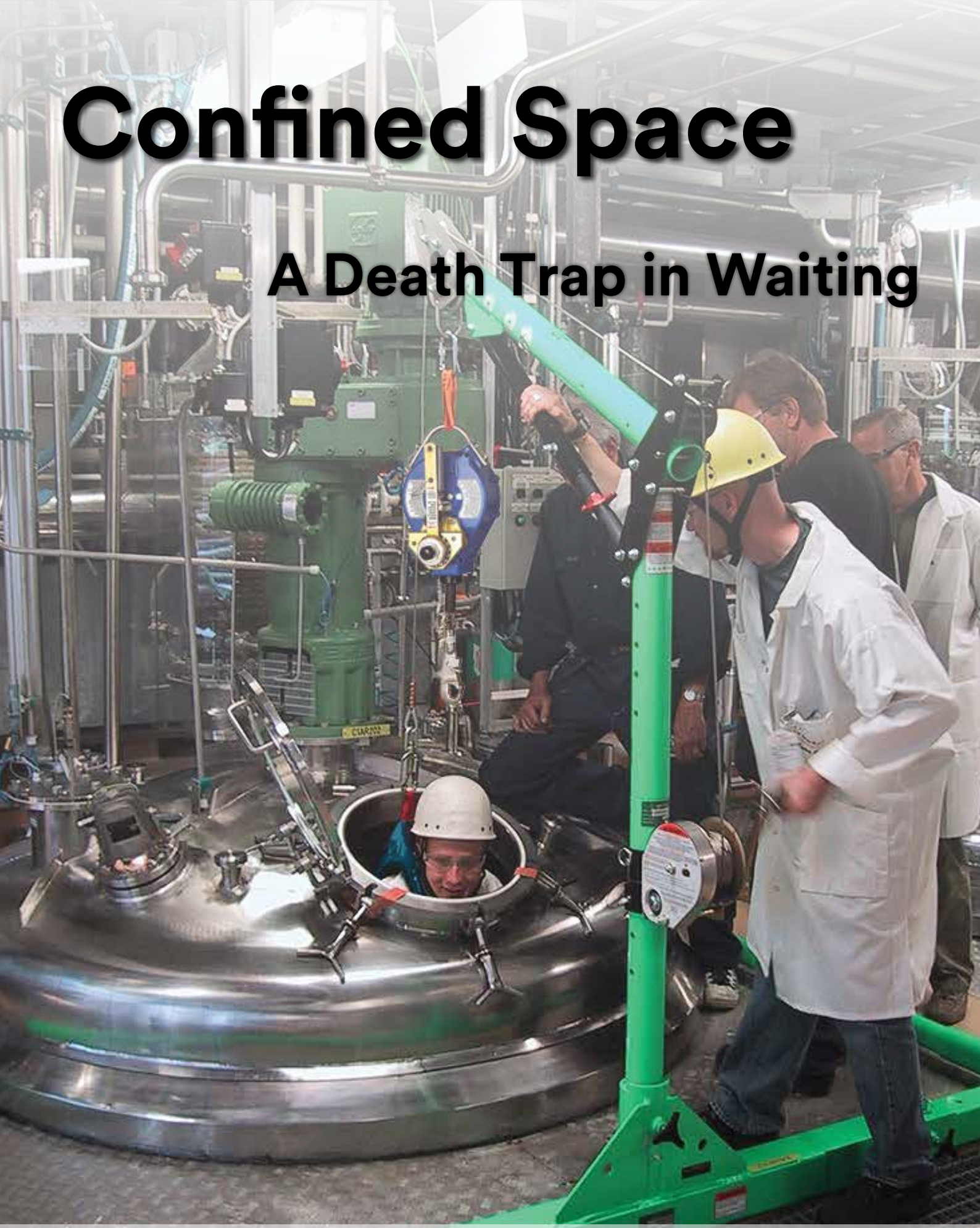
Confined Space

A Death Trap in Waiting



Technical Article

Introduction

Not all employers and operators understand what constitutes a “confined space”, nor the dangers associated with working in such environments. Similarly, should the need for rescue from a confined space occur, a well prepared and rehearsed retrieval operation must be available for immediate implementation. The failure of understanding of confined space operations and rescue and retrieval methods can place both the employee and the employer at significant risk.

The following article has been written to provide an overview of confined space operations in layman’s terms and should not be seen as a substitute for taking correct professional advice - nor for certificated training.

What is a Confined Space?

A confined space is an enclosed location that is not intended for human occupancy that may include a restricted means of entry or exit.

A confined space is:

- Large enough for a worker to enter and perform work.
- May have limitations to the entry to or exit from the confined space.
- May knowingly or unknowingly contain a hazardous atmosphere.
- May contain other hazards that expose anybody in the area to risk.

Confined spaces include:

- Tanks, vessels, silos and vats.
- Manholes, pipes, culverts and ducts.
- Large vessels, tanks and rooms with restricted entry and exit.
- An enclosed area that may have a build up of toxic or hazardous substances.

Confined space activity is a complex issue requiring experienced analysis. It is not simply the size of the space that is critical, nor is it simply the ease of access and egress, nor is it only the risk of hazardous atmospheres and chemicals within the confined space. It is a combination of all these coupled with the risk of injury to the worker within the confined space and the resulting complexities for a rescue and recovery operation in this environment.

Why are Confined Spaces dangerous?

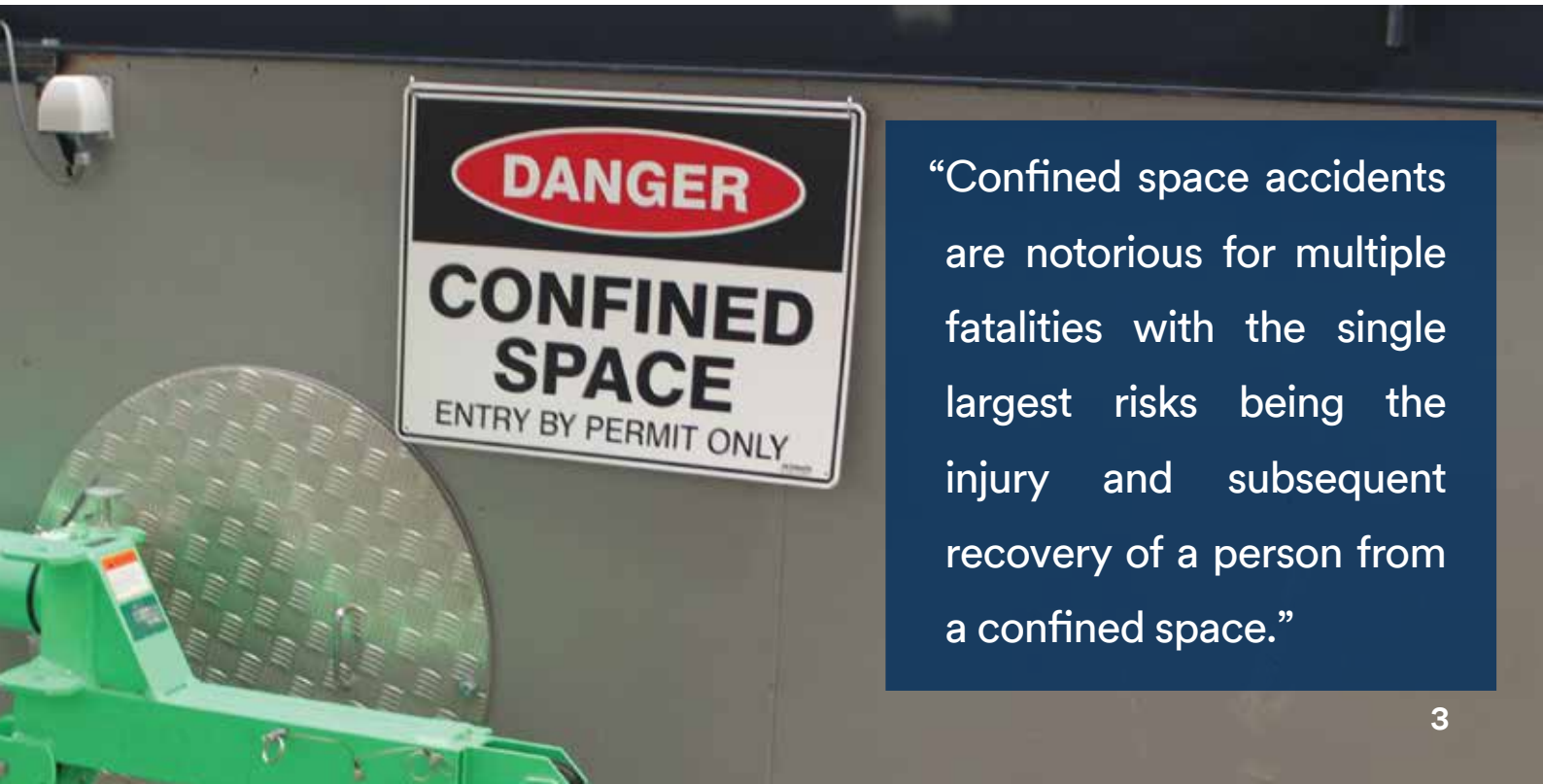
Confined space accidents are notorious for multiple fatalities with the single largest risks being the injury and subsequent recovery of a person from a confined space. Atmospheric hazards from the presence of chemicals are often odourless, tasteless and colourless. Lack of sufficient oxygen to remain conscious is also undetectable without the use of correctly calibrated analysis equipment.

Restricted working space often leads to work being carried out closer than desirable to electrical and mechanical risks, including moving machinery such as conveyors.

When an accident occurs within the confined space, rescue measures are often initiated in an unplanned and unrehearsed fashion with untrained employees and inadequate equipment, leading to risk to the rescuers which often results in them succumbing to the same fate as the worker being rescued.

Confined space risks include:

- Oxygen deficiency
- Noxious and poisonous gases
- Suffocation by materials (e.g. grain silo) or drowning (e.g. culvert)
- Contact with toxic or hazardous materials (e.g. chemical industry)
- Electrocution
- Extremes of temperature (e.g. furnaces, cold rooms)
- Slips, trips and falls (e.g. descending / ascending access)
- Explosion



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How do we prepare for Confined Space operations?

Potential confined space operations should be subjected to the same analysis as any other work practice where a risk to employees has been identified.

Where the requirement may exist for service or maintenance works in a confined space, the basic principles of hazard identification and risk assessment should be applied.

The hierarchy of this process is as follows:

- Hazard identification
- Risk assessment
- Risk elimination
- Risk minimisation
- Protective equipment and work practice specification

Having identified confined space access as a hazard, the first objective should be to eliminate the hazard by effecting changes to either the equipment or the work practice that prevents the need for personnel to enter the confined space.

Where this is not possible, risk minimisation action should be attempted – again by effecting changes to the equipment or work practice. By example, increasing the size of the entry and exit positions to the confined space or ensuring improvements to air flows, lighting, etc. The isolation of other potential hazards (electrical, chemical risks, etc.) should be implemented. This can include zone shut downs, process flow shut downs – using correct lock out/tag out controls and processes.

If the results of the elimination and minimisation activities still leave an identified risk, efforts must then be directed at the minimisation of risk through the use of appropriate safety equipment coupled with documented work practices that cover the total confined space activity plan. These documented processes should cover the original work required, but must also cover rescue and retrieval procedures in the event of an accident.

Entry, Exit and Retrieval Equipment is Critical

A safe means of entry and exit from a confined space is critical in the risk assessment process, as is the provision of rescue and retrieval plans.

Access to the confined space requires both the correct equipment and work practice which is usually achieved by the use of correctly matched equipment forming a confined space “kit”.

This would generally comprise:

- A suitable anchorage point outside the confined space, such as a tripod or davit system. Tripods with telescopic legs are available in 2.1 m and 2.7 m versions constructed from corrosion resistant aluminium. Davits come in a wide range of flexible configurations for permanent or temporary mounting.
- A self-retracting fall arrest device to arrest any free falls on descent or ascent. These units are available in lengths up to 40 m in stainless steel and galvanised cable. Due to the high level of contaminants and dirt usually associated with confined space operations, units with mechanisms sealed from the cable and drum should be preferred. Breaking forces of less than 4 kN over an arrest distance of less than 1 m should be used.
- A manually operated Winch in lengths up to 58 m for entry and rescue. Winches offer a mechanical system of rescue in demanding locations providing a means of retrieval and secondary back up when required.
- A rope positioning device or retrieval winch for work positioning and suspension as well as rescue and retrieval. These are available in a number of configurations from 3:1 to 5:1 pulley ratios. Where a bosun’s chair is used with a rope-positioning system, Australian Standards require the use of a full body harness and a secondary fall arrest device.
- A Confined Space fall arrest harness with rescue attachment points and a spreader bar.

Critical to the use of this equipment is professional confined space training and personnel certification, together with documented work practices that include rescue and retrieval plans.

Equipment maintenance – it's too late if it doesn't work

Confined space operations are often carried out in severe conditions. It is therefore critical that all equipment is fully cleaned after use and before storage. Because of the limited use of such equipment in some applications, it is essential that regular training of confined space staff is undertaken and recorded. Additionally, under Australian Standards, many items of confined space equipment require annual inspection and recertification by the manufacturer. It is the duty of care of the employer to ensure that all equipment being used in such applications is within its test period.

Don't Overlook Supporting equipment

Depending on the risk assessment conducted, additional equipment may be required before and during the confined space access.

This may include some or all of the following:

- Oxygen analysis equipment to ensure adequate oxygen levels to support breathing, but not high levels that would enhance any fire risks. This equipment may require being either single sample or continuous monitoring, depending on the risk analysis.
- Gas analysis equipment to detect hazardous levels of other gases or noxious fumes that may, or could become, present in the confined space.
- The oxygen and gas analysis results may then require the use of respiratory equipment which can range from full self-contained breathing apparatus, through airline flow equipment to simpler respirators. There are also ranges of respirators suitable for use in dust and atmospheres containing particulate matter.
- Communication equipment may also be required in confined space applications to maintain voice contact with the remote working personnel.

As with entry and exit equipment, correct certified training is recommended for all the above equipment, as well as incorporation into the documented work practices and confined space training programs.

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For more information call 1800 245 002 (AUS), 0800 212 505 (NZ) or visit www.capitalsafety.com.au

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