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## CONFINED SPACES

### How to Create an Entry Permit Program

“Somebody better do something about that [propylene oxide (PO)] gas before someone gets killed in there.”

“[I]n there” was a cornstarch processing tank, a tight and dangerously restricted area deemed a “confined space” under OHS regulations. Within hours after these words were uttered, a worker making repairs inside the space succumbed to toxic PO vapors. In a twist of tragic irony, the victim was 54-year-old Jim Beals, the very worker who had sounded the all too prophetic warning. [Read more about the Beals tragedy on page 2.] The OHS offenses for which Jim’s employer was later cited read like a catalog of common confined space violations, including:

- Letting Beals and his co-worker enter the tank without proper confined spaces training and instruction.
- Not having a safe entry procedure in place.
- Failing to control the atmospheric hazards inside the tank.
- Failing to equip the workers with proper PPE and safety equipment for confined space work.
- Lack of confined space emergency response procedures.
- Failing to provide a safe means of entry into and exit from the tank.

### Why You Need an Entry Permit System

If the employer had properly implemented a confined space entry permit system, none of these violations would have happened and Jim Beals might still be alive today. The entry permit sets out the work to be done inside the confined space and the precautions necessary to perform it safely. And while permitting is

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just one of many confined spaces safety measures required by OHS laws, it plays a critical role in prevention by serving as a checklist ensuring nothing is overlooked before entry. Permitting also plays a critical role in compliance by documenting all such required measures were taken.

## The 8 Things You Need to Know

Here are the 8 things you need to know to establish an effective entry permit system at your own worksite. Not only are these 8 items the basis for a permitting system, you can use them to guide your confined space training.

### 1. When Entry Permitting Is Required

Many workplaces contain spaces which are considered “confined” because their configurations hinder the activities of any employees who must enter, work in, and exit them. In addition, there are many instances where employees who work in confined spaces face increased risk of exposure to serious hazards. In some cases, confinement itself poses entrapment hazards. In other

cases, confined space work keeps employees closer to hazards, such as asphyxiating atmospheres or the moving parts of a mixer, than they would be otherwise.

The term “permit-required confined space” (permit space) is used to describe those spaces which both meet the definition of “confined space” and pose health or safety hazards.

*Strategic Pointer:* Even if not expressly required by safety and health regulations, establishing an entry permit system is highly advisable as a matter of best practices.

### 2. How Entry Permits Are Issued

Entry permits can’t be generic. They must be issued for a specific confined space. Even if work in that same space takes place the next day, a new permit is required.

### 3. What Entry Permits Must List

Entry permits must list, at a minimum, the information required by safety and health regulations, which typically include:

## How Jim Beals Died in a Confined Space

The tragedy began when Beals and co-worker Jerry Sumner, both mechanics, were ordered to make repairs inside a cornstarch processing tank.

“This was a boilermaker’s job,” Mr. Sumner recounts “that we’d never done before.” But the supervisor reassured them that the vessel was safe and ordered them to go in. And so they did.

The tank met the OHS criteria for a “confined space” requiring special safety measures. Sadly, none of those measures were taken. The two workers had to “worm their way into” the narrow 12” x 18”

opening. The crawl space inside measured 24”. The insides were “slimy.” And the round surface made walking tough.

But the real danger was the one Beals had expressed concern about earlier that day: the toxic PO gas.

Less than 15 minutes after entering the tank, Sumner detected a liquid chemical seeping into the tank from an open vent. “Then we started choking and I realized it was PO,” Sumner relates. “We were suffocating, and I told Jim I was getting the hell out of there.”

Sumner remembers “going toward the light” and escaping. “I tried going back in for Jim,” he continues, “but my eyes were burning too much.”

After recovering his vision, Sumner strapped on a Scott air pack and tried to go back in. But he couldn’t get through the opening with the pack on. Ironically, the breakdown in the rescue procedure saved his life. “I later found out there was almost no oxygen in the air pack.”

Beals would never make it out of the tank alive. He was overcome by the PO vapors and died of asphyxiation.

## SafetySmart

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## ABOUT US



- The location and description of the confined space;
- The date and time of entry;
- The permit's duration (when it expires);
- The name of each person entering the confined space;
- The means of communication between those in the space and the attendant;
- The work to be done inside the space;
- Details on any atmospheric testing done in the space;
- The required precautions for the work;
- The signature of the worker who did the air testing; and
- The signature of the confined space supervisor.

#### 4. How Long an Entry Permit Can Last

A copy of the entry permit (or original) must be available and posted at the site of the entry when employees are inside the space. Permits can only last for a certain period. The duration will depend on your OHS laws and company requirements above and beyond those laws. Common triggers for when the entry permit must be re-authorized and signed by the entry supervisor include:

- When there's been a change in the equipment or processes done in the space;
- When the atmospheric or environmental conditions in the work space change;
- After each shift change;
- After a change in the supervisor responsible for the entry; and
- If there's a change in the work crew.

In general, most permits can't last longer than 24 hours from the time required atmospheric testing is performed. As noted above, permits are typically required to list the time and date of expiry.

#### 5. When an Entry Permit Must Be Reviewed

Atmospheric and other conditions inside a confined space constantly change. So, as a rule, entry permits need to be closely reviewed and updated as necessary to keep up with the changes and ensure the safety of the workers inside.

#### 6. How an Entry Permit Can Be Revised Without Being Reissued

In addition to the review requirements described above, there is limited leeway for revising or altering a current permit and if permit alterations are made, the affected workers must be immediately notified.

#### 7. When & Where Entry Permits Must Be Posted

Permits typically must be posted at or near the entry to the confined space or otherwise made accessible so that affected workers can see the important safety information they list.

### BY THE NUMBERS

#### 7 Facts About Confined Spaces

Here are seven facts relating to confined spaces:

1. **1** confined space fatality occurs every four days on average in workplaces across the United States. (US Department of Labor)
2. Toxic gases present **2** risks: chemical asphyxiation (smothering) and irritation to the human respiratory system, skin and eyes.
3. **4** dangers of confined spaces are oxygen deficiency or oxygen enrichment; fire/explosion; the potential to drown in liquids or solids; and toxic atmospheres.
4. **10** examples of confined spaces are vessels, tanks, storage bins, silos, vaults, pits, manholes, sewers, septic systems and pipelines.
5. About **50** percent of confined space deaths in Canada result from insufficient oxygen. (Labour, Government of Canada)
6. **60** percent of the people who die in confined spaces are would-be rescuers attempting to help fallen co-workers. (OSHA)
7. **61** percent of confined space fatalities in the US occur during construction, repair or cleaning activities. (US Department of Labor)



#### 8. How Long Entry Permits Must Be Retained

The last key piece in the entry permit program is ensuring compliance with the rules for retaining entry permits. OSHA requires cancelled permits be kept for one year and used to complete an annual review of the written program. In Canada the requirements can vary from one year all the way up to 10 years. ❖

## Confined Space Safety

### WHAT'S AT STAKE?

A confined space does not necessarily mean a small, enclosed space. It could be rather large, such as a ship's hold, a fuel tank or a pit. A confined space has three defining features:

1. A confined space is large enough to enter and perform work.
2. The second defining feature is it has limited means of entry or exit. Entry may be obtained through small or large openings and usually there is only one way in and out.
3. The third defining feature is that confined spaces are not used for continuous or routine work. In other words, you wouldn't set up your office or the break room in a confined space.

All confined spaces are categorized into two main groups: non-permit and permit-required. Permit-required confined spaces must have signs posted outside stating that entry requires a permit. In general, these spaces contain serious health and safety threats including:

1. Oxygen-deficient atmospheres
2. Flammable atmospheres
3. Toxic atmospheres
4. Mechanical or physical hazards
5. Loose materials that can engulf or smother

### WHAT'S THE DANGER?

Although the danger in a confined space is obvious, the type of danger often is not. For example, a confined space with sufficient oxygen might become an oxygen-deficient space once a worker begins welding or performing other tasks. Confined spaces are dangerous for many reasons.

- Poor ventilation can cause an accumulation of toxic gases or hazardous airborne substances, or a lack of oxygen.
- Moving equipment, slippery or dangerous surfaces, electric shock hazards, falling objects, water or other liquid contents, chemicals or extreme temperatures.
- Noise, poor visibility or shifting materials such as grain or sand could be present.

### HOW TO PROTECT YOURSELF

7 easy ways to keep yourself safe

1. Be prepared
  - Attend training and pre-job briefings. The minimum is before starting work on the site,

the ideal is daily. The briefing should cover: hazards associated with the job; special precautions; energy-source controls; work procedures involved; personal protective equipment requirements.

- Only use tools and equipment suitable for the potential hazards in the space. Non-sparking tools shouldn't be used in a potentially flammable space.
2. Protect the zone
    - Separate and barricade the entry work area.
    - Ensure signage is clear, easy to read, and in place.
  3. Testing, testing, testing
    - Before you go into the space, check it has been tested by a qualified person.
    - Atmospheric test monitoring needs to occur near the surface of the opening, midway into the enclosure and near the bottom of the enclosure.
    - Make sure there is continuous monitoring in place while you are working.
    - Documentation of the tests should be available on the site and available to read.
  4. Get out if it changes
    - If the attendant or entry supervisor tells you to get out of the space - you must get out as quickly as you can and stay out until you are told it is safe.
    - To do this, know where your exit(s) is and how to get out.
    - If a retrieval device is available: Wear your safety harness connected to the retrieval device. Check someone is available who can use the retrieval device correctly.
    - Remember! Properly trained rescuers with self-contained breathing systems and emergency equipment must be available to perform rescue.
  5. Just breathe
    - Fresh air ventilation should be available to ensure the proper level of oxygen is present to: Support life; Prevent heat exhaustion; and Prevent worker fatigue.
    - Use a respirator if working conditions make it necessary.
  6. Do not start a fire
    - If the space contains energized cable an arc flash in the space may occur.
    - Burning insulation creates toxic fumes; so, does burning many other materials.

7. You are in

- When you enter the space, look around to check for:
  - structural changes due to weather, heavy traffic vibration;
  - low suspended pipe, cable trays and equipment;
  - any pressurized or energized equipment; and
  - water due to rain, sewage seepage, etc.

### FINAL WORD

*Confined spaces can pose serious hazards. But if you follow simple procedures, these spaces don't have to be so threatening. ❖*

## TEST YOUR KNOWLEDGE

1. A confined space could be a trench and pit.  
 True  False
2. A confined space has limited means of entry and is not designed for continuous occupancy.  
 True  False
3. Underground electric cable cannot arc underground.  
 True  False
4. Atmospheric hazards are the only real hazard in a confined space.  
 True  False

### What Would You Do?

You are working in a confined space repairing some piping. You have been there a while and have been feeling fine. You only have about five more minutes of work left on the repair and you start to feel dizzy. What would you do?

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Quiz Answers: 1. True, 2. True, 3. False, 4. False



## TOOL BOX

## Ladder Safety Checklist

Use this ladder safety checklist to ensure that the ladders in your workplace are in good operating condition and that your workers are setting up and using ladders safely.

Inspected by: \_\_\_\_\_ Date: \_\_\_\_\_

## Ladder Inspection

- Are all the rungs, cleats, or steps in good condition?
- Are the side rails intact without any cracks, bends, or breaks?
- Do the rungs, cleats, or steps fit snugly into the side rails?
- Is the ladder free of corrosion?
- Are the side rails and steps free of oil or grease?
- Are the ladder's hardware and fittings secure and undamaged?
- Do moveable parts operate freely without binding or excessive play?
- Are the ropes on extension ladders intact without fraying or excessive wear?
- Are damaged ladders removed from service and marked "Do not use"?

## Ladder Usage

- Ensure step ladders are fully open and locked before climbing them.
- Place the ladder on a flat, secure surface.
- Place the ladder on a hard surface, as it will sink into a soft surface.
- Place the ladder on a non-movable base.
- Lean the ladder against a secure surface, not boxes or barrels.
- Do not place a ladder in front of a door.
- Position base of a ladder 1 foot away for every 4 feet of height to where it rests (1:4 ratio).
- Ladder rails should extend at least three feet above the top landing.
- Check shoes to ensure they are free of grease or mud.
- Mount the ladder from the center, not from the side.
- Face the ladder when ascending or descending and hold on with both hands.
- Carry tools in pockets, in a bag attached to a belt, or raised and lowered by rope.
- Do not climb higher than the third rung from the top.
- Work facing the ladder.
- Do not overreach. Always keep your torso between the ladder rails.
- When using a ladder for high places, securely lash or fasten the ladder to prevent slipping.
- Avoid outdoor ladder use on windy days.
- Avoid aluminum ladders if work must be done around electrical wires or power lines.



## PICTURE THIS

# Prepare for Impact



Source: [www.reddit.com/r/OSHA](http://www.reddit.com/r/OSHA)

**C**hoosing and using the right ladder for the job is the basis for all other ladder safety concepts. If you don't start out with the right ladder you are setting yourself and your ladder, up for failure.

Looking at this picture, a few obvious unsafe work practices probably jump out for you.

First off, the worker appears to be working on a unit powered by electricity. And he's doing it while on a metal ladder. Another basic tenant of ladder safety – NEVER use a metal ladder when working with or around electricity. A safer choice would be a wooden or fiberglass ladder.

Next, look at the ladder placement and setup. This worker is leaning his stepladder up against a soda dispenser. A stepladder is not designed to be safely used this way (I'm guessing neither is the soda dispenser). A better choice for our leaning laborer, may be an extension ladder or mobile ladder with a platform.

Additionally, the ladder feet (or the parts of the feet making contact with the floor) are precariously placed on a highly waxed, smooth floor, around a beverage station where spills and puddles of melting ice are a common occurrence. A perfect storm of slip and fall hazards all right under the ladder's feet.

Finally, while there is a lot going on at the base of the ladder, check out the worker's feet. Looks like he is standing on the second step from the top of the ladder; a most dangerous place to be!

The safe way is to avoid working from, or standing on, the top two rungs, steps or cleats or bucket shelf of a portable ladder.

There's at least one more hazard in this picture. I'll leave you to find it. Happy hunting! ❖

### FATALITY FILES

## Carpenter Dies After Falling from Extension Ladder



A 49-year-old male carpenter (victim) employed by a residential contractor was fatally injured after falling from an extension ladder. The victim and a co-worker were on site

to perform gutter work on a house. The victim was climbing an extension ladder that was set up on stone pavers to access the roof.

While climbing the ladder, the victim fell to the ground below when the base of the ladder slipped out and the ladder fell to the left. The co-worker went to assist the victim, and both the co-worker and the homeowner called emergency medical services (EMS).

EMS and local police arrived within minutes. The victim was transported to a local hospital where he died 16 days later. At the time of the incident, the company the victim worked for did not have a safety and health program.

Contributing factors identified in the accident investigation included:

- Lack of a safety and health program.
- An incorrect ladder type/duty rating was being used.
- The ladder was overloaded and was set up on a surface that was not flat.

### Final Word

Take the following steps to protect your workers from meeting a similar fate:

- Ensure the correct equipment, both types and ratings, are provided and used for the tasks being performed.
- Ensure ladders are set up properly before use and equipped with accessories that will help stabilize the ladder.
- Provide all employees with training on ladders, and other equipment such as scaffolding and aerial lifts, when they will be used to complete tasks.
- Develop, implement, and enforce a safety and health program that addresses hazard recognition and avoidance of unsafe conditions.

**FATALITY FILES****Road Construction Worker Dies After Being Hit**

A driver is likely to face charges after hitting and killing a construction worker in a road construction work zone. The victim was a 42-year-old construction worker, who was removing barrels from the end of a road closure as it was about to reopen. The driver entered the closed lane with the intent to exit when he hit the worker. Police said the victim was wearing a reflective jacket and helmet at the time.

The victim was transported to a local hospital with serious injuries. He died the following day.

The driver told police he realized he was in the construction zone and was in the process of merging back into traffic when the accident happened. He will likely face charges of vehicular homicide.

**Final Word**

Imagine if your “office” was smack in the middle of multiple lanes of traffic, or a narrow two-lane road with no shoulder. You are just feet, sometimes inches away, from speeding vehicles, semi-trucks, and heavy equipment. Even with your required reflective clothing and other PPE, you know who will likely win if some driver isn’t paying attention.

Traffic work zones are dangerous. Hundreds of workers die each year in work zones because of:

- Driver inattention.
- Worker inattention.
- Improperly placed warning signs; and other factors, including speeding, abusive drivers experiencing road rage, and driver impairment from drugs and alcohol.

**Disaster Response: Keeping Responders Safe**

In the panic and shock-filled aftermath of a natural disaster such as a hurricane, tornado, earthquake, fire or flood, disaster response teams rush in to help clear roads, rescue people, and get utilities and other services back up and running. But, are you doing enough to ensure their safety?

**Help Responders Cope with Disaster Response**

1. Talk about the emotional and physical strain of disaster response work and how it makes them more vulnerable to stress-induced illnesses.
2. Talk about the signs of emotional exhaustion and stress so crews can keep an eye out on each other.
3. Help them set priorities and pace work to avoid exhaustion. Remind them, they can’t help others if they don’t take care of themselves.
4. Stress the importance of sleep and resuming their normal sleep schedule as quickly as possible.
5. Set and enforce frequent breaks to help fend off exhaustion.

**How Does Disaster Response Differ from Regular Work?**

Disaster response work has several differences from a normal day on the job – go over these with workers before they get on site:

1. New command structure of an Incident Command System (ICS) with the Incident Site Commander in charge.
2. Exposure to new hazards and new requirements for protective equipment.
3. Unplanned or unscheduled extended work hours.
4. Shortages in supplies, materials, and personnel.
5. Unpredictable response or reaction from the public, motorists, and victims.
6. Stress.

**Special Health and Safety Issues**

Disasters can create unique health and safety challenges.

*Health*

1. Contamination of water and/or the environment.
2. Disruption of the food supply.
3. Disruption of power and energy.
4. Hygiene.
5. Immunizations.

*Safety*

1. Pressure to bypass normal safety protocols.
2. Difficulty getting safety gear or materials.
3. Communication and language barriers.
4. An unpredictable or panicked public or motorists.
5. Equipment staging and use.

Source: [https://www.workzonesafety.org/files/documents/training/courses\\_programs/rsa\\_program/RoadwaySafety\\_Toolbox\\_English/RoadwaySafety\\_Toolbox\\_Disaster\\_English.pdf](https://www.workzonesafety.org/files/documents/training/courses_programs/rsa_program/RoadwaySafety_Toolbox_English/RoadwaySafety_Toolbox_Disaster_English.pdf)