

CONFINED SPACE ENTRY

COURSE OUTLINE

- **By definition, hazardous materials are inherently unsafe.**
 - But working with them can be even more dangerous in a confined space.
- **Confined space entries are never routine.**
 - You may use the same equipment, run the same tests, and even work with the same crew.
- **But the conditions you face inside can be different every time. Things that can complicate an entry include:**
 - Tight areas.
 - Loose materials.
 - Moving parts.
- **When hazardous materials are added to the mix, things can become even more dangerous.**
- **To protect workers in these situations, OSHA created the "Permit-Required Confined Space Entry Regulation."**
- **OSHA defines "confined spaces" as areas that are large enough for a person to enter and work in, but that are not designed for continuous use. They include:**
 - Tanks.
 - Silos.
 - Storage bins.
 - Pits.
 - Hoppers.
- **OSHA requires all facilities that may have employees entering confined spaces to set up written "Permit Space Entry Programs."**
- **Under these programs, confined spaces are examined for unsafe conditions such as:**
 - Hazardous atmospheres containing flammable or toxic gases and vapors.
 - Atmospheres with too little or too much oxygen.
 - Tight areas that could trap workers.

- **If these or other hazards are suspected, the area is classified as a "permit required" confined space.**
 - Before anyone can enter one of these spaces, a safety or management representative must issue a written "entry permit."
- **Entry permits list a lot of important information, including:**
 - Location of the space.
 - Duration, purpose and date of entry.
 - Names of the entry supervisor and personnel entering the space.
 - Potential hazards within the space.
 - Dates, times, and results of initial and periodic atmospheric testing.
 - Measures used to isolate the space, such as locking and tagging energy sources.
 - Emergency rescue procedures that have been put in place.
- **If a welder's torch, grinder or any other piece of equipment that could cause a fire is to be used in a confined space, a "hot work permit" is also required.**
- **It is important to make sure that all of the safety precautions listed in the permits have been met before anyone enters a confined space.**
- **In addition to safety measures like atmospheric testing, entering a confined space requires a team of people to work closely together to make sure the entry proceeds safely.**
- **This "entry team" is made up of specially trained personnel, who perform specific tasks. They include:**
 - "Entry supervisors", who are in charge of the team.
 - Attendants, who look out for the well-being of the people working inside the confined space.
 - "Rescue personnel", who stand by to assist in an emergency.
 - "Entrants", who work in the space.
- **The entry supervisor oversees the confined space entry, and determines if acceptable entry conditions exist.**
 - Before operations can begin, they must ensure that all members of the entry team have had the proper training for the situation.

- **Prior to entry, the entry supervisor must also make sure that:**
 - Entry permits are filled out and signed.
 - Atmospheric testing is completed.
 - Safety equipment is on hand.
 - Communication systems are in place.
 - Workers have the proper personal protective gear.
 - Trained rescue personnel are ready in case an emergency occurs.
- **The second member of the team is the attendant, who is responsible for watching over the entrants while they are inside.**
 - The attendant monitors all entry activity from outside the space, and is ready to act if there is a problem.
- **One of the attendant's most important jobs is to perform atmospheric testing.**
 - This is done to determine if the confined space is safe to enter.
 - The tests are performed with calibrated, "direct reading" devices known as "sniffers."
 - The attendant uses these to probe the air inside the space for hazards.
- **Once the testing is complete, the attendant must show the results to the entry supervisor and the entrants.**
 - If everyone agrees that conditions are safe, entry may begin.
- **While the entrants are inside, the attendant will also periodically test the atmosphere in the space to make sure that conditions have not changed.**
 - Entrants can also request additional readings at any time.
 - If a change occurs in the atmosphere that would endanger the entrants, the attendant will order a full evacuation.
- **Throughout an entry, the attendant must stay in communication with everyone who is inside the space and constantly check with them to make sure they are safe.**
 - Attendants must also know the exact number of entrants in the space at all times, so that everyone can be accounted for in an evacuation.
- **Keeping unauthorized personnel away from a confined space is another one of the attendant's responsibilities.**
 - This is especially important during emergency situations.

- **If there is an emergency, it is the attendant's responsibility to alert rescue personnel.**
 - Anytime testing reveals atmospheres that may be "immediately dangerous to life and health" (IDLH), rescue teams must be standing by before the entry begins... ready to give immediate assistance.
 - Even if IDLH conditions are not likely, a rescue team that can begin emergency rescue operations within 15 minutes must still be available.
- **All first responders have to receive specialized entry training, as well as instruction in first aid and CPR.**
 - They must also have all of the personal protective equipment they need for any situation that they may encounter.
- **Rescue personnel should be informed ahead of time about any hazards they might confront.**
 - This information allows responders to prepare for specific emergencies.
- **To help rescue personnel with their training, your company should conduct at least one practice drill per year.**
 - This should simulate some type of worst-case scenario, to ensure that the rescue personnel can perform under the most extreme conditions.
- **While the responsibilities of the rescue personnel, attendants and the entry supervisor are to ensure that entrants are safe at all times, the primary responsibility of entrants is to look out for themselves.**
 - To do this, entrants need to be able to "read" the conditions in the confined space, and be aware of the hazards they may encounter.
 - Entrants must also wear appropriate personal protective equipment, and use other safety gear (such as explosion-proof lights), when necessary.
- **The use of lifelines that allow the entrants to be pulled from confined spaces in emergencies is required as well, unless it can be shown that the lines themselves are likely to get entangled or otherwise become a hazard.**
 - These retrieval lines are hooked to the entrants using a chest or full-body harness.
 - When these kinds of harnesses are not practical, entrants may wear retrieval lines attached to wristlets.

- **The other end of the retrieval lines are attached to fixed points outside of the entrance, to keep them in reach of the attendants and rescue personnel.**
 - If an entrant is going into a space that is more than five feet deep, their lifeline must be attached to a device that will help to hoist them from the space in the event of an emergency.
- **Making sure that the air inside a confined space is free of hazards is one of the most important parts of an entry. Three tests must be run, to check for:**
 - Oxygen levels.
 - Flammable gases.
 - Toxic fumes.
- **Because the amount of oxygen in the atmosphere must be known in order to get accurate results when testing for flammables, the test for oxygen is always performed first.**
 - Serious hazards may exist if this test reveals that there is too little or too much oxygen in the atmosphere.
- **If the oxygen in the atmosphere is below 19.5%, it is "oxygen-deficient."**
 - Breathing this air can result in an entrant losing consciousness, and eventually even dying.
- **If the test reveals an oxygen level above 23.5 percent, the atmosphere is "oxygen-enriched."**
 - This significantly increases the chances that a spark or other ignition source will cause a fire or explosion.
- **The second atmospheric test detects flammable gases, such as:**
 - Methane.
 - Acetylene.
 - Carbon disulfide.
- **Flammable gases are dangerous when they reach concentrations greater than 10% of their lower flammable or explosive limit.**
- **Dust particles are another flammability hazard to watch out for.**
 - When enough dust fills the air it can fuel a fire or explosion.
 - The general rule of thumb is if dust reduces your vision to a distance of five feet or less, it should be considered dangerous.

- **The last test identifies toxic atmospheres.**
 - Carbon dioxide and hydrogen sulfide are two common toxic gases.
 - Materials such as these can cause loss of consciousness, and even permanent brain damage.
- **In addition to the initial testing, the atmosphere in the space must also be checked periodically as the entry progresses.**
 - This is because the conditions inside a confined space can change at any moment.
 - Atmospheric testing is usually done by the attendants at the opening to the space.
 - However, some situations require the entrants to perform the tests.
- **Many harmful gases have a different weight than air.**
 - As a result they tend to sink or rise to various levels within a space.
 - When the air becomes "stratified" like this, atmospheric hazards can be difficult to detect at the entrance, because the harmful vapors may be out of range of the testing instruments.
 - If stratified air is suspected, entrants should probe the air at least four feet in front of them and to each side.
 - If conditions are determined to be IDLH, then the space must be evacuated immediately.
- **An important part of the permit-required confined space regulation gives entrants the right to observe the testing and monitoring of confined space atmospheres.**
 - Entrants can also request that periodic testing be performed anytime they feel it is necessary.
 - This allows entrants to make sure that the space they are working in is safe.
- **Once atmospheric tests are complete, a plan of action can be created to protect the entrants.**
 - For instance, when testing detects a flammable or toxic gas, its source must be found and, if possible, locked out and tagged.
 - This will stop the contamination of the atmosphere.

- **A space's air quality can also be improved by using "forced air ventilation."**
 - Here, fresh clean air is forced through a hose into the space.
 - This can often eliminate atmospheric hazards completely.
 - A flammable atmosphere can also frequently be neutralized by filling the confined space with a non-flammable gas, such as Nitrogen.
 - This process, known as "inerting," dilutes the atmosphere so that it will not burn.
- **Any time testing uncovers atmospheric problems that cannot be reduced to safe levels, entrants must wear air-line respirators or a self-contained breathing apparatus (SCBA).**
 - In these conditions, rescue personnel also must be equipped with SCBAs, so that they can give assistance to the entrants in an emergency.
- **When conditions are this dangerous, it is especially important that radio communications be maintained between the entrants inside a confined space and the attendant at all times.**
 - This allows the entrants and the attendant to immediately alert each other in the event of a problem.
- **Any time an entrant appears to be unconscious or in trouble, the attendant must call to them to find out if they are alright.**
 - If the entrant does not respond, the attendant must order a rescue.
 - This is when rescue personnel come into play.
- **When rescuing entrants, the rescue personnel must first try to remove them by pulling on their lifelines.**
 - If the entrants can't be evacuated in this way, the rescue personnel will have to enter the space to evacuate them.
 - Any time there is a rescue or evacuation of a confined space, the entry permit must be canceled, and the situation reevaluated before a new permit can be issued.

*** * *SUMMARY* * ***

- **Every confined space has its own unique hazards, but when you are working around hazardous materials in one of these spaces you need to be especially careful.**
- **Familiarize yourself with both OSHA's Confined Space Standard and the HAZWOPER regulations.**
- **Follow all entry permits to the letter.**
- **Be aware of hazards that may exist in any space that you will be working with.**
- **Know your role and responsibilities on the team.**
- **Always use the correct personal protective equipment for the conditions that you are working in.**
- **Make sure the atmosphere in a space is periodically tested while entrants are inside.**
- **There can be a lot of potential hazards in "enclosed" environments. But by following the proper guidelines, confined spaces can be safer places.**