieved attendant may enter a permit space to attempt a rescue when the employer's permit space program allows attendant entry for rescue and the attendant has been trained and equipped for rescue operations as required by paragraph §1926.1211(a).

- (e) Communicates with authorized entrants as necessary to assess entrant status and to alert entrants of the need to evacuate the space under paragraph §1926.1208(e);
- (f) Assesses activities and conditions inside and outside the space to determine if it is safe for entrants to remain in the space and orders the authorized entrants to evacuate the permit space immediately under any of the following conditions:
  - (1) If there is a prohibited condition;
  - (2) If the behavioral effects of hazard exposure are apparent in an authorized entrant;
  - (3) If there is a situation outside the space that could endanger the authorized entrants; or
  - (4) If the attendant cannot effectively and safely perform all the duties required under §1926.1209 of this Standard;
- (g) Summons rescue and other emergency services as soon as the attendant determines that authorized entrants may need assistance to escape from permit space hazards;
- (h) Takes the following actions when unauthorized persons approach or enter a permit space while entry is underway:
  - (1) Warns the unauthorized persons that they must stay away from the permit space;
  - (2) Advises the unauthorized persons that they must exit immediately if they have entered the permit space; and

- (3) Informs the authorized entrants and the entry supervisor if unauthorized persons have entered the permit space;
- (i) Performs non-entry rescues as specified by the employer's rescue procedure; and
- (j) Performs no duties that might interfere with the attendant's primary duty to assess and protect the authorized entrants.

#### §1926.1210 Duties of entry supervisors.

The entry employer must ensure that each entry supervisor:

- (a) Is familiar with and understands the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;
- (b) Verifies, by checking that the appropriate entries have been made on the permit, that all tests specified by the permit have been conducted and that all procedures and equipment specified by the permit are in place before endorsing the permit and allowing entry to begin;
- (c) Terminates the entry and cancels or suspends the permit as required by paragraph 1926.1205(e) of this Standard;
- (d) Verifies that rescue services are available and that the means for summoning them are operable, and that the employer will be notified as soon as the services become unavailable;
- (e) Removes unauthorized individuals who enter or who attempt to enter the permit space during entry operations; and
- (f) Determines, whenever responsibility for a permit space entry operation is transferred, and at intervals dictated by the hazards and operations performed within the space, that entry operations remain consistent with terms of the entry permit and that acceptable entry conditions are maintained.

#### §1926.1211 Rescue and emergency services.

- (a) An employer who designates rescue and emergency services, pursuant to paragraph §1926.1204(i) of this Standard, must:
  - (1) Evaluate a prospective rescuer's ability to respond to a rescue summons in a timely manner, considering the hazard(s) identified;

Note to paragraph §1926.1211(a)(1). What will be considered timely will vary according to the specific hazards involved in each entry. For example,

§1926.103—Respiratory Protection requires that employers provide a standby person or persons capable of immediate action to rescue employee(s) wearing respiratory protection while in work areas defined as IDLH atmospheres.

- (2) Evaluate a prospective rescue service's ability, in terms of proficiency with rescue-related tasks and equipment, to function appropriately while rescuing entrants from the particular permit space or types of permit spaces identified;
  - (3) Select a rescue team or service from those evaluated that:
    - (i) Has the capability to reach the victim(s) within a time frame that is appropriate for the permit space hazard(s) identified;
    - (ii) Is equipped for, and proficient in, performing the needed rescue services;
    - (iii) Agrees to notify the employer immediately in the event that the rescue service becomes unavailable;
  - (4) Inform each rescue team or service of the hazards they may confront when called on to perform rescue at the site; and
  - (5) Provide the rescue team or service selected with access to all permit spaces from which rescue may be necessary so that the rescue team or service can develop appropriate rescue plans and practice rescue operations.
- (b) An employer whose employees have been designated to provide permit space rescue and/or emergency services must take the following measures and provide all equipment and training at no cost to those employees:
- (1) Provide each affected employee with the personal protective equipment (PPE) needed to conduct permit space rescues safely and train each affected employee so the employee is proficient in the use of that PPE;
  - (2) Train each affected employee to perform assigned rescue duties. The employer must ensure that such employees successfully complete the training required and establish proficiency as authorized entrants, as provided by §§1926.1207 and 1926.1208 of this Standard;
  - (3) Train each affected employee in basic first aid and cardiopulmonary resuscitation (CPR). The employer must ensure that at least one member of the rescue team or service holding a current certification in basic first aid and CPR is available; and
  - (4) Ensure that affected employees practice making permit space rescues before attempting an actual rescue, and at least once every 12 months, by means of simulated rescue operations in which they remove dummies, manikins, or actual persons from the actual permit

spaces or from representative permit spaces, except practice rescue is not required where the affected employees properly performed a rescue operation during the last 12 months in the same permit space the authorized entrant will enter, or in a similar permit space.

Representative permit spaces must, with respect to opening size, configuration, and accessibility, simulate the types of permit spaces from which rescue is to be performed.

(c) Non-entry rescue is required unless the retrieval equipment would increase the overall risk of entry or would not contribute to the rescue of the entrant. The employer must designate an entry rescue service whenever non-entry rescue is not selected. Whenever non-entry rescue is selected, the entry employer must ensure that retrieval systems or methods are used whenever an authorized entrant enters a permit space, and must confirm, prior to entry, that emergency assistance would be available in the event that non-entry rescue fails. Retrieval systems must meet the following requirements:

(1) Each authorized entrant must use a chest or full body harness, with a retrieval line attached at the center of the entrant's back near shoulder level, above the entrant's head, or at another point which the employer can establish presents a profile small enough for the successful removal of the entrant. Wristlets or anklets may be used in lieu of the chest or full body harness if the employer can demonstrate that the use of a chest or full body harness is infeasible or creates a greater hazard and that the use of wristlets or anklets is the safest and most effective alternative.

(2) The other end of the retrieval line must be attached to a mechanical device or fixed point outside the permit space in such a manner that rescue can begin as soon as the rescuer becomes aware that rescue is necessary. A mechanical device must be available to retrieve personnel from vertical type permit spaces more than 5 feet (1.52 meters) deep.

(3) Equipment that is unsuitable for retrieval must not be used, including, but not limited to, retrieval lines that have a reasonable probability of becoming entangled with the retrieval lines used by other authorized entrants, or retrieval lines that will not work due to the internal configuration of the permit space.

(d) If an injured entrant is exposed to a substance for which a Safety Data Sheet (SDS) or other similar written information is required to be kept at the worksite, that SDS or written information must be made available to the medical facility treating the exposed entrant.

#### §1926.1212 Employee participation.

(a) Employers must consult with affected employees and their authorized representatives on the development and implementation of all aspects of the permit space program required by §1926.1203 of this Standard.

(b) Employers must make available to each affected employee and his/her authorized representatives all information required to be developed by this Standard.

§1926.1213 Provision of documents to Secretary.

For each document required to be retained in this Standard, the retaining employer must make the document available on request to the Secretary of Labor or the Secretary's designee.

**Appendix C: Sample Confined Space Entry Permit Template Sections**

**Job Hazard Analysis**

Task	Hazard	Control	Means of Implementation

## CONFINED SPACE ENTRY PERMIT

<b>Date:</b>		
<b>Site location or description:</b>		
<b>Host Employer Information:</b>		
Contact Person	Phone	Email Address
<b>Controlling Contractor Information:</b>		
Competent Person	Phone	Email Address
<b>Entry Contractor Information:</b>		
Supervisor	Phone	Email Address
Attendant	Phone	Email Address
Entrant	Phone	Email Address
<b>Rescue Team Information:</b>		
Team Leader	Phone	Email Address

<b>Other Associated Entities (i.e. other contractors, facility security, vendors etc.)</b>		
Name and Association	Phone	Email Address

<b>Communication and Coordination Checklist</b>		<b>Yes</b>	<b>No</b>
1.	Has the host provided controlling contractor the location of the PRCS?		
2.	Has the host provided controlling contractor with the specific nature of the hazard(s) within the PRCS?		
3.	Has the host employer provided controlling contractor with precautions and controls previously utilized in the PRCS by other controlling and entry contractors?		
4.	Has the host communicated and coordinated with controlling contractor on emergency action plan and provided facility orientation protocol?		
5.	Has controlling contractor received, reviewed and consulted with host on above items 1 through 4?		
6.	Has controlling contractor provided and reviewed the information from the host in items 1 through 4 with entry employer?		
7.	Does the entry employer fully understand the information provided by the controlling contractor?		
8.	Have all workers on site been trained to recognize and avoid permit confined spaces?		
9.	Has a plan of communication during entry been established?		
10.	Are there any barriers of communications between workers i.e. language, impairment etc.?		
11	Have all workers been trained in recognition and avoidance of PRCS?		
12.	Has a qualified rescue team been provided a briefing of facility, hazards and procedures?		
13.	Has a bilateral debriefing between the controlling contractor and the entry employer taken place regarding the performance of the PRCS program followed and any hazards confronted or created in the permit space(s) during entry operations?		
14.	Has the controlling contractor apprised the host employer of the information exchanged with the entry entities pursuant to this subparagraph		
15.	Has the host reviewed and archived debriefing notes and information within permit?		

<b>Purpose of entry:</b>		
Entry Supervisor(s) in charge of crews:	Type of crew (welding, plumbing, etc)	Phone #:
<b>Permit duration:</b>		
<b>Communication and Coordination procedures (including equipment and entities involved):</b>		
<b>Rescue Procedures and Coordination Procedures</b>		
<b>Rescue Team Information Briefing and Preparedness:</b>		

REQUIREMENTS COMPLETED  (Put N/A if item doesn't apply)	DATE	TIME	REQUIREMENTS COMPLETED  (Put N/A if item doesn't apply)	DATE	TIME
Lockout/De-energize/Try-out			Supplied Air Respirator (N/A if alternate entry)		
Line(s) Broken-Capped-Blank			Respirator(s) (Air Purifying)		
Purge-Flush and Vent			Protective Clothing		
Ventilation			Full Body Harness w/ "D" ring		
Secure Area (Post and Flag)			Emergency Escape Retrieval Equip		
Lighting (Explosive Proof)			Lifelines		
Hot work Permit			Standby safety personnel (N/A if alternate entry)		
Fire Extinguishers			Resuscitator—Inhalator (N/A if alternate entry)		
Add other specific information, if needed, or attach additional instructions or requirements. See the following examples in bold print..					
<b>Line(s) to be bled/blanked:</b>					
<b>Ventilation equipment:</b>					
<b>PPE clothing:</b>					
<b>Respirator(s):</b>					
<b>Fire extinguisher(s):</b>					
<b>Emergency retrieval equipment:</b>					

## CONFINED SPACE ENTRY PERMIT

AIR MONITORING								
Substance Monitored		Permissible Levels		Monitoring Results				
Time monitored (put time)		Record the time 19.5% to 23.5%						
Percent Oxygen								
LEL/LFL		Under 10%						
Toxic 1:		<u>      </u> PEL	<u>      </u> STEL					
Toxic 2:		<u>      </u> PEL	<u>      </u> STEL					
Toxic 3:		<u>      </u> PEL	<u>      </u> STEL					
Toxic 4:		<u>      </u> PEL	<u>      </u> STEL					
<b>REMARKS:</b> <hr/> <hr/>								
Air Tester Name		ID#	Instrument(s) Used (For example: oxygen meter, combustible gas indicator, etc.)		Model # or Type	Serial# or Unit		
<b>ATTENDANTS AND ENTRANTS</b>								
Attendant(s) (Required for all confined space work except alternate entry)			ID#	Confined Space Entrant(s)			ID#	

**REMARKS:****SUPERVISOR AUTHORIZATION - ALL CONDITIONS SATISFIED**

Department or phone number: \_\_\_\_\_

**EMERGENCY CONTACT PHONE NUMBERS:**

AMBULANCE: \_\_\_\_\_

FIRE: \_\_\_\_\_

SAFETY: \_\_\_\_\_

RESCUE

TEAM: \_\_\_\_\_

OTHER:

\_\_\_\_\_

**CONFINED SPACE ENTRY PERMIT**  
**Sample Section A**

Date and time issued:	
Job site/space I.D.:	
Equipment to be worked on:	
Standby personnel:   	
Date and time expires:	
Job supervisor:	
Work to be performed:   	
1. Atmospheric Checks: Time: _____ Oxygen _____ % Explosives _____ %L.F.M. Toxic _____ PPM    	
2. Tester's signature: _____    	
3. Source isolation (No Entry): N/A Yes No Pumps or lines blinded, disconnected, or blocked: <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>    	
4. Ventilation modification: N/A Yes No Mechanical: <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Natural Ventilation only: <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>    	
5. Atmospheric check after isolation and ventilation: Oxygen: _____ % >19.5% Explosive: _____ % L.F.M. <10%	

Toxic: \_\_\_\_\_ PPM <10PPM H<sub>2</sub>S

Time: \_\_\_\_\_

Tester's signature: \_\_\_\_\_

6. Communication procedures:

**CONFINED SPACE ENTRY PERMIT**  
**Sample Section A**

7. Rescue procedures:				
Entry standby and backup persons successfully completed required training?			Yes <input type="checkbox"/> No <input type="checkbox"/>	
Is it current?			<input type="checkbox"/> <input type="checkbox"/>	
9. Equipment:		N/A	Yes	No
Direct reading gas monitor-tested:		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Safety harnesses and lifelines for entry and standby persons:		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hoisting equipment:		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Powered communications:		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SCBA's for entry and standby persons:		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Protective clothing:		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
All electric equipment listed: Class I, Division I, Group D and non-sparking tools		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

10. Periodic atmospheric tests:

Oxygen \_\_\_\_\_ % Time \_\_\_\_\_

Explosive \_\_\_\_\_ % Time \_\_\_\_\_

Toxic \_\_\_\_\_ % Time \_\_\_\_\_

We have reviewed the work authorized by this permit and the information contained here. Written instruction and safety procedures have been received and are understood. Entry cannot be approved if any squares are marked in the "No" column. This permit is not valid unless all appropriate items are completed.

Permit prepared by: \_\_\_\_\_  
Entry Supervisor

Approved by: \_\_\_\_\_  
Unit Supervisor

Review by: \_\_\_\_\_  
Operations Manager

**This permit is to be kept at the job site. Return this job site copy to the unit supervisor following job completion.**

Entrants Name	Sign in	Sign out	Sign in	Sign out

## CONFINED SPACE ENTRY PERMIT

### Sample Section B

**PERMIT VALID FOR 8 HOURS ONLY. ALL PERMIT COPIES MUST REMAIN AT THE SITE UNTIL JOB IS COMPLETED.**

Date:	Site location /description:	
-------	-----------------------------	--

Purpose of entry:

Supervisor (s) in charge of crews	Type of Crew	Telephone #

Communication procedures:

--

--

Rescue procedures (telephone number at bottom):

--

--

--

**BOLD INDICATES MINIMUM REQUIREMENTS TO COMPLETE AND REVIEW PRIOR TO ENTRY**

**Note: For Items that do not apply, enter N/A in the blank.**

REQUIREMENTS COMPLETED	DATE	TIME	REQUIREMENTS COMPLETED	DATE	TIME
Lockout/De-energize/Tagout			Full Body Harness w/"D" Ring		
Line(s) Broken-Capped-Blank			Emergency Escape Retrieval Equipment		
Purge-Flush and Vent			Lifelines		
Ventilation			Fire Extinguishers		
Secure Area (Post and Flag)			Lighting (Explosive proof)		
Breathing Apparatus			Protective Clothing		

<b>Resuscitator - Inhalator</b>			Respirator(s) (Air Purifying)		
<b>Standby Safety Personnel</b>			Burning and Welding Permit		
<b>Continuous Monitoring:</b>		<input type="checkbox"/> Yes		<input type="checkbox"/> No	
<b>Periodic Monitoring Frequency:</b> _____					
<b>Test(s)</b>	<b>Permissible entry level</b>				
Percent of oxygen	19.5% TO 23.5%				
Lower flammable limit	Under 10%				
Carbon monoxide	+35 PPM				
Aromatic Hydrocarbon	+1 PPM *5 PPM				
Hydrogen Cyanide	(Skin) *4 PPM				
Hydrogen Sulfide	+10 PPM *15 PPM				
Sulfur Dioxide	+2 PPM *5 PPM				
Ammonia	* 35 PPM				

\* Short-term exposure limit: Employees can work in the area up to 15 minutes.

+ 8 hour Time Weighted Average: Employees can work in the area 8 hours (longer with appropriate respiratory protection).

**REMARKS:**

## **CONFINED SPACE ENTRY PERMIT**

### **Sample Section B**

GAS TESTER NAME & CHECK #:	
<hr/>	
INSTRUCTIONS USED:	
<hr/>	
MODEL &/OR TYPE:	
<hr/>	
SERIAL &/OR UNIT #:	
<hr/>	
<b>SAFETY STANDBY IS REQUIRED FOR ALL CONFINED SPACE WORK</b>	
SAFETY STANDBY PERSON(S)	
CHECK#	
CONFINED SPACE ENTRANT(S)	
CHECK #	

**SUPERVISOR AUTHORIZATION - ALL CONDITIONS SATISFIED:**

Department or phone number: \_\_\_\_\_

**EMERGENCY CONTACT PHONE NUMBERS:**

Ambulance: \_\_\_\_\_

Fire: \_\_\_\_\_

Safety: \_\_\_\_\_

Gas coordinator: \_\_\_\_\_

## Appendix D: Confined Space Basics

**Question: What is a Confined Space?**

**Answer: A confined space means a space that:**

- (1) Is large enough and so configured that an employee can bodily enter it;
- (2) Has limited or restricted means for entry and exit; and
- (3) Is not designed for continuous employee occupancy.

**Examples of typical Confined Spaces:**



**Pipes and pipelines**

**Possible Hazards:**

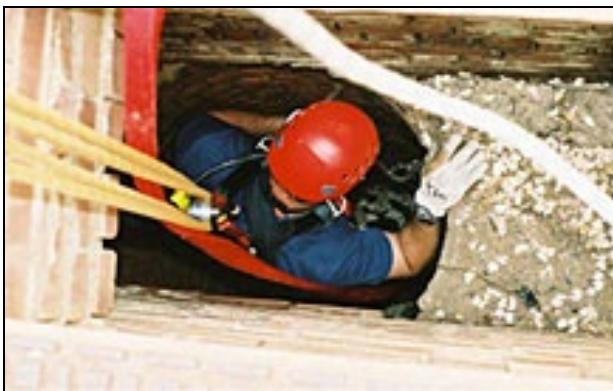
Engulfment  
Atmospheric  
Configuration



**Attics**

**Possible Hazards:**

Extreme Temperature  
Configuration  
Electrical  
Falls  
Animals



### Vaults

**Possible Hazards:**  
**Engulfment**  
**Atmospheric**  
**Configuration**  
**Electrical**  
**Explosion**  
**Stored Energy**



### Crawspaces and Ducts

**Possible Hazards:**  
**Configuration**  
**Atmospheric**  
**Electrical**  
**Animals**  
**Enfulgment**  
**Struck-by**



### Pits and Shafts

**Possible Hazards**  
**Engulfment**  
**Atmospheric**  
**Struk-by**  
**Electrical**  
**Explosion**  
**Stored Energy**  
**Falls**



### Manholes

**Possible Hazards:**  
**Configuration**  
**Atmospheric**  
**Electrical**  
**Enfulgment**  
**Stored Energy**  
**Struck-by**  
**Falls**



Tanks Vessel

Possible Hazards:  
**Engulfment**  
**Atmospheric**  
**Explosion**  
**Stored Energy**



Concrete Mixers

Possible Hazards:  
**Configuration**  
**Atmospheric**  
**Stored Energy**  
**Configuration**

**Question:** In a permit required confined space, what is a hazard?

**Answer:** A hazard in permit required confined space means a physical hazard or hazardous atmosphere:

**Question:** What is a physical hazard?

**Answer:** A physical hazard means an existing or potential hazard that can cause death or serious physical damage. Examples include, but are not limited to: explosives (as defined by paragraph (n) of §1926.914, definition of “explosive”); mechanical, electrical, hydraulic and pneumatic energy; radiation; temperature extremes; engulfment; noise; and inwardly converging surfaces. Physical hazard also includes chemicals that can cause death or serious physical damage through skin or eye contact (rather than through inhalation).

**Question:** What is a Hazardous Atmosphere?

**Answer:** A Hazardous atmosphere means an atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (that is, escape unaided from a permit space), injury, or acute illness from one or more of the following causes:

- (1) Flammable gas, vapor, or mist in excess of 10 percent of its lower flammable limit (LFL);

- (2) Airborne combustible dust at a concentration that meets or exceeds its LFL;
- (3) Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent;
- (4) Atmospheric concentration of any substance for which a dose or a permissible exposure limit is published in Subpart D—Occupational Health and Environmental Control, or in Subpart Z—Toxic and Hazardous Substances, of this part and which could result in employee exposure in excess of its dose or permissible exposure limit;

**Note.** An atmospheric concentration of any substance that is not capable of causing death, incapacitation, impairment of ability to self-rescue, injury, or acute illness due to its health effects is not covered by this definition.

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

**Host employer** means the employer that owns or manages the property where the construction work is taking place.

**Examples of Permit Required Confined Space Hazards:**



**Physical:** Hazards include moving parts and uncontrolled energy.



**Physical: Hazards exposed electrical**



**Physical: Paint mixing/spray booths/chemicals**



**Atmospheric: Hazards may include a toxic or flammable atmosphere or an atmosphere that is oxygen enriched or oxygen deficient.**

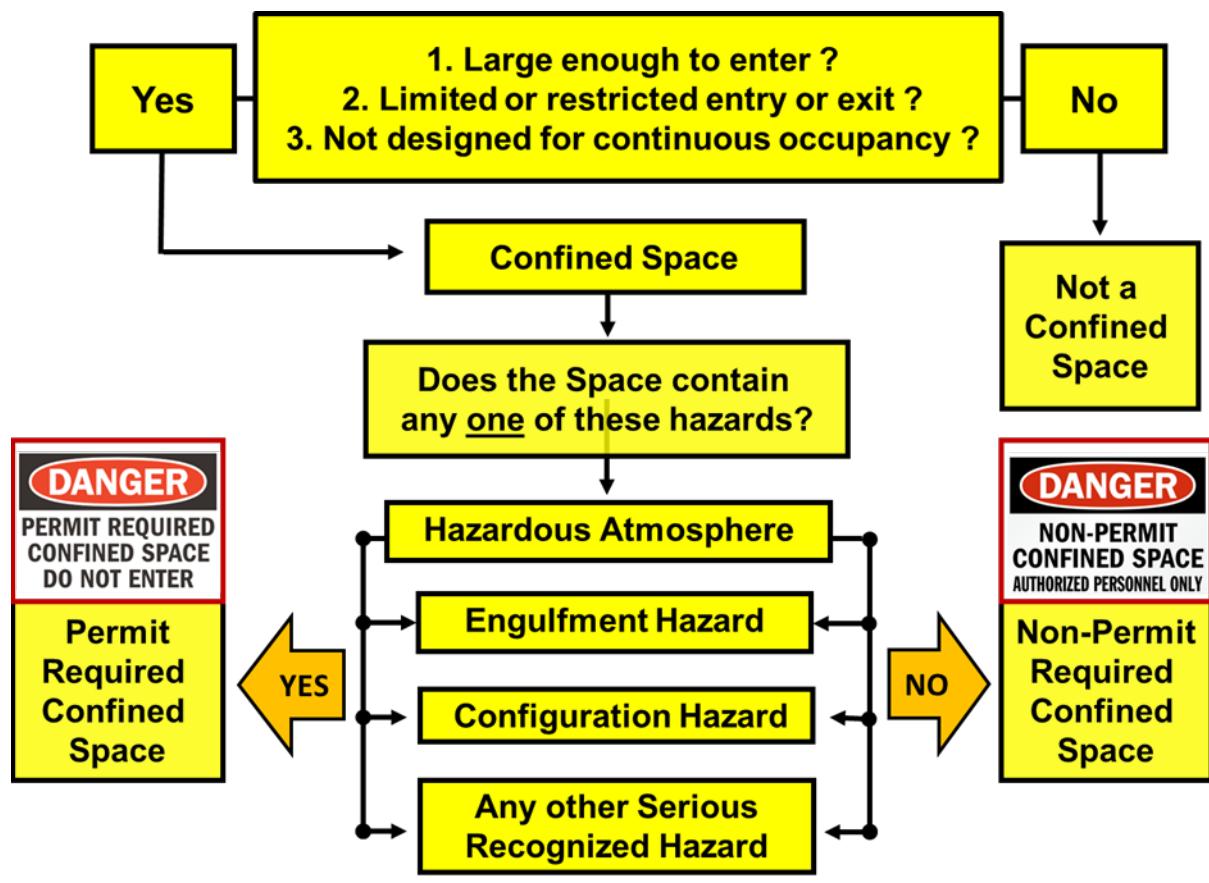
**Question: What is a permit required confined space?**

**Answer: A permit-required confined space (permit space) means a confined space that has one or more of the following characteristics:**

- (1) Contains or has a potential to contain a hazardous atmosphere;**

- (2) Contains a material that has the potential for engulfing an entrant;
- (3) Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or
- (4) Contains any other recognized serious safety or health hazard.

Physical hazard means an existing or potential hazard that can cause death or serious physical damage. Examples include, but are not limited to: explosives (as defined by paragraph (n) of §1926.914, definition of “explosive”); mechanical, electrical, hydraulic and pneumatic energy; radiation; temperature extremes; engulfment; noise; and inwardly converging surfaces. Physical hazard also includes chemicals that can cause death or serious physical damage through skin or eye contact (rather than through inhalation).



**Appendix E: Sample Safety Data Sheet**

## **PRE-Student Evaluation**

**Name:** \_\_\_\_\_

Date: \_\_\_\_\_

Circle the best answer to each of the following questions.

1. President Nixon signed the OSH Act on:
    - a) April 28, 1971
    - c) December 29, 1970
    - b) November 29, 1970
    - d) Don't Know
  2. When working in construction at heights of 6 feet or more above a lower level, guardrails must be installed...
    - a) True
    - b) False
    - c) Don't Know
  3. Which of the following is the number one cause of fatalities in accidents in the Construction Industry?
    - a) Scaffolds
    - c) Struck-By
    - b) Electrocution
    - d) Falls
  4. Before using a ladder, inspect it for which of the following?
    - c) Cracks in the frame
    - c) Oil, grease or other substances on the rungs
    - d) Broken or missing rungs
    - d) All of the above
  5. A floor hole wider than \_\_\_\_ must be protected.
    - a) 12 inches
    - c) 8 inches
    - b) 1 inches
    - d) Don't Know
  6. While working in the construction industry, at what height is fall protection required.
    - a) 4 feet
    - c) 6 feet
    - b) 10 feet
    - d) 8 feet
  7. When inspecting a harness before using it, you should look for the following:
    - a) Cuts / Abrasions
    - c) Other visible damage
    - b) Burns
    - d) All the above
  8. When working on scaffolding and you need a little more height, you must do the following:
    - a) Stand on a saw-horse
    - c) Erect another section of scaffolding
    - b) Jump
    - d) Use a ladder
  9. What rights do you have under OSHA?
    - a) Weekly Pay
    - c) A Safe and Healthful Workplace
    - b) Safety Equipment
    - d) Don't Know
  10. Stairs that are incomplete and missing handrails are acceptable to use during the construction phase of the project.
    - a) True
    - b) False
    - c) Don't Know

## **POST-Student Evaluation**

**Name:** \_\_\_\_\_

**Date:** \_\_\_\_\_

Circle the best answer to each of the following questions.

1. President Nixon signed the OSH Act on:
    - a) April 28, 1971
    - c) December 29, 1970
    - b) November 29, 1970
    - d) Don't Know
  2. When working in construction at heights of 6 feet or more above a lower level, guardrails must be installed...
    - a) True
    - b) False
    - c) Don't Know
  3. Which of the following is the number one cause of fatalities in accidents in the Construction Industry?
    - a) Scaffolds
    - c) Struck-By
    - b) Electrocution
    - d) Falls
  4. Before using a ladder, inspect it for which of the following?
    - c) Cracks in the frame
    - c) Oil, grease or other substances on the rungs
    - d) Broken or missing rungs
    - d) All of the above
  5. A floor hole wider than \_\_\_\_ must be protected.
    - a) 12 inches
    - c) 8 inches
    - b) 1 inches
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  6. While working in the construction industry, at what height is fall protection required.
    - a) 4 feet
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    - d) 8 feet
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    - a) Cuts / Abrasions
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    - b) Burns
    - d) All the above
  8. When working on scaffolding and you need a little more height, you must do the following:
    - a) Stand on a saw-horse
    - c) Erect another section of scaffolding
    - b) Jump
    - d) Use a ladder
  9. What rights do you have under OSHA?
    - a) Weekly Pay
    - c) A Safe and Healthful Workplace
    - b) Safety Equipment
    - d) Don't Know
  10. Stairs that are incomplete and missing handrails are acceptable to use during the construction phase of the project.
    - a) True
    - b) False
    - c) Don't Know

## **POST TEST**

1. Common causes of cave-ins are;
  - A. Poor planning
  - B. Misjudgment of soil type
  - C. Defective protective systems
  - D. Failure to adjust for changing conditions
  - E. All the above
  
2. Excavation standard applies to;
  - A. Excavations
  - B. trenches
  - C. surface encumbrances
  - D. protective systems
  - E. All the above
  
3. Timber and aluminum hydraulic are \_\_\_\_\_ systems.
  - A. Shoring
  - B. Ramp
  - C. Hazardous
  - D. Access
  
4. A hazardous atmosphere can be;
  - A. Flammable
  - B. Poisonous
  - C. Toxic
  - D. Irritating
  - E. All the above
  
5. Surface encumbrances that are hazardous to employees shall be \_\_\_\_\_ as necessary to safeguard employees.
  - A. Added
  - B. Removed or supported
  - C. Built in
  - D. Blocked

6. Structural ramps used by employees shall be designed by \_\_\_\_\_

- A. Safety officer
- B. Laborer
- C. Competent person
- D. Operator

7. Oxygen deficient atmosphere are problems in trenches when the oxygen content falls below;

- A. 12.5%
- B. 30.5%
- C. 19.5%
- D. 25.5%

8. Water removal operations shall be monitored by a \_\_\_\_\_

- A. Competent person
- B. Safety person
- C. Water man
- D. Flag person

9. Competent persons shall take prompt corrective measures when surroundings are \_\_\_\_\_ to employees?

- A. Hazardous
- B. Unsanitary
- C. Dangerous
- D. All the above

10. Employees are \_\_\_\_\_ in shields when being installed, removed or moved vertically.

- A. Not permitted
- B. Permitted

11. Type A soils are fissured, subject to vibration, previously disturbed?

- A. True
- B. False

12. A visual test and a \_\_\_\_\_ test shall be done to determine soil classification?

- A. Standard
- B. Manual
- C. Perk
- D. Legal

13. Cohesive soils have a high \_\_\_\_\_ content?

- A. Clay
- B. Rock
- C. Sand
- D. Gravel

14. \_\_\_\_\_ is caused by a downward pressure created by weight of adjoining soil or equipment?

- A. Heaving or squeezing
- B. Toppling
- C. Boiling

15. Timber can be used to shore trenches up to \_\_\_\_\_ feet in depth without a registered engineer's approval?

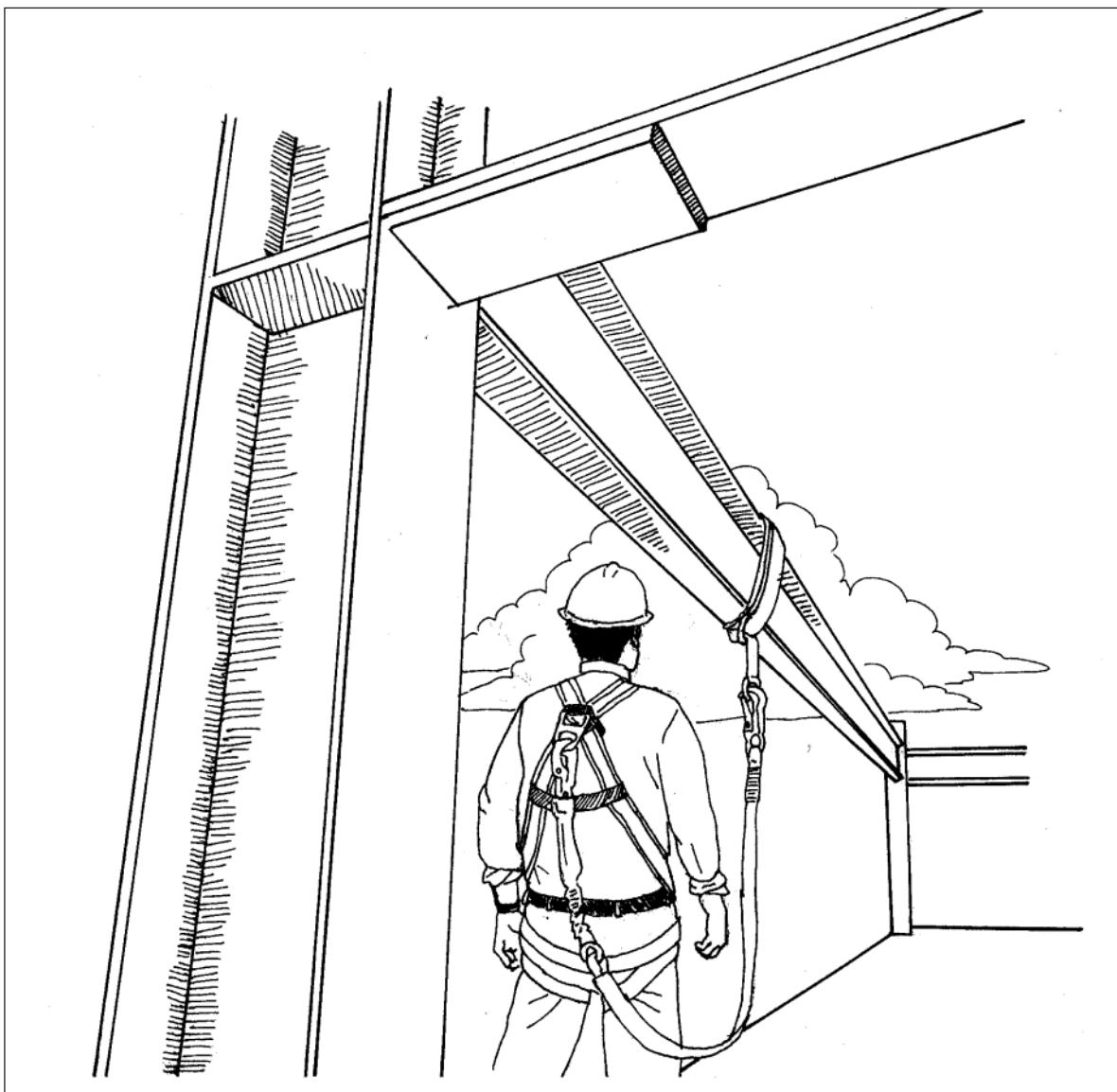
- A. 10
- B. 20
- C. 30
- D. 40

## Post – Test Answers

- 1) E
- 2) E
- 3) C
- 4) E
- 5) B
- 6) C
- 7) C
- 8) A
- 9) D
- 10) A
- 11) B
- 12) B
- 13) A
- 14) A
- 15) B

# **FOCUS 4**

# **CONSTRUCTION SAFETY & HEALTH**



## **'Fall' Hazards**

### *Trainer Guide*

This material was produced under grant number SH-16586-07-06-F-36 from the Occupational Safety and Health Administration, U.S. Department of Labor. It does not necessarily reflect the views or policies of the U.S. Department of Labor, nor does mention of trade names, commercial products, or organizations imply endorsement by the U.S. Government.



## SECTION #1

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### ACTIVITY 1: FALLS FROM HEIGHTS – INTRODUCTION

Working in construction can be very dangerous. More workers die while working on construction than in any other industry. Construction workers make up about 5 percent of the workers in the U.S., but they account for about 20 percent of the worker deaths.

Falls are the **most common** cause of death for construction workers, as they account for more than 33 percent of all construction deaths. More than 700 workers died from falls on the job in the past year.

A **hazard** is a condition that is likely to cause injury, illness or death to a worker. What are the hazards that exist on a construction job that could cause a worker to fall?

List and discuss.

1.

2.

3.

4.

### THERE ARE LAWS THAT PROTECT WORKERS

The Occupational Safety and Health Administration (OSHA) sets rules for workers to protect them from dangerous falls. These rules are called standards, and employers, by law, are required to follow all standards to protect their workers. If the standards are not followed, OSHA can make your employer fix the hazard and will also fine your employer. OSHA has standards that are specifically for construction workers and they have standards that apply to other “general industry” workers.

# How Can We Protect Ourselves From Falls?

OSHA says that there are three major ways to protect workers from falls from elevations:

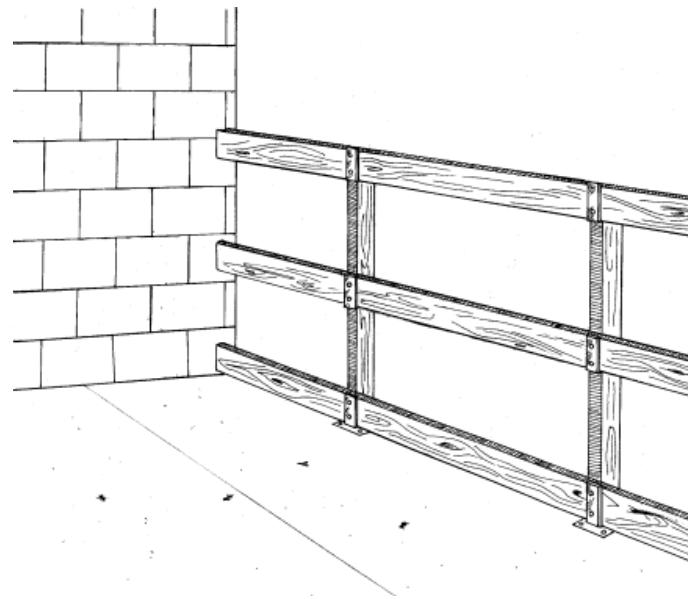
Guardrails, Safety Nets, Personal Fall Arrest Systems

OSHA requires that employers provide these protections to workers when they are needed.

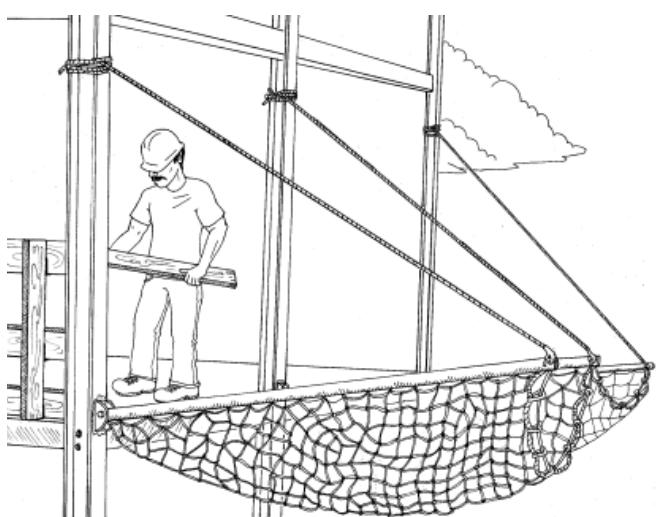
OSHA requires employers to:

1. Develop a written fall protection plan;
2. Identify potential fall hazards prior to each project and during daily walk-around inspections;
3. Ensure that your fall protection equipment is right for the work you are doing, that it is in good condition, and that it is used properly;
4. Conduct regular trainings on fall hazards and on the required personal protective equipment.

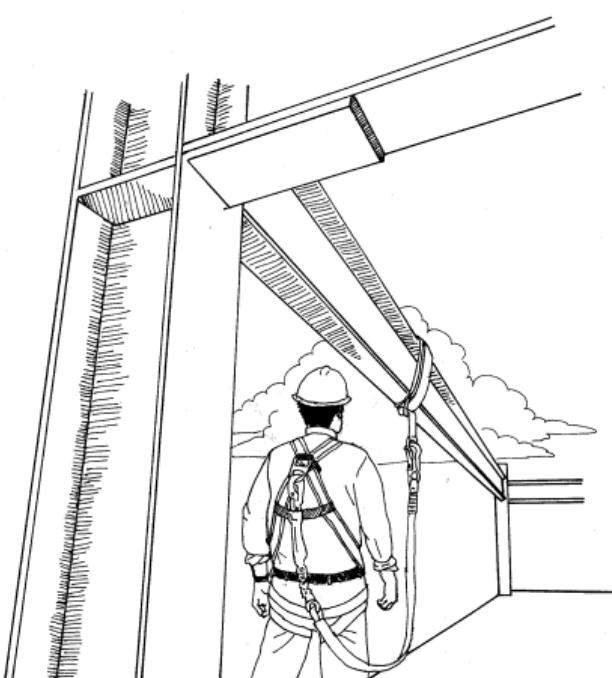
Take the short introductory quiz to understand some basic ideas about these fall protection methods. Remember, your employer needs to provide you with protections to prevent falls from occurring at your workplace.



**Safe Work:** Wood guardrail has a toprail, midrail and toeboard.



**Safe Work:** This safety net extends outward at least eight (8) feet, for a vertical fall that doesn't exceed five (5) feet from the working level to the horizontal plane of the net.



**Safe Work:** Beam strap, lanyard and a full body harness.

# Want Some Basic Information On OSHA's Fall Protection Standard? Take The Quiz!

Work with your classmates to come up with the correct answers to these 20 questions. This is not a test, but just a chance to give you some basic information on OSHA's fall protection rules and requirements for employers. Note that these are not all the rules for fall protection, but just some of the basic concepts. More details on each topic will be provided later.

**1. Workers in the construction industry, who are working on surfaces with unprotected sides or edges which are \_\_\_\_\_ or more above the lower level, must be protected from falls by their employer.**

- a. 3 feet
- b. 6 feet
- c. 9 feet

**ANSWER:** Six feet is the *general rule* for the Construction Industry, i.e. it's the threshold when no specific rule applies. (No fall protection is required until 10 feet when working on scaffolds.)

**NOTE:** Fall protection must be provided regardless of height if you're working above sharp objects (like exposed ends of rebars for concrete) or working above dangerous equipment (that you wouldn't want to fall into).

**2. On the other hand, under OSHA's general industry standard, workers who are working \_\_\_\_\_ or more above the lower level must be protected from falls by their employer.**

- a. 4 feet
- b. 10 feet
- c. 6 feet

**ANSWER:** Four feet is the fall protection trigger height in General Industry.

**3. What are all the ways that an employer can protect workers from falls?**

- a. Guardrails, safety net systems and safety belts
- b. Guardrails and safety net systems
- c. Guardrails, safety net systems and personal fall arrest systems with full-body harnesses

**The answer is c.** These are the three methods that OSHA prefers. However, there are a couple of other methods used in special situations. You need not discuss them, but they include warning line systems and use of controlled access zones.

**4. Guardrails are often used by employers to protect workers from falls. How high must the top guardrail, called the "toprail", be above the walking/working level?**

- a. 24 inches, plus or minus 3 inches
- b. 42 inches, plus or minus three inches
- c. 60 inches, plus or minus three inches

**ANSWER: 42 inches**, i.e. the toprail must be 39 to 45 inches above the working surface. OSHA also requires a midrail, so workers can't fall through the guardrail.

5. The guardrail system must be capable of withstanding a force of at least \_\_\_\_\_ at the toprail.

- a. 100 lbs.
- b. 200 lbs.
- c. 300 lbs.

**ANSWER:** It's **200 lbs.** for the toprail. The midrail must withstand 150 pounds.

6. According to OSHA, safety nets must be installed as close as possible to the walking/working surface of the worker, and never more than \_\_\_\_\_ below these levels.

- a. 10 feet
- b. 30 feet
- c. 60 feet

**ANSWER:** **30 feet** is the maximum fall allowed into a safety net. That's why the border rope around the outside of a safety net must withstand **5,000 lbs.**

7. Safety nets must be able to absorb an impact force of a drop test consisting of a \_\_\_\_\_ bag of sand

- a. 200 lb.
- b. 400 lb.
- c. 750 lb.

**ANSWER: 400 lbs. of sand** for the drop test: the sand bag is dropped the distance of the fall to the net, but no more than 30 feet. Additionally, the sand bag must be dropped a *minimum* distance of 42 inches.

8. A personal fall arrest system consists of:

- a. An anchorage and a body belt
- b. An anchorage, lanyard and connectors, and a body belt
- c. An anchorage, lanyard (sometimes with a built-in shock absorber) and connectors, and a full body harness

**The answer is c.** The connecting device is generally (but not always) a lanyard made of webbing, with locking snap hooks on each end for connection to the anchor and the D-ring on back of the *full body harness*. Sometimes a worker clips into a self-retracting lifeline, often consisting of a wire rope (steel cable). In that case, you really need a shock absorber if someone falls the full six feet maximum fall distance allowed.

9. An anchorage for a personal fall arrest system shall be capable of supporting \_\_\_\_\_ of dead weight for each worker tied off to it.
- 200 lbs.
  - 1,800 lbs.
  - 5,000 lbs.
- ANSWER:** It's 5,000 lbs. per worker. Also, each worker has his/her own *independent* lifeline with an *independent* anchor.
10. If you use a personal fall arrest system for fall protection, you must rig it so that a worker can fall no more than \_\_\_\_\_ nor contact any level.
- 6 feet
  - 12 feet
  - 24 feet
- ANSWER:** Six feet of *free fall* is the maximum fall allowed while using a personal fall arrest system. As of January 1, 1998, a full body harness is required for fall arresting service. (Prior to that date, a *safety belt* was legal for this purpose.)
11. The maximum *fall arresting force* that can be transmitted to the body of a worker through a full body harness is:
- 200 lbs.
  - 5,000 lbs.
  - 1,800 lbs.
- ANSWER:** 1,800 lbs. of force can be transmitted to the worker's body through the required full body harness. However, this force is distributed over a large area by the harness straps. The straps pass around the worker's legs and the harness is designed so that most of the force is passed on to the worker's buttocks and thighs, as well as some force to the shoulders, chest and waist.
12. A personal fall arrest system must stop a worker taking the maximum fall of 6 feet within a deceleration distance of no more than:
- 4 feet (48 inches)
  - 3.5 feet (42 inches)
  - 6 feet (72 inches)
- ANSWER:** 3.5 feet (42 inches) is the maximum *deceleration distance* allowed by OSHA. In other words, after taking the maximum allowable free fall of six feet, OSHA requires that the fall be stopped within 3.5 feet (for a total of 9.5 feet, not including any stretch or slack). In practice, shock absorbers are built to *elongate* up to 42 inches. The most common type of shock absorber has webbing woven or stitched together. These pieces of webbing rip apart, or the stitches rip out, in a fall, thereby absorbing excess force.

**13. When the height of a *supported* scaffold (a scaffold with legs) is more than \_\_\_\_\_ its narrowest base dimension, it must be tied to a structure.**

- a. 2 times
- b. 6 times
- c. 4 times

**ANSWER: 4 times** – a *supported* scaffold is considered to be inherently unstable when its height exceeds four times its width. At that height, the scaffold must be tied to the structure with guys, ties or braces. These must be installed in accordance with manufacturers' recommendations. For scaffolds more than three (3) feet wide, additional tie-ins are required every 26 vertical feet above that, but no more than 20 feet from the top of a structure; and, also every 30 feet horizontally. For scaffolds three (3) or less in width, these tie-ins are required at every 20 vertical feet.

**14. Each leg of a supported scaffold must support the weight of the scaffold and \_\_\_\_\_ what you intend to put on the scaffold.**

- a. 4 times
- b. 6 times
- c. 10 times

**ANSWER: 4 times the intended load** for *supported* scaffold components, i.e. each leg.

**15. If you paint wooden scaffold planks,**

- a. The wood will probably last longer
- b. You won't be able to see any cracks or defects in the wood
- c. Workers are more likely to slip on the planks

**The answer is b.** You can't see defects in the wood if opaque paint is used.

**16. Fall protection on a two-point *suspended* scaffold requires:**

- a. Tying your full body harness to the scaffold
- b. A guardrail
- c. Both a guardrail and a personal fall arrest system, with an independent lifeline for each worker, tied to the structure

**The answer is c.** The worker's lifeline must be tied to the structure, *not to the suspended scaffold*. If you are properly tied off to the building or structure, you'll live even if the scaffold comes off the structure.

17. Each rope on a two-point suspended scaffold must hold the weight of the scaffold and \_\_\_\_\_ the intended load.

- a. 10 times
- b. 4 times
- c. 6 times

**ANSWER:** 6 times the intended load is the required safety factor for *each rope* holding a suspended scaffold.

18. When you position a ladder against a wall that is 20 feet high, how far from the wall should you place the ladder?

- a. 2 feet ( $\frac{1}{10}$  the distance from the surface to the top support)
- b. 4 feet ( $\frac{1}{5}$  the distance)
- c. 5 feet ( $\frac{1}{4}$  the distance)

**The answer is c:**  $\frac{1}{4}$  of the vertical distance to the top. This angle can be approximated by holding your hands out in front of you. The point at which your fingers touch the rails of the ladder will provide the required angle. Additionally, it's always wise to tie off a ladder to prevent unwanted movement.

19. The top of a ladder must extend at least \_\_\_\_\_ above the surface you are climbing onto.

- a. Three feet
- b. Two feet
- c. Four feet

**ANSWER:** It's 3 feet. You'll really appreciate this fact when it's time to climb *down* the ladder from the roof or other surface.

20. The best material for a step ladder used by an electrician who may be working near energized conductors is:

- a. Wood
- b. Fiberglass
- c. Aluminum

**ANSWER:** Fiberglass is the only reliable electrical *insulator* of the three materials listed. Wood conducts electricity when it's wet; and, never trust wood if the ladder is near a power line. Aluminum is a metal and an electrical *conductor*.

**NOTE:** This question is not an endorsement of the practice of working too closely to energized electrical conductors. In general, you must remain at least 10 feet away from power lines. Even greater distances are required at very high voltages.

# **Guardrails And Safety Nets**

When workers on a construction site are exposed to vertical drops of 6 feet or more, OSHA requires that employers provide fall protection, generally in one of these three ways before work begins:

- placing guardrails around the hazard area;
- deploying safety nets;
- providing a personal fall arrest system for each employee.

On Construction Site X, the employer has chosen to use guardrails and safety nets. Let's make sure that all the requirements are followed to ensure the workers' safety.

## EXERCISE

# Guardrails And Safety Nets: Lifesaving Devices

Below are several questions regarding the proper set-up of guardrails and safety nets. Look at the list of answers and choose the one that correctly completes the sentence.

## GUARDRAIL ANSWERS

21 inches	150 pounds	39 to 45 inches
toprail	200 pounds	No rough and jagged surfaces
walkway	3½ inches	39 inches

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## GUARDRAIL QUESTIONS

1. On Job #1, the supervisor is putting up guardrails, and is checking the *height of the toprail*, since he knows that it needs to be between **39 TO 45** inches above the walking/working level.
2. He is also ensuring that there is a *midrail, mesh and/or screens* on this rail, because there is no wall or parapet wall at least **21 INCHES HIGH**.
3. The supervisor needs to make sure that the guardrail system is capable of *withstanding* at least **200 LBS.** of *force*, within 2 inches of the top edge in any downward or outward direction and at any point along the edge. If, from the force, the rail deflects downward to a height less than **39 INCHES**, then he knows he has a problem with that guardrail system.
4. He then checks to ensure that the mid-rail/screen/mesh is able *to withstand* at least **150 LBS.** of force.
5. The workers are using various tools on the scaffold, so a *toeboard* is installed. The supervisor ensures that the toeboard is at least **3½ INCHES HIGH**, which is the minimum height requirement.
6. If he decides that he wants to use mesh or screen instead of the toeboard, the mesh must extend from the **TOPRAIL** to the **WALKWAY**.
7. The supervisor also wants to make sure that there are **NO ROUGH OR JAGGED SURFACES**, or anything pointy or sharp, since he doesn't want anyone to be cut, hurt, or have their clothes caught in the guardrail system.

## SAFETY NETS ANSWERS

Drop test	Once a week	Six inches
30 feet	400-lb. bag of sand	Whenever relocated
5,000 pounds	13 feet	Six inches by six inches
Highest		

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## SAFETY NETS QUESTIONS

8. On Job #2, the supervisor is setting up safety nets. He knows he can use a safety net because the employees will be working no more than **30 FEET** above the net; if it were a longer potential fall, he could not use the net.
9. Since the distance from the working level to the net is more than 10 feet, he is setting up the safety net to extend outward from the working surface a total of **13 FEET**.
10. In order to check if the safety net system is set up properly, the supervisor will conduct a **DROP TEST**.
11. For the drop test, the supervisor must use a **400-LB. BAG OF SAND**, 28-32 inches in diameter, and he will drop it into the net from the **HIGHEST** surface at which the workers are exposed to fall hazards, but not less than 42 inches above the net.
12. The drop test must be done after initial installation and before being used, **WHENEVER RELOCATED**, after major repair, and at 6-month intervals if left in one place.
13. The maximum size of the net's mesh must not exceed **6 INCHES BY 6 INCHES**.
14. The supervisor knows that he must inspect the safety net system at least **ONCE A WEEK** to check for damage and/or wear, and after any event that could affect the integrity of the system.
15. The supervisor will ensure that each safety net has a border rope for webbing with a minimum breaking strength of **5,000 LBS**.
16. Since they plan to use several nets, the supervisor needs to be sure that the connections between the panels are not spaced more than **SIX INCHES** apart.

## SUMMARY

# Guardrail And Safety Net Systems

Guardrail and safety net systems are two ways to protect workers from falls on the job. If workers are more than 6 feet above the lower surface, some type of fall protection must be used by the employer.

If the employer uses guardrails, s/he must be sure that:

- toprails are at least  $\frac{1}{4}$  inch thick to prevent cuts and lacerations; and they must be between 39 and 45 inches from the working surface;
- if wire rope is used, it must be flagged at least every six feet with highly visible materials;
- midrails, screens or mesh are installed when there are no walls at least 21 inches high. Screens and mesh must extend from the toprail to the working level.
- there are no openings more than 19 inches;
- the toprail can withstand at least 200 lbs. of force; the midrail can withstand 150 lbs. of force;
- the system is smooth enough to protect workers from cuts and getting their clothes snagged by the rail.
- if guardrails are used around holes at points of access, like a ladderway, a gate must be used to prevent someone from falling through the hole, or be so offset that a person cannot walk directly into the hole.

If an employer uses safety nets, s/he must be sure that:

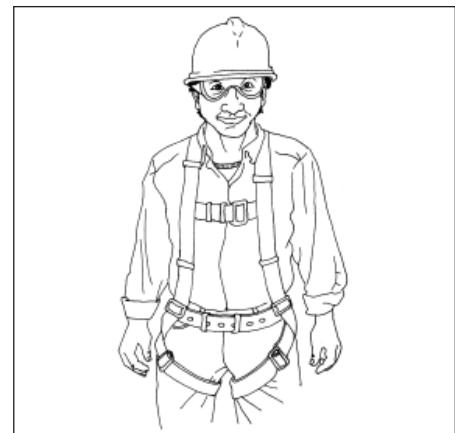
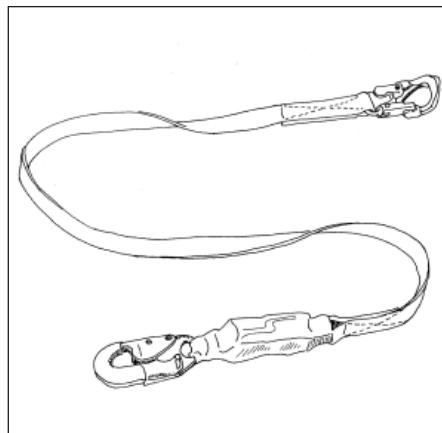
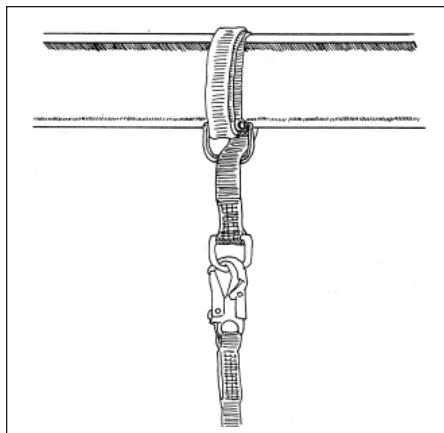
- the nets must be as close as practicable under the working surface, but never more than 30 feet below;
- they must inspect the safety net every week for damage;
- each net has a border rope with a minimum strength of 5,000 lbs.;
- the safety net extends outward a sufficient distance, depending on how far the net is from the working surface (OSHA has a formula to follow);
- the safety net can absorb the force of a 400-pound bag of sand dropping on to the net (“the drop test”);
- items in the net that could be dangerous are removed as soon as possible.

# Personal Fall Arrest Systems

Personal fall arrest systems are one way to protect workers from falls. In general, workers must have fall protection when they could fall 6 feet or more while they are working.

OSHA **requires** workers to wear a full-body harness, (one part of a *Personal Fall Arrest System*) when they are working on a *suspended scaffold* more than *10 feet* above the working surface, or when they are working in *bucket truck or aerial lift*. Employers may also choose to use a Personal Fall Arrest System, instead of a guardrail, when workers are working on a *supported scaffold* more than 10 feet above the working surface.

There are **three** major components of a Personal Fall Arrest System (PFAS):



- the anchor and the anchorage connector;
- the connecting device, which is a lanyard or a retractable lifeline, with snaphooks;
- the full-body harness.

Before you begin work using your Personal Fall Arrest System, you must be sure that **all** parts of your system are in working order. Complete the exercise below to better understand the steps you need to take to protect yourself from a dangerous fall.

## EXERCISE

# A Checklist For Your Personal Fall Arrest System

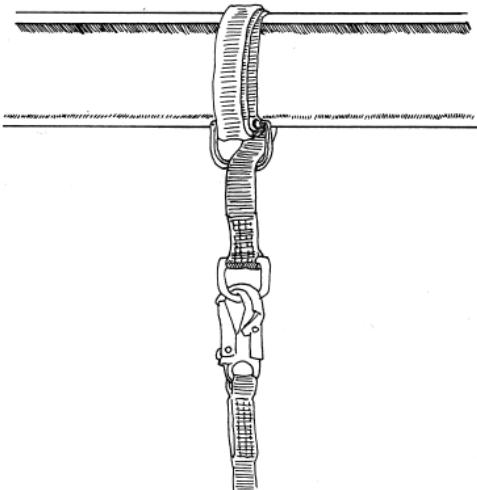
In your group, identify all the things you need to do when inspecting your personal fall arrest system to make sure you can work safely. Each piece of paper contains a statement regarding personal fall arrest systems; include all those statements that you believe should be included in your checklist. (Note: Some of the statements are incorrect, so discuss your choices with other members of the group.)

Each group should post their answers, and the entire group should discuss all the points addressed. Participants should also be trying on a harness to get better acquainted with the equipment.

**TRAINERS' NOTE:** Each group will receive a pack of cards; each card will contain one of the following statements, and then they will post their choice of instructions on the board for all to see and compare.

## ANCHOR AND ANCHORAGE CONNECTOR

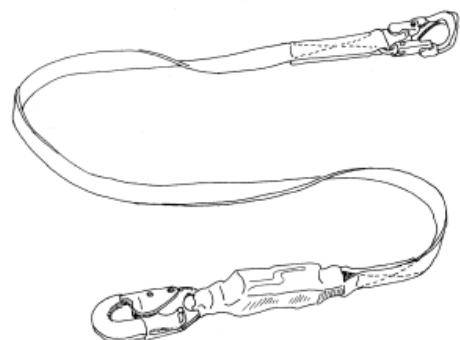
- (Y) Your anchorage point must be capable of supporting 5,000 pounds per attached worker.
- (N) You can tie onto a beam or other substantial structural member that can withstand 3,000 pounds if there is only one worker tying on.
- (Y) The material for your anchorage connector must be synthetic material that is resistant to cutting.
- (N) You can use twisted rope as your anchor connector, as long as it is capable of withstanding 5,000 pounds of dead weight.
- (N) If need be, you can use a guardrail or a water pipe as your anchor.
- (Y) Each worker must have an independent lifeline attached to an anchor.



**Safe Work:** Lanyard is connected to a beam strap.

## CONNECTING DEVICE (LANYARD OR RETRACTABLE LIFELINE) WITH SNAPHOOKS

- (Y) Use a lanyard that has a minimum breaking strength of 5,000 lbs.
- (N) Lanyards can be made of natural fiber rope.
- (Y) Lanyard material must be synthetic and appropriate for the environment in which it is used.
- (Y) Lanyards should have locking snap-hooks on each end.



**Safe Work:** Lanyard with locking snap-hooks and built-in shock absorber.

- (N) You can use a regular carabiner (a type of non-locking snap hook used in mountaineering) instead of a locking snap hook, as long as it can withstand 5,000 pounds of force.
- (Y) Shock absorbers must be able to reduce the total force on the worker's body, through the full-body harness, to no more than 1,800 pounds.
- (N) You could use your co-worker's lanyard when he is not around.

## HARNESS

- (N) You can use a body belt if a full-body harness is not available.
- (N) Wear a body harness that is loose and easy to take off.
- (Y) Wear a body harness that fits snug but allows for full range of movement.
- (Y) Personal fall arrest systems must be inspected prior to each use.
- (Y) Personal fall arrest systems must be rigged such that, an employee can neither free fall more than 6 feet nor contact any lower level.



**Safe Work:** Worker is wearing a full body harness.

# Personal Fall Arrest Systems

Personal Fall Arrest Systems are one way to protect workers on construction sites where there are vertical drops of 6 or more feet. Systems must be set up so that a worker can not fall more than 6 feet, nor come into contact with any lower level.

1. A Personal Fall Arrest System is made up of an **anchorage, connecting device, and a full-body harness**. The connecting device may be a lanyard with snaphooks, or a self-retracting lifeline. A lanyard could also include a deceleration device. Make sure that you are using components from the same manufacturer to ensure that the system works as it should. Mixing and matching components from different manufacturer's systems isn't a good idea.
2. Body belts can not be used for fall arresting service. However, a body belt is allowed as part of a *positioning system*. A positioning system is one way to prevent falls from occurring. It involves equipment for keeping your body in a position where you are not able to fall. For all situations where you could actually fall, you need to wear a full-body harness.
3. Your personal fall arrest system must be inspected for damage before each time you wear it. If there are defects, or if someone has taken a fall using the equipment, it must be removed from service.
4. The **attachment location** of the body harness must be in the center of the wearer's back, near the shoulder level or above the head.
5. **Vertical lifelines or lanyards** must have a minimum breaking strength of 5,000 lbs, and be protected against being cut or abraded.
6. Each employee must be attached to a **separate vertical lifeline**. (There is a special exception when constructing elevator shafts.)
7. The **webbing**, which is the materials used for ropes and straps of lifelines, lanyard and harnesses, must be made of **synthetic** fibers.
8. **An anchorage** for workers' personal fall arrest equipment must be **independent of any anchorage** used to support or suspend platforms, and it must be able to support at least 5,000 lbs. per employee attached to it.
9. **Connectors** must be made from **steel** or equivalent materials, they must have a corrosion-resistant finish, and the edges must be smooth.
10. **D-rings and snaphooks** must have a minimum tensile strength of 5,000 lbs.
11. **Snaphooks** must also be a locking-type, (they are generally double-locking) and designed to prevent the snaphook from opening and slipping off the connector.
12. **Snaphooks can not be directly connected** to the webbing, rope or wire, to each other, to a D-ring to which another snaphook or other connector is attached, to a horizontal lifeline, or to any other object that could cause the snaphook to open.

## **EXERCISE #1**

# **Ladder Safety: Introduction**

Every year, about 50 workers are killed by falls from ladders. Work with others to answer these questions.

## **QUESTIONS**

1. What's more dangerous, going up or coming down a ladder?

**ANSWER:**

Twice as many falls occur stepping down compared to going up ladders.

2. What do you think the main cause of falls from straight and extension ladders is?

**ANSWER:**

Sliding of the ladder base

3. For self-supported ladders or stepladders, what is the main cause of the falls?

**ANSWER:**

Tipping sideways

4. What other injuries can workers get from working with ladders?

**ANSWER:**

Back injuries from carrying the ladder.

## EXERCISE #2

# LADDER SAFETY: What's Wrong with this Picture?

Read the following scenario; ask participants to take on the roles of Mike, Joe and the foreman. After reading the story, participants should identify all the **wrong** things that the workers did when working with ladders; discuss the **RIGHT** way to work safely on a ladder.

**Roles:** Mike and Joe, the workers  
Mr. Smith, the foreman

### INTRODUCTION:

Joe and Mike are excited; they just got the call to work on the new residential construction project in the area. They don't have much experience, but the pay is good, and they want to use this job as a stepping stone to bigger and better jobs.

It's their first day on the job.

### SCENE ONE: The foreman's office

*Mr. Smith:* So you know how to work on ladders, right guys?

*Joe:* Well, I haven't had a lot of experience, so maybe you could just go over the basics...

*Mr. Smith:* Well, I have to take this delivery, and I thought you told me you had lots of experience – where was your last job, anyway? We've got a deadline on this project, so....

*Mike:* Don't worry, Mr. Smith, I'll explain it all to him. I used ladders a lot on my last job.

*Mr. Smith:* Okay. First you need to paint the trim around the top of the building, and then, go inside and finish with the painting in the lobby. There are a couple of extension ladders out here, and a couple of step ladders inside. One of you should work out here, and the other start inside. Are you sure you know what to do? I asked them to find me some experienced guys, not rookies...

*Mike:* We're fine, Mr. Smith. We'll call you if we have any questions.



**SCENE TWO:** Mike and Joe are outside setting up.

**Mike:** So Joe, you work out here, and I'll do the inside work, okay?

**Joe:** Sure, but can you help me to set up here? Is this extension ladder okay, and how do I set it up?

**Mike:** Well, first you should inspect it. Of course the ladder needs to be long enough to reach the top, and it has to be able to hold you. So check the information on the ladder.

It says it's a type I – I'm not sure what that means, but I think it has something to do with your weight. How heavy are you?

**Joe:** About 260 pounds – I've been eating like a horse lately. I have to get back to the gym.

(All ladders should have duty ratings, which state how high the ladder can be placed, and how much weight it can hold. Type III: 200 lbs., Type II: 225 lbs., Type I: 250 lbs, Type IA: 300 lbs, Type IAA: 375 lbs. So a Type I will not sufficiently support Joe's weight. Also, remember to add the weight of Joe's tools and materials.)

**Mike:** Well, that should be good enough. And how long is the ladder, and how high to the roof?

**Joe:** It says it's a 24-foot ladder, and the building is about 20 feet tall.

(A ladder should extend at least 3 feet higher than the top of the surface you are stepping onto. This ladder is too short to do that. The reason it's too short is that a "24-foot" ladder is actually two 12-foot ladders. Since these ladders must overlap one another by at least three (3) feet in an extension ladder, the maximum actual length of a "24-foot" ladder is only 21 feet. This actual length (21 feet) will not allow the ladder to extend the required three (3) feet above the roof. Therefore, you would need a "28-foot" ladder – with an actual maximum length of 25 feet – if the building is 20 feet high.)

**Mike:** Okay, that should work. Just be careful if you're climbing on to the roof.

**Joe:** Am I supposed to check the ladder before using it?

**Mike:** Yeah, but this one looks fine to me.

(Always need to do the inspection)

**Joe:** Well, the step pads are ripped, and there is no pad on one of the feet – won't that make it uneven?

(Ladders need slip-resistant pads on the feet, and all parts of the ladders should be in good shape.)



**Unsafe Work:** "What's wrong with this picture?"  
(See the arrows.)

**Mike:** Just wrap some of this tape around it to even it off. I don't want to be asking for too much on our first day, you know?

**Joe:** This bolt seems a bit loose, and the pulley rope is a bit frayed. I wonder how that happened... and the steps feel like they have some kind of slippery stuff on them...

*(There should be no loose bolts, no frayed pulley ropes. If a ladder is defective in any way, it needs to be marked "Do Not Use" and taken out of service.)*

**Mike:** So just wipe them off. Listen, we need to get started here...

**Joe:** Okay, okay, let's just set up then. Where should I start?

**Mike:** Start over by the doorway; it's early in the day, so not many people should be walking in and out. If you see anyone, just yell. And it's windy already, and it's supposed to get worse later on, so be careful.

*(Never set up in an area where there is traffic, either pedestrian or vehicular. And don't work on a ladder when it is windy.)*

**Joe:** Okay. The ground is pretty uneven here with all these rocks. And do I need to worry about those electrical wires? They seem like they are pretty close to the ladder.

*(The ground must be even under the ladder. You must place the ladder at least 10 feet away from any power lines.)*

**Mike:** Man, you ask a lot of questions, dude! Let's get this set up. Okay, you need to set this up at the right angle to make sure you don't fall. I remember that the ratio is 1 foot of length from the wall for every... every 5 feet of height, I think. So the building is 20 feet high, so put the ladder 4 feet from the wall.

*(Ratio is 1 foot from the wall for every 4 feet of height. So here, the ladder should be 5 feet from the wall, not 4)*

**Joe:** That seems a little steep, doesn't it?

**Mike:** No, that's right. And remember that if we do well on this job, we get another one with this company, so we need to move fast. I will be inside, so don't keep calling me to help you. Carry the paint up with you – try to bring up a couple of cans the first time up to save time.

*(Don't carry too much weight – use a hoist when needed. Always use three-point contact)*

**Joe:** Should I try to tie the ladder to something so it doesn't move?

**Mike:** Don't worry about it moving at the top; just use this rope to tie the ladder to this bicycle stand.

*(Ladder should be tied off at the top, and at ground level, tie on to something sturdy, like a stake placed in the ground.)*

**Joe:** And who left all these cans and plants around? Someone is going to trip on this stuff!

*(Work areas should be kept free of debris.)*

**Mike:** Yeah, yeah, don't worry about it, someone may be looking to use the stuff, so leave it there for now. I'm going inside to start on the lobby; I'll take one of these step ladders. See you later.

**Joe:** Yeah, see you.

**SCENE THREE:** Mike is inside, using the step ladder.

**Mr. Smith:** Hey Mike, how's it going?

**Mike:** Great, Mr. Smith, this is a great job.

**Mr. Smith:** Be careful, you should not be sitting on the ladder, and before I saw you standing on the top step.

*(Never sit on a ladder, or step on the top step – it's dangerous!)*

**Mike:** Oh, don't worry, Mr. Smith, I can handle myself on a ladder – I've been working with my father for years doing this kind of work.

**Mr. Smith:** Okay, but try not to lean so far; just get down and walk the ladder closer, okay?

*(Never lean on the ladder; stay centered. And never “walk” a ladder while you are standing on it – very dangerous!)*

**Mike:** No problem, Mr. Smith, I'm a good worker, and I work fast.

Suddenly, they hear Joe yelling from outside, and then they hear a “thud.” They run outside to see what happened.



**Unsafe Work:** List the safety hazards inside and outside of the building.

# QUESTIONS

1. Are there any problems with Joe's and Mike's ladder work?
  2. What could have been the reason for Joe's fall?
  3. Do you think Mike is working safely? Why or why not?

## LADDER SAFETY CHECKLIST

### When you are working on ladders, you need to ensure your safety...

#### 1. Choose the right ladder to use!

There are two types of ladders: fixed and portable. If you need to use a portable ladder, decide whether you need a self-supporting ladder (an “A” frame), or a straight ladder or extension ladder.

#### 2. Always inspect the ladder first!

- a. Check for any damage, like cracks, any bends, look for splits or corrosion. If you are working on a extension ladder check to see that there are no frays in the rope.
- b. Check all the rungs and the steps.
- c. Slip-resistant pads are needed to make sure the ladder can be properly placed on the surface.
- d. Make sure locks and bracers are working properly, and that all bolts are securely fastened.

Setting up and using a straight or extension ladder:

- Use two people to carry and set up a ladder, if possible.
- The horizontal distance between the ladder and the wall should be  $\frac{1}{4}$  of the length of the ladder. For example, if a ladder is 20 feet high, it should be 5 feet from the wall (20 divided by 4 is 5). Counting the rungs will give you a good estimate of the length – rungs are about 1 foot apart.
- Don’t place ladders in front of door unless the doors are blocked off, locked or guarded.
- Don’t place ladders on boxes, barrels or other unstable bases.
- When using a ladder to get onto a roof, the top of the ladder must extend at least 3 feet above the roof surface.

When you are using the ladder:

1. Hold on with both hands when going up or down. Always use at least one hand to hold on.
2. If material must be handled, hoist it up and lower it using a rope.
3. Always face the ladder when climbing up or down.
4. Always rest a ladder on the side rails – never on the rungs.
5. Do not climb higher than the 3rd rung from the top on straight or extension ladders.
6. Do not climb higher than the 2nd tread from the top on step ladders.
7. Do not reach your body to a point where your waist is beyond the side rails.
8. Do not use a metal ladder near electricity (be at least 10 feet away).
9. Use three-point contact at all times, always with at least one hand on the ladder. Carry only small objects, and no heavy loads.
10. Take special precautions when setting up or climbing a ladder on a windy day.

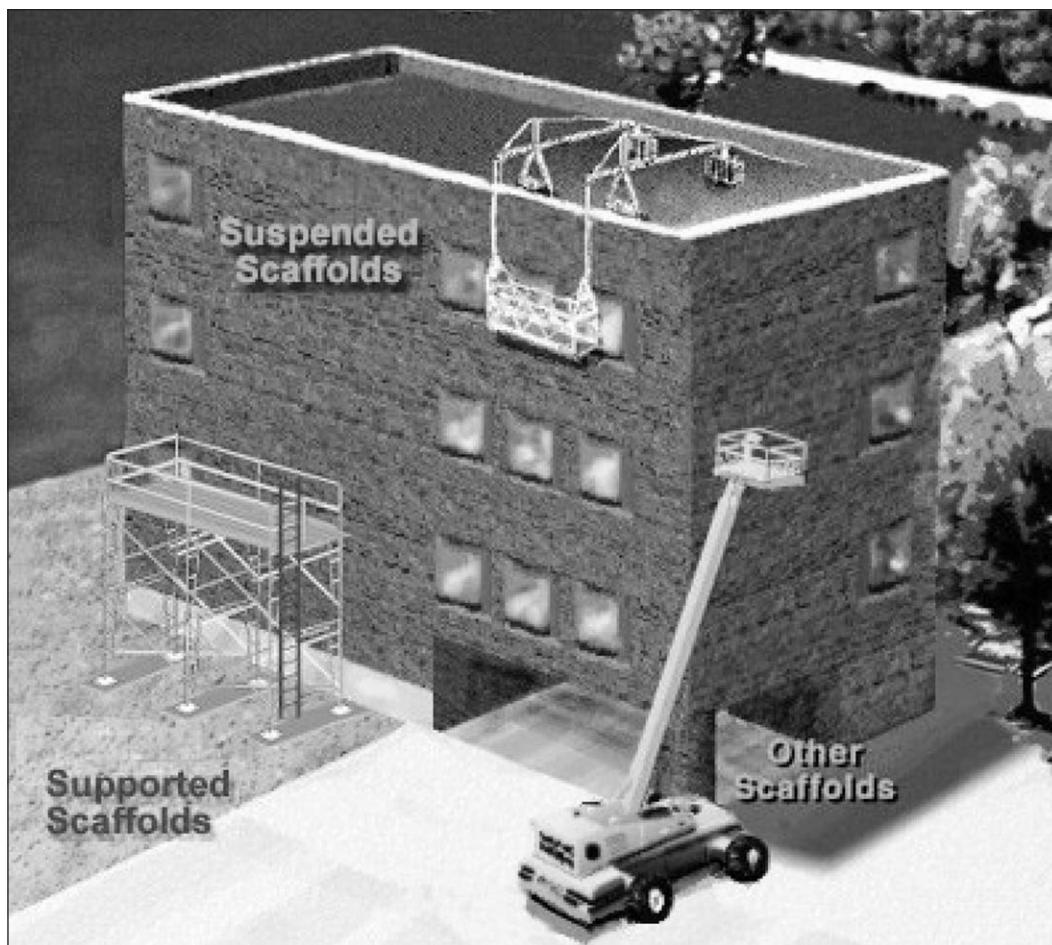
# Scaffolds

Use the attached worksheet to:

1. identify the different types of scaffolds in use
2. conduct the exercise “What’s Wrong with this Picture?”

Participants receive a copy of the exercise with no answers. Ask them to work in groups to figure out what is wrong with the picture, and to discuss ways to prevent falls from occurring.

# Scaffold Hazards: As Seen in Pictures



This drawing illustrates the three different types of scaffolds. In general:

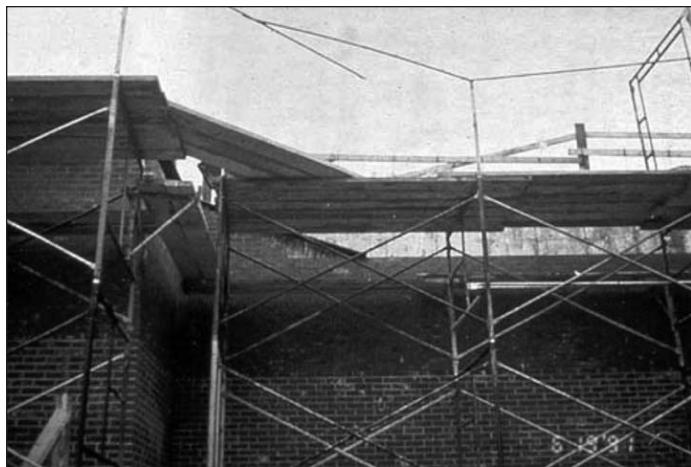
1. Supported scaffolds are supported by the earth or by a floor. The legs are supported by base plates, sometimes on mud sills (as shown here). Portable scaffolds are supported by casters (wheels).
2. Suspended scaffolds hang from buildings or other structures by ropes. The ropes can be made of steel or fibers. There is a wide variety of suspended scaffolds in use, including the two-point (swing stage) scaffold shown here.
3. “Other” scaffolds include the personnel lift with boom and platform, as shown. Elevated platforms or buckets can also be in other forms, such as a scissors lift. All of these are considered to be “aerial platforms.”



Worker is climbing a portable scaffold over an uncovered floor hole. No fall protection is being used, although total fall would be more than 10 feet above lower level.



Different view of the same scene: the floor hole is not covered and workers have no fall protection.



No standard guardrails here, folks...



The roof of this truck is not a solid platform for the scaffold above it...



This worker is climbing the scaffold frame. He has no fall protection and unsafe access.



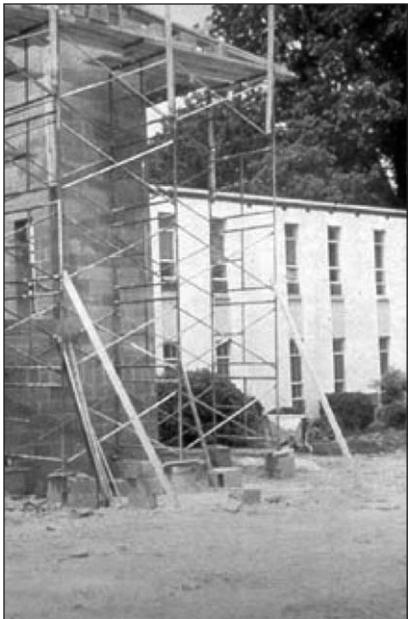
He's standing on a sawhorse, placed on top of a scaffold, and has no fall protection...



Out of the window, stepping on a ledge and over the second stage of an illegal scaffold...



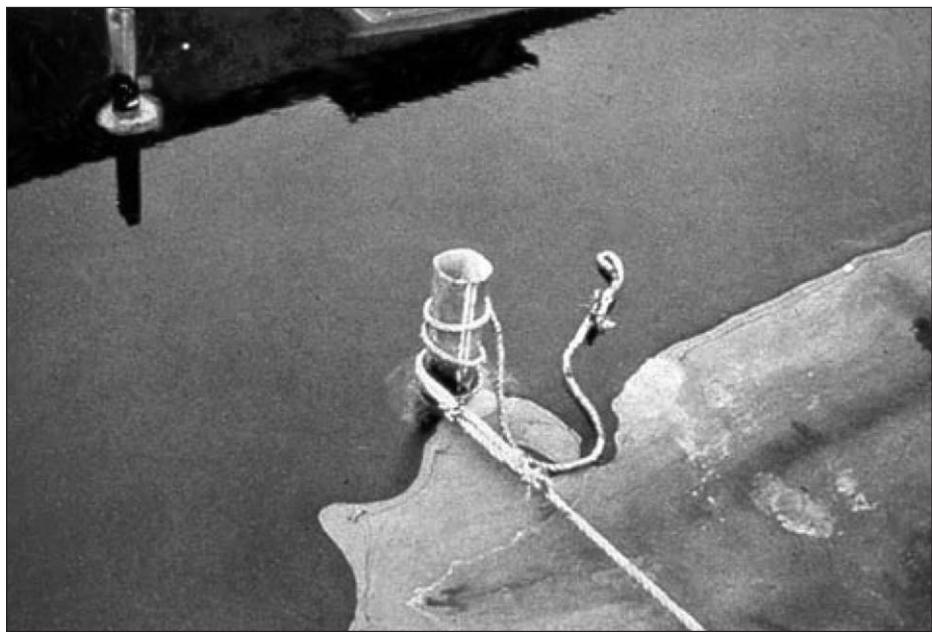
Let's hope that neither the pipe nor the rope is part of the anchor for a worker's lifeline. Neither one would meet the requirement of withstanding 5,000 lbs. of dead weight per worker tied to it...



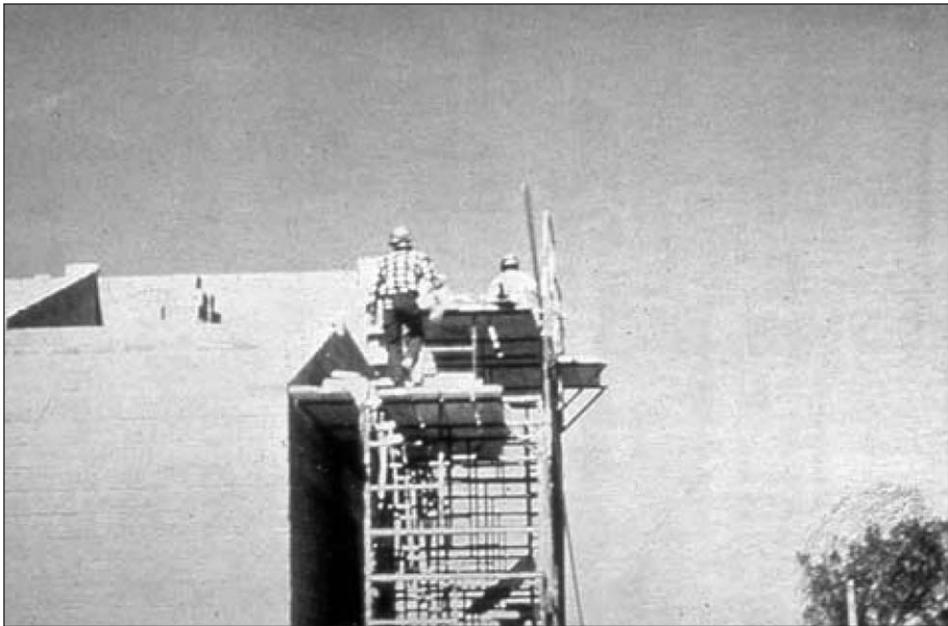
This scaffold is propped up with planks, rather than being tied to the structure.



This is a different view of the same scene. Notice that the scaffold sections are sitting on blocks and propped up with planks. The entire scaffold could collapse if planks move or blocks shift.



This vent pipe and rope are no better than the one shown on page 26.



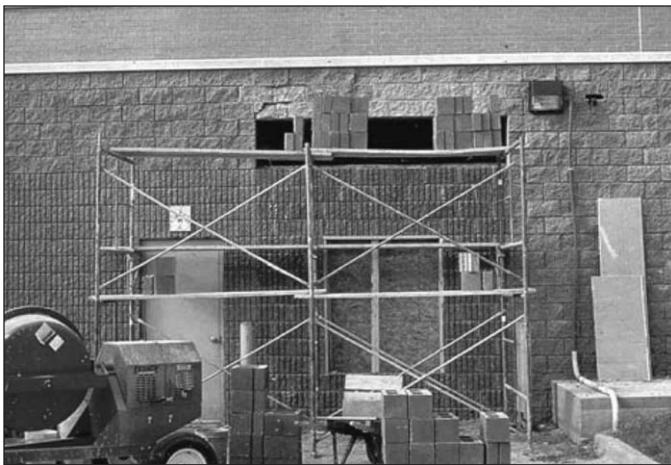
At roof level, this worker has no fall protection.



No fall protection here, either.



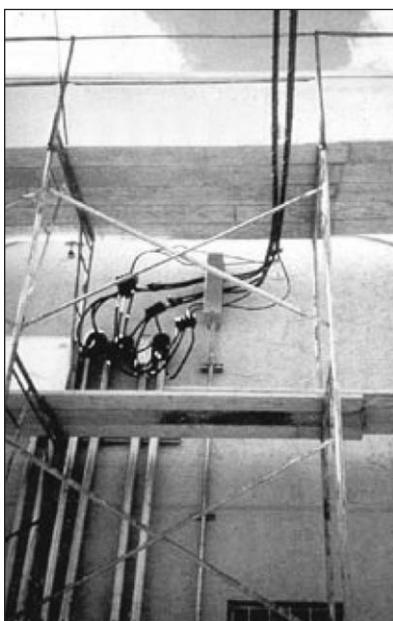
It's charred, broken and unsupported: the plank at left has it all...



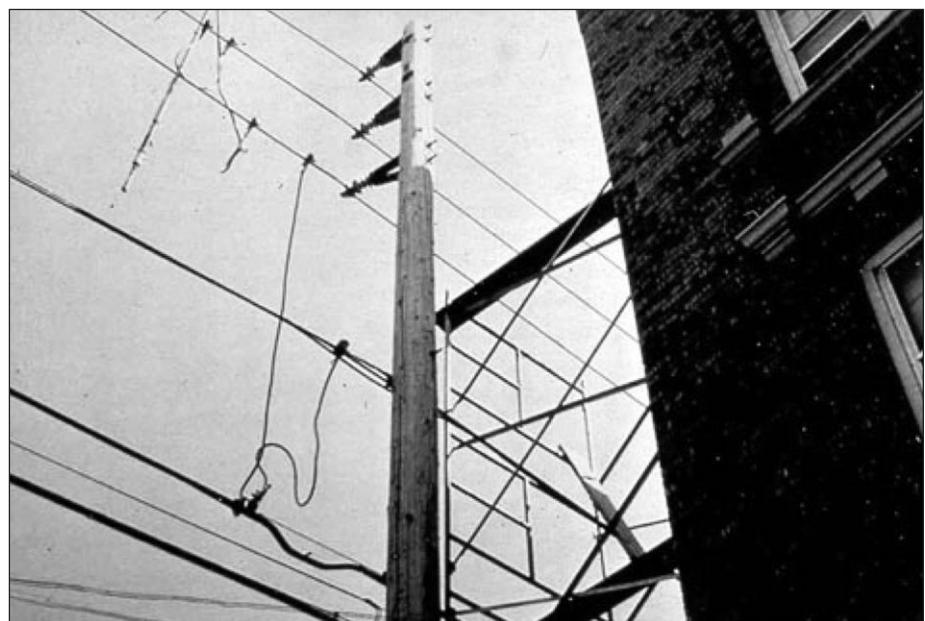
The excessive number of concrete blocks on one section of this scaffold has created a condition known as “point loading.” There is a risk of the blocks breaking the scaffold planks, which could result in a worker’s fall and the collapse of the entire scaffold.



Close-up view of point-loading condition: You can see the bow in the planks caused by overloading. The two solutions to this are to either spread out the blocks over more of the scaffold or reduce the number of blocks. Note also that the scaffold is not fully planked, nor does it have a guardrail. A guardrail or a personal fall arrest system is required if the scaffold is 10 feet or more above the ground.



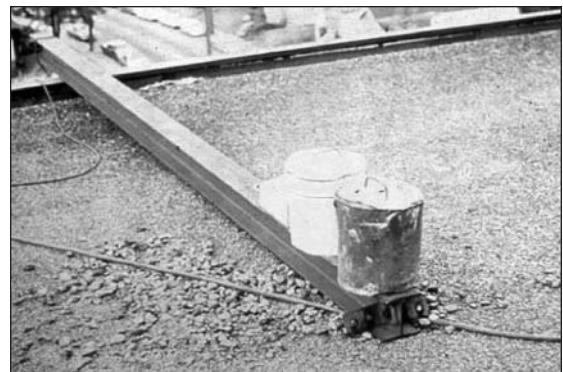
There is a hazard of shock or electrocution: scaffold and platform are less than 10 feet away from these powerlines.



This scaffold has been protected from electrical hazards: three powerlines at the top have been de-energized, jumpered together and then electrically grounded by the power company.



This two-point suspension scaffold doesn't have the required guardrail. The workers may be tied into the required lifelines but that looks like a safety belt, **not the required full body harness**, on the worker at the right.



These two concrete-filled buckets aren't a very good counterweight for this counterweight beam. If they're knocked off the beam, down goes the scaffold. Let's hope it's not the scaffold shown to the left...



There is rope tied to these two counterweight beams and the rope is slack. Why are they tied together? What's going on here? Surely they aren't being used as an anchor for workers' lifelines...



This close-up shows the rope from this counterweight beam going over the edge. It's probably for a worker's lifeline. *Each worker is supposed to be tied off to an independent lifeline with an independent anchor, capable of withstanding 5,000 lbs. of dead weight per worker.* The scenario shown here would likely result in the movement of the counterweight beams, possibly pulling down the entire scaffold, workers and all, in the event of a fall.

## ACTIVITY: SUPPORTED SCAFFOLD CASE STUDY

**Read the story and discuss the questions below.**

The incident occurred at a single-family house located in a suburban area. The house was a single-story, wood-framed structure with a tall, peaked roof. The owner wanted to convert the attic into living space by raising the roof and adding dormers.

The victim was working for his son, who was the owner of a small construction company that had been in business for four years. The owner was an immigrant from Costa Rica who hired other Hispanic laborers as needed. The owner said he was not aware of OSHA or that safety standards existed. The victim was an experienced carpenter who traveled periodically to the United States to work with his son.

Before the incident, the contractor and his crew had already demolished and rebuilt most of the rear section of the house. The crew removed the back section of the peaked roof, and all the discarded wood and surrounding lumber from the rear roof was piled in the backyard. They then rebuilt the roof to increase the interior space. Once the new addition was built, the crew started installing vinyl siding on the outside of the house. During the project, the crew built a homemade scaffold with the discarded lumber from the backyard. This scaffold was poorly built, using wood that had been damaged during the demolition (See Photo 1).

On the day of the incident, the company owner and his crew arrived early to install the vinyl siding. At about 4:00 pm, the victim arrived at the jobsite after just having flown in that day from Costa Rica. The company owner (his son) was away from the work site to get a gutter, so the victim started installing siding on the side of the house. He was standing on a 2" by 6" wood plank set 10 ½ feet above a concrete walkway. One end of the plank was placed on the peak of a small porch roof, and the other end rested on the improvised scaffold at the back of the house (See Photo 2).

A short time later, the company owner arrived back at the house and greeted his father. The victim, who was bending and cutting siding, turned around to talk to him, lost his balance, and fell from the narrow plank. He fell to the concrete, striking his head and losing consciousness. He was brought to a hospital where he underwent surgery for severe head injuries, but he died later that day.



Photo 1. Damaged wood used to make the improvised scaffold.



Photo 2. Porch roof peak used to support the scaffold plank.

## QUESTIONS

1. The contractor said that he did not know about the OSHA regulations? What could be done to ensure that employers know about these rules?

**ANSWER:**

**Construction contractors should be aware of federal OSHA safety standards for the construction industry.**

The employer was a small construction contractor who received all of his training in Costa Rica. When he started his business in the US, he was unaware of OSHA safety standards that he needed to follow. To prevent future incidents, it is important that new companies are aware of applicable safety, health, and environmental standards.

2. What was wrong with this scaffold work? How could this incident have been avoided?

**ANSWER:**

**Employers should use properly designed and assembled scaffolds and/or ladders for working at heights over six feet.**

The scaffold was an improvised and homemade scaffold made with scrap wood left over from the demolition work. This scaffold was unsafe and could have collapsed at any time. The unguarded wood plank from which the victim fell was an extension of this scaffold and was unsafe. Employers and employees need to always use properly designed and assembled commercial scaffolds and/or ladders when working at heights.

It should also be noted that fall protection is required in most cases when working six or more feet above the ground. However, for work involving scaffolds, OSHA doesn't require fall protection until 10 feet above the ground. A proper scaffold with safety railings is adequate, but more fall protection may be needed in other situations, such as during roofing, when a personal fall arrest system may be preferable.

3. What do employers need to do to protect workers on all construction jobs?

**ANSWER:**

**Employers and employees should conduct a safety survey of the job site before starting work, and employees need to be properly trained.**

Employers should conduct a safety survey of the work area with all employees. This should consist of a brief walk-through to look for any apparent hazards at the work site, such as fall, electrical, chemical, equipment, or other hazards they may encounter. Once found, the hazards can be corrected, and employees should be trained on all safety measures.

(From New Jersey Case Report: 03NJ091)

## ACTIVITY: SUSPENDED SCAFFOLD CASE STUDY

**Read the story and discuss the questions with your group.**

A window washer died when he fell 60 feet from a swing stage scaffold onto the pavement below. The center shaft of the electric hoist operating one side of the scaffold failed. The primary and secondary brake of the hoist also failed, causing the scaffold to drop to a vertical position.

The window washer's employer was a small company that had been in business for 23 years. The window washer had 12 years of window washing experience, and training was done mainly on the job.

The site of the incident was a 12-story building with windows on all four sides. The north side of the building was landscaped with a parking lot. The building was equipped with permanent rooftop attachments to accommodate the scaffold rigging needs. The equipment being used was a swing stage, type-F, elevating scaffold. This scaffold measures approximately 20 feet long and 3 feet wide. It had a carrying capacity of about 2,000 pounds, and it was attached to the building by two 5/16" wire rope cables dropped from the roof. These cables were attached to electric hoists on each end of the scaffold, which raised and lowered the scaffold.

The electric hoist comes equipped with an emergency power cut-off, an over-speed secondary brake, and an auxiliary slack rope brake which attaches to a second wire rope. Also secured to the roof were two safety lifelines that were dropped over the side of the building for the workers to attach to their fall protection devices.

After the window washing was completed on a bank of windows, the scaffold was on the ground. The window washer and his co-worker decided to finish up for the day. They went to the roof of the building to transfer the scaffold over one bank and secure the safety lifelines on the roof. Upon returning to the scaffold at ground level and re-evaluating the job, the window washer decided to finish washing the windows on the building because they only had one bank of windows left.

The co-worker wanted to return to the roof of the building and drop the safety lifelines over the side, but the window washer convinced him to finish the job with him. The co-worker got in the scaffold, but he tied off to the guardrail of the scaffold.

The window washer and the co-worker then proceeded to raise the scaffold to the top of the building. About 60 feet from the ground, the left hoist suddenly failed, dropping the scaffold from a horizontal to vertical position. The window washer fell to the concrete parking lot below. The co-worker, who was tied off to the scaffold handrail, was able to climb onto the building balcony.

The paramedics arrived in less than five minutes, and found the window washer without a pulse and not breathing. He died from multiple blunt force traumatic injuries.

## QUESTIONS

1. What should the window washer have done to protect himself and his co-worker? Why do you think he did what he did?

**ANSWER:**

Ensure employees always attach the lanyard to the fall protection harness and the independent safety lifeline before operating a swing stage scaffold.

All too often a sense of false security overtakes employees of high-risk occupations when repetitive tasks occur. With 12 years experience as a window washer, the repetitive act of attaching the lanyard over and over again without any incident could have created a sense of false security for the window washer. Had he taken the time to drop the lifelines and attach his lanyard, this incident still would have occurred, but he would be alive.

2. What are the other safety features of this scaffold which – *if they had been used* – might have prevented this accident?

**ANSWER:**

Ensure that all safety features of the hoist systems are used as prescribed by the manufacturer when feasible. The company could have required the workers to use all available safety equipment included with the scaffold, such as the auxiliary slack rope brake system.

This particular electric hoist came equipped with an auxiliary slack rope brake system. This system locks the hoist to a second wire rope whenever the main suspension wire rope is slack. It would require the installation of a second wire rope to be used. This system was not used on the day of the incident. Had it been incorporated, this incident might have been prevented.

3. Would having a supervisor there made a difference? Why or why not?

**ANSWER:**

Ensure employees are supervised when using window washing equipment and safety gear.

In this incident, there was no supervisor to stop the window washer when he began raising the scaffold without being properly tied off. Therefore, when the hoist failed, he fell to his death. Safe work practices can be assured through supervision, as well as training programs.

(Excerpted from California FACE Report #00CA003)

## SUMMARY

# Scaffold Work Can Be Dangerous. Know The Basics Of Scaffold Safety.

There are thousands of scaffold-related injuries – and about 40 scaffold related deaths – every year in the U.S. If you are doing work on scaffolds, know how to work on them safely – it could save your life!

Here are some rules about scaffolds that must be followed if you want to work safely:

1. A **competent person** must be available to direct workers who are constructing or moving scaffolds; s/he must also train employees, and inspect the scaffold and its components before every work shift, and after any event that could affect the structural integrity of the scaffold.

The competent person must be able to identify unsafe conditions, and be authorized by the employer to take action to correct unsafe conditions, to make the workplace safe. And you need a **qualified person**, someone who has very specific knowledge or training, to actually design the scaffold and its rigging.

2. Every **supported** scaffold and its components must support, without failure, its own weight and at least four times the intended load. The intended load is the sum of the weights of all personnel, tools and materials you will place on the scaffold. Don't load the scaffold with more weight than it can safely handle.
3. On **supported** scaffolds, working platforms/decks must be planked close to the guardrails. Planks are to be overlapped on a support at least 6 inches, but not more than 12 inches.
4. Inspection of **supported** scaffolds must include:
  - Check metal components for bends, cracks, holes, rust, welding splatter, pits, broken welds and non-compatible parts.
  - Cover and secure floor openings and label floor opening covers.
5. Each rope on a **suspended** scaffold must support the scaffold's weight and at least **six times** the intended load.
6. Scaffold **platforms** must be at least **18 inches wide**, (**there are some exceptions**, and guardrails and/or personal fall arrest systems must be used for fall protection any time you are working 10 feet or more above ground level. **Guardrails** must be between 39 and 45 inches high, and **midrails** must be installed approximately halfway between the toprail and the platform surface.
7. The OSHA standard requires that a worker have **fall protection when working on a scaffold 10 or more feet above the ground**.
  - OSHA requires the use of a **guardrail OR a personal fall arrest system** when working on a **supported scaffold**.
  - OSHA requires **BOTH a guardrail AND a personal fall arrest system** when working on a **single-point or two-point suspended scaffold**.

- OSHA requires a **personal fall arrest system** when working on an *aerial lift*.
- Your lifeline must be tied back to a **structural anchorage** capable of withstanding **5,000 lbs** of dead weight **per person** tied off to it. Attaching your lifeline to a guardrail, a standpipe or other piping systems will not meet the 5,000 lbs requirement and is not a safe move.
  - Wear hard hats, and make sure you have toeboards, screens and debris nets in place **to protect other people from falling objects**.
  - Counterweights for *suspended scaffolds* must be able to resist at least **four times the tipping moment**, and they must be made of materials that can not be easily dislocated (no sand, no water, no rolls of roofing, etc).  
(The term “tipping moment” refers to the number of *foot-pounds* where *weight times distance* of the *counterweight* equals, or balances, *weight times distance* for the *loaded scaffold*. Therefore, *multiplying the calculated weight of the counterweight by four* will ensure that the scaffold is able to resist at least “four times the tipping moment.” This would be calculated by the *qualified person* who designs the scaffold.)
  - Your employer must provide safe access to the scaffold when a platform is more than two (2) feet above or below the point of access, or when you need to step across more than 14 inches to get on the platform. Climbing on cross braces is not allowed! Ladders, stair towers, ramps and walkways are some of the ways of providing safe access.
  - All workers must be **trained** on:
    - how to use the scaffold, and understand how to recognize hazards associated with the type of scaffold they are working on;
    - understanding the maximum intended load and capacity;
    - recognizing and reporting defects;
    - fall hazards, falling object hazards and any other hazards that maybe encountered, including electrical hazards (such as overhead power lines);
    - having proper fall protection systems in place.

**NOTE:** Only some scaffolds were selected for this training. There may be additional hazards associated with other scaffolds that will not be covered in your training.

# Training Evaluation – Focus 4 Construction Safety & Health

## FALL PROTECTION

Date:

Location:

Trainer:

1. Overall, how would you rate this training?

Excellent     Good     Fair     Poor

2. Were the teaching methods (activities, exercises) effective?

Yes     No     Not sure

3. Were the handouts and materials useful?

Yes     No     Not sure

4. Will the information you received in this workshop be useful on your job?

Yes     No     Not sure

5. What did you like most about this training?

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6. What did you like least about this training?

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7. Please feel free to make additional comments or to suggest ways to improve the training.

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