

Confined Spaces: *Deadly Places*

**Trainer's
Manual**

 **Safe Expectations, Intl.**
a LearnCom, Inc. Company
Environmental, Health & Safety Training

Confined Spaces

Deadly Places

Trainer's Manual

Written by: Mary Worobec
Design/Production: Barbara Alter
Copyright © 1996
by BNA Communications Inc.
Printed in U.S.A.

Distributed by:

 **Safe Expectations, Intl.**
a LearnCom, Inc. Company

714 Industrial Drive
Bensenville, Illinois 60106
800-217-2338
800-824-8889

NOTICE

BNAC believes that the information contained herein is factual and that the opinions expressed are those of qualified experts. The information is not, however, to be taken as warranty or as representation for which BNAC assumes legal responsibility. Any use of this information must be determined, by the user, to be in accordance with policies within the user's organization and with applicable federal, state, and local laws and regulations.

Compliance with any applicable federal, state, or municipal laws or rules, regulations, or standards is the sole responsibility of the user's management. The use of this material cannot ensure complete compliance with any applicable law, rule, regulation, or standard.

Confined Spaces: *Deadly Places*

Summary

Subject

Hazards of confined spaces and rules for entry, including permit system.

Running time

21 minutes

This video . . .

- Shows a graphic example of how confined spaces kill. In this case, when one man gets in trouble, four others who try to rescue him die.
- Explains the types and hazards of confined spaces and the requirements for permits for entering.
- Motivates workers to recognize confined spaces, permits, and safety measures needed.
- Gives you the chance to explain your policies on confined space entry and your permit procedures.
- Can be used for training those who enter confined spaces, those who issue permits, rescuers, and standby employees. Also an excellent tool for general employee training to inform workers who might enter a confined space without knowing the hazards inside.
- In combination with the companion video, *Survival by Permit*, provides a complete training and awareness program on confined space entry.

Table of Contents

Trainer's Manual

Subject information and set-up instructions for the person who will conduct the training on this subject.

Lesson Plan

A customized step-by-step narrative script to assist the trainer in conducting the session. Includes suggestions to target your organization's special needs.

Participant's Manual

A handout to be photocopied and distributed to persons attending the training session.

Participant's Quiz

A quiz for employees to take after the training session. This page should be photocopied so each employee in the training session gets a copy. The quiz will help identify workers who need further assistance. The completed quiz can be collected and placed with the employees' records as further proof that they took part in the required training.

Answer Key

An answer key to the employee quiz. This gives correct answers to the questions in the participant's quiz. This may be photocopied and distributed to employees at the close of the training session or may be used by the trainer as a reference tool.

Trainer's Manual

Before training begins . . .

Plan the Session

Arrange for a location suitable for the training session. Ideally, the room should be comfortable to seat all participants and in a quiet location. You should be able to darken the room to make viewing easier. The video monitor must be close to an electrical outlet and in a position where everyone can see it.

Reserve the audio/visual equipment and video for the day and time needed. Check the equipment to ensure that it is in the proper format and in working order.

Read through all the materials in this manual, including the trainer's and the participant's material. Be familiar with the subject and ready to answer questions, or arrange for an expert to join you during the training session.

Notify those you want to attend and their supervisors. Photocopy the participant's manual and participant's quiz.

Gather Materials

Photocopy,

- A participant's manual for each participant.
- The participant's quiz, one for each participant.
- The answer key for the trainer. Copies of this may also be given to participants after they take the quiz.

In addition,

- Collect and review pertinent company policies related to the training. If you plan to distribute these to participants, you should make enough copies.
- Gather safety equipment or other items that will be part of a demonstration.
- Bring a wristwatch or clock to time the session.
- Provide pencils or pens for all participants.

Final Set-up

Before the participants arrive on the day of training

- Set up the room so everyone can see the Trainer and video monitor. Include space for the trainer's materials.
- Distribute the materials, one set at each participant's seat.
- Insert and cue the video and check the sound level.

You're ready to begin the training.

Lesson Plan

Opening remarks (5 minutes)

Read or paraphrase the following:

"Today we are going to look at the subject of confined spaces and the special dangers they pose. Because there are so many hazards associated with entering things like tanks, utility vaults, sewer lines, silos, and pipelines, there are very stringent safety rules on working in or near confined spaces.

"Some of you may not know why you are here. Others are here as part of your training for entering confined spaces, for being on standby, for rescue purposes, or for issuing permits. In all cases, the information we are discussing here today is extremely important. So important that hundreds die each year in confined space accidents and very strict safety rules and procedures govern confined space entry."

Hint: It would be a good idea here to mention some confined spaces at your facility to help participants better understand the concept.

If you have had any confined space incidents at your organization, you may want to mention them here.

Introduce the video

Read or paraphrase the following:

"We are now going to watch a video that graphically shows what can happen when well-meaning employees do not understand the dangers present in confined spaces, dangers that you cannot see, smell, or hear, but that can kill you in just a few minutes.

"As you watch the video, try to think about how it relates to actions and situations you've seen around here."

Show the video (21 minutes)

Ask for questions

Answer any questions. Make sure you have an expert there if you think you might need it. If you don't know the answer, say so, but promise to get the answer and contact the person. Remember to do it.

Discussion and demonstrations (15 minutes)

Show participants a confined space entry permit and the form needed to complete such a permit. Make sure they know who in their work area initiates a permit and how the permit is displayed.

Administer the safety awareness quiz and review it (10 minutes)

Ask the participants to complete the quiz that you distributed. Make sure they know that the quiz is not a condition of employment. It is a self-check of the points made in the session.

Review the quiz with the participants, giving them the correct answers from your answer sheet. Pass out answer sheets if you decided to do this. Then collect the quiz. It can be filed as evidence that training was completed.

Closing remarks

Read or paraphrase:

“Thank you for your participation today. I know the video you just saw was troubling. It is upsetting to see four people try to come to the aid of a coworker and five people die because no one in the group understood the dangers of confined spaces.

“Some of you will be given further training and will have to enter confined spaces as part of your jobs. Others will never be assigned to enter a confined space. For you, this training is important because you could easily end up being victims through lack of knowledge — if a buddy is in trouble or you drop a tool.

“Remember that there are no heroes when it comes to confined spaces. And that knowledge is the best defense against a confined space accident.

“If you have any other questions, I will try to answer them or you can ask your supervisor.”

Make sure you store the quizzes as documentation that the training was done.

Participant's Manual

Confined spaces can kill, quickly and silently. And too often they claim would-be rescuers as well. Because of this, a permit is needed before any entry into a confined space. The permit includes a checklist and certain monitoring and safety measures. Entry cannot proceed until all actions mandated by the permit are completed.

This permit system and the safeguards it requires are not just niceties. It is an important rule that must be followed at all times in all cases. OSHA has listed the confined space entry permit requirements in the Code of Federal Regulations at 29 CFR 1910.146.

What is a confined space?

Confined spaces come in all shapes and forms. But they all share several characteristics:

- They are not intended for humans to be in them for any period of time.
- They have limited ways to get in and entering is usually awkward.
- They have little air movement and unfavorable ventilation.
- They come in all shapes and sizes, and can be above or below ground. They include tanks, reactor vessels, utility vaults, sewers, pipelines, boilers, and even trenches and ditches.

People have to go into a confined space for many reasons, but usually they involve repairs or maintenance activities like cleaning or painting.

Specific hazards

There are many different hazards in confined spaces, ranging from not enough oxygen, through various toxic gases, to being crushed or engulfed. What they all have in common is that a person in trouble in a confined space rarely has time to get out before death or serious injury occurs.

Oxygen deficiency

The primary hazard in confined spaces is lack of enough oxygen to support human life. This is called an oxygen-deficient atmosphere. As a general rule there must be at least 19.5% percent oxygen for a person to breathe. If there is not enough oxygen, the person passes out before he or she can get out. In a just a few more minutes, the person can die.

As the video shows, lack of oxygen sneaks up on you. There may be enough to breathe at higher levels of the confined space but not enough at the bottom. Sometimes another gas used to purge the tank replaces the oxygen at the bottom if it is heavier.

Oxygen deficiency is dangerous because you can't see it, smell it, or in any easy way know that it exists. In the video, one of the rescuers put on an air-purifying respirator

(APR) before entering. While this type of respirator would have filtered out toxic materials, it was not a toxic substance that was causing the problem. The problem was not enough oxygen and the would-be rescuer died.

Other hazards

Many other hazards can exist in confined spaces. They include:

Toxic atmosphere — The confined space can contain toxic substances that can affect you now or years later. Examples are carbon monoxide and hydrogen sulfide. Because there is so little ventilation in a confined space, vapors that pose little hazard in the outside air can be fatal in a confined space.

Combustible atmosphere — The space can contain substances that will explode or catch fire.

Engulfment — Dry bulk materials, like grain or dust, or liquids in a tank can trap or drown the worker.

Crushing and other physical hazards — Equipment in the confined space can be activated when a person is inside. These could include heavy equipment, conveyers, augers, or fill valves.

Entry permit process

Each workplace must determine its confined spaces that require entry permits. Whenever work needs to be done inside one of the confined spaces, the foreman or supervisor must begin the permit process. The permit activities must be completed and the permit posted visibly at the confined space before the entry can begin.

The permit must include a large amount of information and requires that certain monitoring be done before the permit is completed.

Permit requirements may vary depending on the type of space and workplace, but generally the permit must include

- The location and a description of the confined space.
- The purpose of the work and the person in charge.
- The time of entry and estimated completion time, usually within one eight-hour shift.

The permit cannot be completed until air inside the space is sampled to check the amount of oxygen and for other hazards like toxic gases. While less than 19.5% oxygen is considered oxygen deficient, more than 23.5% oxygen is considered oxygen rich, a situation that increases the risk of explosion and/or fires. (The interim rule specified 22% oxygen whereas the final rule designates 23.5% as the maximum oxygen level in a confined space.)

Other actions required before the permit is issued include assigning and briefing safety standbys and listing them on the permit. A rescue team must be notified and ready to act if needed.

Confined Spaces: *Deadly Places*

Prior to the permit being issued, the supervisor must complete a safety checklist of the items that affect the particular type of entry. Among the items on the checklist are

- De-energizing and lockout of hazardous energy sources that affect the confined space. These might include valves, electricity, machinery, and similar items.
- Lines to the space are broken, capped, blanked, or sealed off in some other way.
- The space is purged, vented, or flushed.
- A ventilation system is activated or set up.
- The area around the space is secured.
- Personal protective equipment, including an air-supply respirator or self-contained breathing apparatus, is assigned to workers who will enter the space.
- Escape harnesses are ready for entrants to use and a tripod emergency escape unit or other acceptable rescue system is ready for use if a vertical entry is being made.
- Lifelines or other rescue equipment is ready for use if needed.
- Fire extinguishers, lights, and nonsparking tools are ready if needed.

Only when all of the above is completed and the permit posted at the space may an entry into a confined space begin.

Deadly places

Confined spaces can be deadly. That's why so many rules and safety measures must be followed before entry. These rules are not to make work. They are to inform and protect everyone who may come into contact with a confined space.

For those who don't deal with confined spaces as part of their jobs, there are a few other points to remember.

Don't ever enter a confined space for any reason. Think before you reach or jump in to retrieve a lost tool or keys.

Don't ever attempt to rescue a person in a confined space. The result could be a pile of bodies and won't be of any help to the person you are trying to rescue. If you see such a situation, call for help but never go in.

If you see someone start to enter a confined space without a permit, call him or her out immediately and remind the person of the danger.

Participant's Quiz

Name _____ Date _____

Signature _____

Circle **True** or **False** for each of the statements below.

1. A confined space has limited openings for entry and exit.

True **False**

2. An oxygen-deficient atmosphere means there is not enough oxygen in the space to support human life.

True **False**

3. An air-purifying respirator is the right kind to use when entering a confined space.

True **False**

4. Confined spaces are so dangerous because they don't look dangerous.

True **False**

5. Lack of oxygen is the only reason to avoid entering confined spaces without a permit.

True **False**

6. You can enter a confined space without a permit if you are very quick.

True **False**

Notes

Answer Key

1. **True.** A confined space has limited openings for entry and exit.
2. **True.** An oxygen-deficient atmosphere means there is not enough oxygen in the space to support human life.
3. **False.** An air-purifying respirator removes contaminants from the air you breathe. In confined spaces you need a respirator that supplies air to breathe, not one that filters air.
4. **True.** Confined spaces are so dangerous because they don't look dangerous.
5. **False.** Lack of oxygen is one reason. Toxic gases, fire or explosion, and engulfment are some others.
6. **False.** Never enter a confined space without a permit. No one is quick enough to get back out safely if trouble arises.

Confined Spaces: *Deadly Places*

Notes