



# CONFINED SPACE SAFETY

## WHAT'S THE BIG DEAL ANYWAY?

Deaths and injuries resulting from unsafe acts are steadily declining in most categories. One of the categories that had been improving, but “flunked” last year according to OSHA was Confined Space Safety. The most outstanding and perhaps tragic part about confined space mishaps is that people usually die when things go wrong. Even more tragic is that it usually results in multiple deaths.

How can this happen? It’s the same scenario over and over... This is a typical account: A person enters a confined space without having a qualified person test the atmosphere with dependable instrumentation. The person loses consciousness or at least “goes down”. Someone on the outside sooner or later discovers the dilemma. The person on the outside, without considering the risk, enters the space to help the downed person, and immediately becomes the second victim.

There have been instances where as many as three persons die along with the first victim, entering one-by-one, before someone decides: “enough is enough”. These would-be rescuers are usually friends of the person inside and in some cases the victims are all related – cousins, brothers, fathers and sons. Multiple deaths are quite common in confined space mishaps.

Confined spaces can appear to be harmless. This is because the hazardous atmosphere is typically colorless and odorless. Don’t be fooled by what you can’t see, it can be a fatal mistake on your part or your subordinate’s.

## WHAT CAUSES HAZARDOUS ATMOSPHERES?

Most of the time the atmosphere is oxygen deficient. This means there is no oxygen or there is not enough oxygen to support life or consciousness. This can happen by a number of processes and is usually the result of a chemical or biological process:

- Rust - when metal combines with air (air contains 21% oxygen), the chemical reaction is called oxidizing. If this occurs in a contained area, guess what happens? The rusting process uses up the oxygen in the air, or at least some of it.
- Corrosion - this is the same type of process as rusting, only it doesn't have to be metal, it can be any material that will break down naturally in the presence of air.
- Rot- this is the simple term for biodegradation. In other words, a material decomposes. In this process the oxygen in the air is used up in the degrading process. If this happens in a contained area, guess what? All the oxygen in the air gets used up and is probably replaced with Carbon Dioxide.
- Displacement- on some occasions, a gas of some kind, which is heavier than air, can enter a confined space. Because it is heavier than air, it can displace the air in the space much like if you poured water into a jar with oil. The water goes to the bottom and forces the oil out the top and if enough water is poured in, it will completely displace all the oil. This can happen in a confined space with invisible gasses and the process isn't detectable by sight alone.

To complicate these issues even more, a layering effect can take place. Assume the example above (displacement) takes place only partially in a tank or a type of room or storage compartment that has to be entered from the top. A person could start his descent and not have any problems breathing in the upper layer. Upon reaching the bottom where the air has been removed by displacement, he would lose consciousness without warning.

## **OTHER CONFINED SPACE HAZARDS**

Below is a listing of other hazards that can cause mishaps in confined spaces:

- Electrical- confined space work takes place in electrical manholes. Extreme caution needs to be taken to ensure workers can't be electrocuted while working in these spaces. In addition, electrical lighting systems and electrical tools can be potential hazards.

- Engulfment- any type of material such as water, if introduced unexpectedly while someone is in a confined space, can be tragic. Another common area where unnecessary fatalities occur is in grain elevators and silos where people go in to do whatever and step into a cavity (air pocket), sinking down into the product and getting buried alive, or someone transfers grain into the silo while the person is inside.
- Falling, slipping, struck by- these are incidents that are self-explanatory by name.

## HOW DO YOU KNOW IF IT IS OKAY?

The only way to know for sure is to test the atmosphere. The NSA Safety department has trained, qualified, and experienced personnel who have instruments and the knowledge necessary to ensure safe entry into confined spaces.

## WHAT ARE CONFINED SPACES?

OSHA's definition of a confined space is: "***A space that is large enough and so configured that an employee can bodily enter and perform assigned work; has limited or restricted means for entry or exit; and is not designed for continuous employee occupancy.***" Examples given (but not limited to) are: tanks, vessels, silos, storage bins, hoppers, vaults, and pits.

## PROCEDURES TO FOLLOW:

A complete program has been established to address confined space entries anywhere on Navy premises or even off premises for Navy Personnel. The written instruction is available for copies and review in the NSA Safety Department. This is a simplified version of how it works:

All personnel, who must enter a confined space or supervise the same, must be trained by the NSA OSH Department. The entry supervisor is the key person in the process. He/She is responsible for notifying all affected personnel and preparing the space for entry and preparing the written permit.

Before entering, the Confined Space program manager must test the atmosphere with a calibrated instrument for oxygen content, carbon monoxide, explosive and hydrogen sulfide vapors. The entry supervisor is also responsible for enlisting a trained attendant, setting up the ventilation system, and establishing a rescue system. In addition, he/she is responsible for ensuring the success of the process, (i.e., he/she oversees the operation.)

The process can become more complicated depending on the work being conducted, and if new hazards are introduced into the space as work commences such as welding, cleaning with chemicals, painting, or generating airborne particles.

In most cases, the process will be simpler in that the majority of the spaces identified for NSA Naples are spaces without any hazards. In cases like these, a much less complicated process can be followed in which the attendant, permit, and rescue system are not necessary. The decision as to the classification of any given space is the responsibility of the entry supervisor and the Confined Space program manager. In all cases, however, the Confined Space program manager must come and test the atmosphere for contaminants before anyone is allowed to enter the space.

**There is an inventory of the known confined spaces at NSA, and is available upon request from the NSA Safety Department (OSH).**

**For any questions or comments, please contact a NSA Safety Department Member, the NSA Safety Department Manager, or the Confined Space Program Manager, at 626-6624.**