Confined spaces: planning for successful management

Of all the environments in which operatives in the food and drink industry might have to work, confined spaces are amongst the most dangerous. No two confined spaces are exactly alike; type and size vary greatly as do the hazards, making safety management seem complicated. This article looks at some basic principles that can be applied to help keep your workforce safe.

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Confined spaces are potentially lethal and fatalities in them happen quickly, often in seemingly innocuous situations.

In the UK between April 2000 and 2012, the Health and Safety Executive (HSE) says that there were 53 fatal injuries in the food and drink manufacturing industries – six of which involved work in confined spaces.

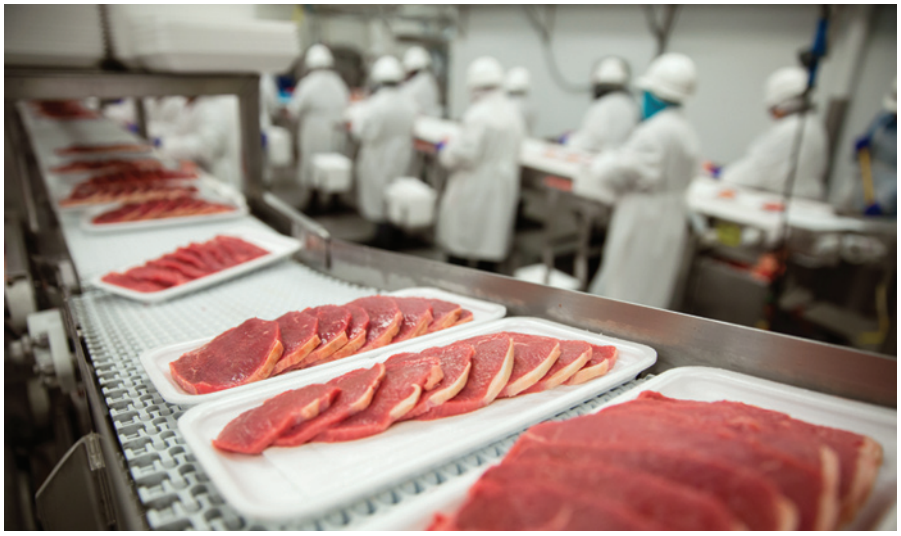
Worryingly, according to the National Institute for Occupational Safety and Health (NIOSH), a significant proportion of deaths in confined spaces occurred during ill-conceived rescue attempts – more than half of all fatalities in confined spaces involve those trying to rescue trapped or injured colleagues.

Many of these tragedies could have been avoided if those involved had the proper training and put adequate safeguards in place to protect themselves before entering.

Definitions

A confined space is a location that is substantially enclosed and where serious injury or death can be caused by at least one hazardous substance or condition within it.

Many workplaces have areas that are considered confined spaces, because even though they are not necessarily designed for people, they are large enough for workers to enter to perform tasks.



Confined spaces also have limited or restricted means for entering and exiting and are not meant for continuous occupancy. Silos, tanks, mixing vats, hoppers and storage bins are all typical examples found in the food and beverage manufacturing industry.

Hazard identification

There may be myriad hazards in such confined spaces. Examples include low levels of oxygen, an engulfment risk from grain, liquids and the like, or the presence of gases such as carbon dioxide or argon. Visibility may be poor and temperature extreme. Movement might be restricted, there could be loose and unstable materials, falling objects, moving parts of equipment and machinery, electrical hazards, and slip, trip, and fall hazards.

Employers must take measures to prevent workers from entering confined spaces wherever possible, label all such spaces and train workers to recognise what constitutes a confined space and the hazards that may be encountered within them.

In the first instance, it is vital that all potential or known confined spaces within a facility are identified. This will help to determine the training, equipment, and people required for all entries and exits to be handled safely.

Ideally, employers should try to 'design-out' the need to enter any confined spaces. For example, silos and vessels could be

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designed or modified to be self-cleaning or remotely operated silo cleaning systems could be employed.

Confined spaces can often be cleaned from outside using modified tools. Equipment such as sump pumps can be located outside, preventing the need for entry, and remote cameras can be employed for the internal inspection of vessels.

Planning

Despite these measures, there may still be occasions where workers will need to access confined spaces. In these instances, there are four key elements to successful safety management:

- **Plan**. Identify and evaluate all possible confined spaces; plan the access equipment required; train all involved and determine access controls.
- **Access**. Undertake a hazard and risk assessment; test the atmosphere and ventilate before entry; complete permit controls.
- **Work inside**. Enter and work safely inside the confined space; maintain constant communication and atmospheric monitoring.
- **Rescue**. Have a rescue plan: remember that self-rescue or non-entry rescues are quicker and carry less risk, but should an entry rescue be required, teams should be trained and qualified in confined space rescue work.

Proper preparation

Confined spaces can be dynamic; unexpected hazards can occur, and a safe system of work developed around the space and the pre-entry preparation may need further adaption when it comes to the prework inspection. Therefore, a hazard assessment should be carried out during that inspection – every single time someone plans to enter a confined space.

Furthermore, a dynamic hazard assessment needs to be conducted continuously, based on the work being carried out at the worksite and the conditions workers are being exposed to that may present a danger.

A pre-work (or pre-access) briefing should be given by the supervisor and should cover and review the tasks to be performed, method statements, permits, the time it will take and emergency protocols, so that all of those involved are working with the same information.

Prior to accessing the confined space, the atmosphere around the entrance and within it must be tested to check for toxic, asphyxiant and flammable/explosive atmospheres.

Confined spaces typically have limited ventilation and air exchange, and within relatively small volumes, dangerous levels of atmospheric hazards can build up. The

ventilation (ideally mechanical/forced) of the space prior to and during entry is commonly required to ensure that the hazards posed by the atmosphere are limited – potentially reducing the need for workers to wear specialist respiratory protection. Where there is a risk that the atmosphere could be explosive, gas purging may also be required.

Tools for the job

Confined spaces can be difficult to work in and gain safe access to, and without the proper equipment and training, the safety and efficiency of the job may be compromised. Rescue operations might also be delayed if a problem does arise.

Consideration needs to be given to access for the entrant and their potential rescuers. Does the equipment enable safe horizontal and, particularly where there is a risk of falling, vertical access? Does the access equipment make the process physically easier or quicker for the entrant?

Can entering the space with an emergency escape breathing device allow the entrant to perform a self-rescue if they encounter a dangerous atmosphere?

Does the access equipment enable a rescue to be performed without a rescuer having to enter the space, and can it enable an immediate extraction rescue by an attendant, and/or provide the means to make the process physically easier or quicker?

Once the confined space has been accessed, every effort should be made to create an environment that is free from hazards. However, this is not always possible, for example the need to enter an asphyxiating atmosphere wearing airline or self-contained breathing apparatus to make an urgent repair.

While it is tempting to rely on personal protective equipment (PPE) – such as breathing apparatus, rescue harnesses, hard hats, safety glasses, protective clothing, gloves and safety shoes – to keep the worker safe, this should be a last resort.

PPE should only be used when risks cannot be eliminated and only when a confined space entry is absolutely necessary.

If the need to wear PPE is identified in the risk assessment, it must be suitable for the application and, importantly, the wearer should be trained to wear and use it properly. Tight-fitting respiratory protective equipment (RPE) must be fit-tested prior to use. When working in the confined space, communication should be fluid and monitoring should be a constant. Environmental elements can change unexpectedly and communicating with workers outside can be difficult.

Rescue plans

As we have seen, injuries, and even deaths, can occur when working in confined spaces. Ill-conceived attempts to save others who have collapsed or ceased to respond usually follow from a lack of proactive planning, appropriate training and/or the identification of a proper rescue plan.

It is crucial, therefore, that a rescue plan is put together, appropriate training is given and the right equipment is purchased before any rescue is ever attempted so you are not using it for the first time in a live scenario.

Remember that self-rescue or non-entry rescues are quicker and carry less risk, so designing your access systems with these in mind at the outset can make all the difference. If a rescue plan needs to be drawn-up on the fly, it is probably already too late.

As a bare minimum, a rescue plan should:

- Describe the location of the confined space and the nature of the work being conducted inside.
- Identify the rescuer, the competent person who will be on hand, the emergency contact and the methods of contact that will be used to keep in touch with those working in the confined space or with anyone involved should a rescue become necessary.
- Lay out all pre-work tasks.
- Catalogue all the rescue equipment that will be available for use and where it can be found, including a checklist for its thorough inspection to ensure that it is in good working order.
- List all the critical rescue factors, including any hazards present.
- Record the response procedure, including how to notify the emergency contact, how to make a medical assessment of the person trapped inside and, if possible, methods for them to perform a self-rescue, the attendant to perform a non-entry rescue, or the next steps if that is not possible.

There is a lot to consider when it comes to working in and rescuing someone from inside a confined space. Above all, planning, preparation and training are key. ■