

The Work at Height Safety Association

Technical Guidance Note 12

“Guidance on the risks of working in confined spaces”

A series of informative notes for all industries
involved with work at height or rescue.

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WAHSA technical guidance note no. 12

Guidance on the risks of working in confined spaces

Introduction

This guidance note give guidance on the dangers and risk consideration, regulations, training, selection of equipment and required procedures related to working or accessing a confined space.

Working in a permanent or potential confined space places the worker at a greatly increased risk or injury or death than an equivalent work task conducted in a risk free area, therefore confined space work requires personnel to be fully trained and competent before work commences. This guidance note is not a substitute for formal training, but raises awareness of the risks and precautions required.

1.0 What are confined spaces?

The Confined Space Regulations 1997 define the term as being:

“Any space, including chamber, tank, vat, silo, pit, trench, pipe, sewer, flue, well, or other similar space in which, by virtue of its enclosed nature, there arises a reasonably foreseeable specified risk.”

Examples of specific risk

- Serious injury from fire or explosion
- Loss of consciousness due to increased body temperature
- Loss of consciousness or asphyxiation arising from gas, fume, vapour or lack of oxygen
- Drowning from an increased level of the liquid
- Asphyxiation from a free flowing solid.

Typical Confined Spaces

- | | | |
|-------------------|---------------------|----------------------|
| • Boilers | • Furnaces | • Sumps |
| • Sewers | • Pipelines | • Boreholes |
| • Inspection pits | • Manholes | • Ballast tanks |
| • Process vessels | • Vats | • Culverts |
| • Storage tanks | • Silos | • Cofferdams |
| • Trenches | • Excavations | • Freight containers |
| • Chimneys | • Flues | • Cargo holds |
| • Wells | • Shafts | • Engine rooms |
| • Cellars | • Under-floor voids | • Chambers |
| • Wind turbines | | |

The features of a confined space given above will assist in identifying locations on any one establishment that may fall within the terms of the definition. These will be classified as follows:-

- Permanent confined space – these are identified as those locations in which both criteria for a confined space are met, i.e. the area is reasonably enclosed and one or more of the specified risks can normally be expected to be present.

Potential confined area – these are identified as those areas in which the potential for Confined conditions may be created, although no specified risk is considered to exist under normal operations. In the main, a potential confined space will be instigated when specific maintenance or operation work activities are implemented.

2.0 Dangers of Confined Space

The work carried out within a confined space may add to the hazards already present within it or may be the source of the hazard.

Working in confined spaces can present personnel with the following dangers:

- oxygen deficiency
- toxic gases, fumes, or vapours
- flammable substances
- liquid ingress
- heat stress
- falls from height at access / egress to the confined space

3.0 Regulations and Legislation

For further information, please refer to WAHSA TGN07. In addition, the information below should also be considered.

3.1 Confined Space Regulations 1997

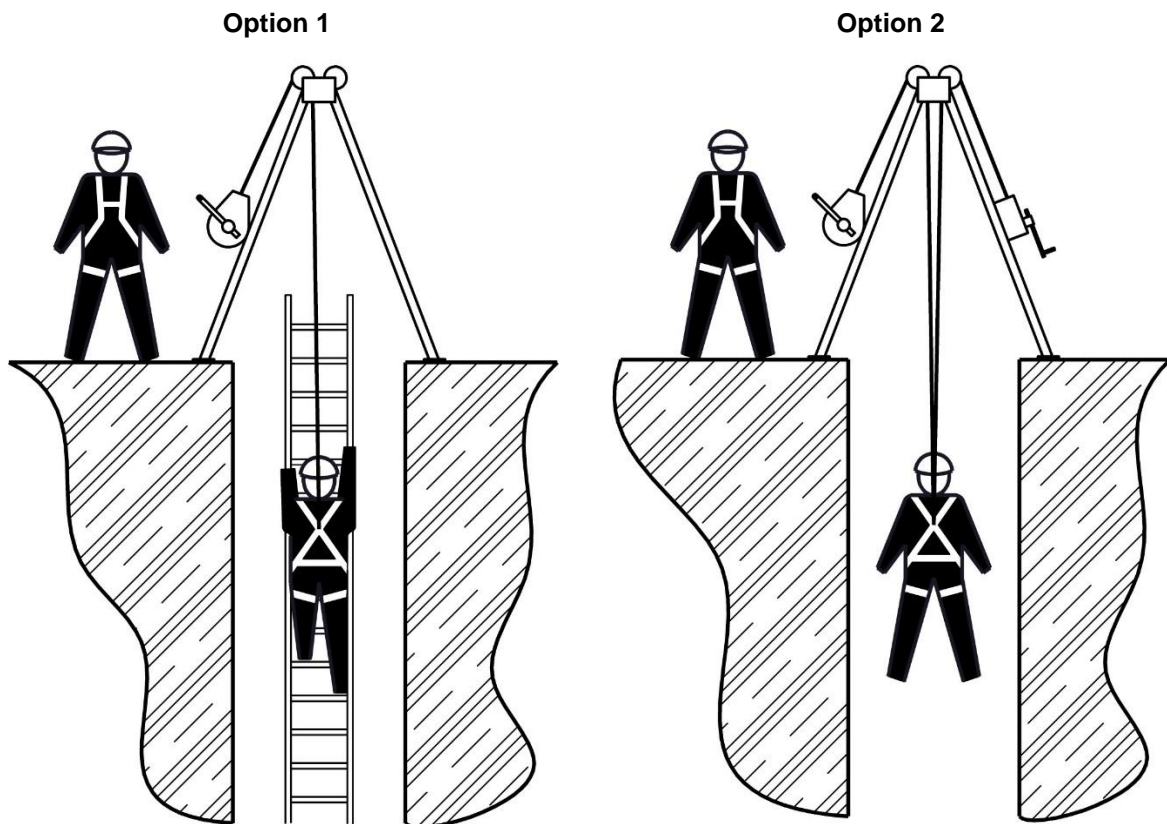
In summary, these regulations cover the following:

- Reg 3 requires any work in a confined space is carried out in accordance with a safe system of work
- Reg 4 prohibits entry into a confined space to carry out work unless there is no other reasonably practicable method to carry out the work
- Reg 5 requires that there must be suitable and sufficient arrangements made for the rescue of any person in the event of an emergency

3.2 ACoP L101 Safe work in confined spaces

An approved code of practice giving guidance on how to apply the Confined Space Regulations.

4.0 Vertical access / egress



Confined spaces may be accessed in a variety of ways, depending on the specifics of the site.

4.1 Option 1

If a user's primary method of access is via a fixed structure such as a ladder, they require a suitable secondary fall arrest device. This could simply be a rope and rope grab, fall arrest block, twin leg or Y shaped shock absorbing lanyard. A suitable means and provision for rescue must be considered and planned. These two functions may be combined in one device.

4.2 Option 2

If a user's primary means of access is via a raise and lower device they require a secondary fall arrest device and means of rescue as above. In this case a winch with a separate fall arrest block and recovery winch could be used.

It is important to note that there are many raise and lower devices and many rescue devices that are fit for purpose, some manual powered and some via battery or electric mains power. Consideration to incorporating an effective "slipping" clutch or overload device should be given to avoid a user becoming snagged and harmed by over tensioning of a powered device.

5.0 Considerations

5.1 General height safety

It is essential that the risks of a fall from height are considered on the same threat level as the specific confined space risks listed in section 1.0.

5.2 Top man safety

It is common to find the top man unprotected from a fall into the confined space but The Work at Height Regulations 2005 require the top man to be prevented or protected from a fall by means of suitable equipment.

5.3 Toxic Fumes

Confined spaces by their nature contain, produce and facilitate toxic fumes, for example hydrogen sulphide (H₂S). Toxic fumes pose an acute threat to an employee and must be considered.

5.4 Duration of work

The duration of the work should be managed depending on the hazards, risks and the level of the confined space entry. For instance:

- high risk duration work would be dictated by the air consumption of the wearer
- high temperatures could restrict the time that employees can be committed into a confined space
- the level of physical activity and individual fitness must also be considered

The duration of work must be indicated on the permit to enter policy.

5.5 Signage

Under The Health and Safety (Safety Signs and Signals) Regulations 1996, there is a requirement for an appropriate safety sign to be displayed, where a 'significant risk' identified under a risk assessment cannot effectively be controlled by any other means.

6.0 Selection of Equipment

The following is a list of equipment that may be suitable for use or required in a confined space application. Each confined space application is different, and careful consideration must be given to selecting the correct equipment which will be identified by the work task and the risk assessment.

6.1 Height Safety Equipment

- suitable anchorage; either structural or temporary such as steelwork, tripod, gantry or davit
- Full Body Harness, suitable for fall arrest
- raise / lower device, such as a winch, pulley or Z-system
- Fall Arrest Block with recovery function

6.2 Gas monitoring

- equipment for checking the air quality before work commences
- equipment for monitoring the air quality continuously during the work task

The major gasses to consider are methane (CH₄), hydrogen sulphide (H₂S), carbon monoxide (CO) and oxygen (O₂). A lack of oxygen will result in poor decision making and leads to unconsciousness, whilst an excess of oxygen will create an explosive atmosphere.

6.3 Breathing Apparatus

- continuous breathing apparatus feed from the surface
- Emergency Escape Breathing Apparatus (EEBA)
- Self Contained Breathing Apparatus (SCBA)

6.4 Communications

An effective system of communication should be implemented and maintained.

7.0 Training requirements

Before working in a confined space, employees must be suitably trained to ensure competence. This training should consist of low, medium and high risk and rescue courses and be appropriate to the worker, the work to be carried out and the type of confined space. These requirements could be industry specific or to the requirements of the individual employer, although the principles covered in the training will remain the same.

Trainers should be qualified to train and have good knowledge and experience in this discipline

8.0 Procedures

8.1 Risk assessment

It is a requirement that a full risk assessment is carried out for all the work tasks, which includes identifying the hazards, assessing the risks, and determining the precautions needed.

8.2 Safety Method Statement

A Safety Method Statement describes in a logical sequence exactly how a job is to be carried out in a safe manner and without risks to health. It includes all the risks identified in the risk assessment and the measures needed to control those risks. This allows the job to be properly planned and resourced.

8.3 Safe System of Work

A Safe System of Work shall be established by the implementation of management procedures. Some things the safe system of work should address are listed below.

- previous contents
- residues
- contamination
- oxygen deficiency
- oxygen enrichment
- hot environments
- physical dimensions
- the work to be carried out
- cleaning chemicals
- sources of ignition
- ingress of substances
- emergency rescue
- communications
- PPE

Note: this list is not exhaustive and dependent on the task there will be other things to address.

8.4 Safety programme

The safety programme differs from a Work Method Statement for a task or activity, in that it is concerned only with the safety measures that are required in order to allow the work to proceed.

8.5 Permit to work

This is an extension of a safe system of work and ensures that all foreseeable hazards have been understood and controlled as necessary.

8.6 Top Man Board

The Top man board is a means of management control and ensures that the whereabouts of all operatives is logged. Furthermore the atmospheric conditions are monitored throughout the confined space and the readings are in place on the top man board plus the emergency procedures and contact numbers. The top man board, in the event of an emergency, is a good means of ensuring there is an effective, quick, clinical rescue. Other information such as COSHH and equipment lists relevant to the work carried out should also be on the board. It is evidence that the safe system of work is being adhered to.

10.0 Rescue

Before work commences, a rescue plan must be carefully considered and put in place to remove a casualty should there be a need. This may or may not be in the event of an emergency.

A planned rescue plan would be a team of rescuers on site at all times when the confined space work is underway, who are trained, familiar, and practised in the rescue plan.

Reliance on the emergency services does not constitute a rescue plan.

11.0 References

Health and Safety at Work Act 1974

Management of Health & Safety at Work Regulations 1999

Confined Space Regulations 1997

Approved Code of Practice L101

The Work at Height Regulations 2005

BS 8437: 2005 Code of practice for selection, use and maintenance of personal fall protection systems and equipment for use in the workplace

BS EN 360 Personal protective equipment against falls from a height - Retractable type fall arresters

BS EN 362 Personal protective equipment against falls from a height - Connectors

BS EN 364 Personal protective equipment against falls from a height - Test methods

BS EN 365 Personal protective equipment against falls from a height - General requirements for instructions for use, maintenance, periodic examination, repair marking and packaging

BS EN 1496 Personal fall protection equipment. Rescue lifting devices

BS EN 341 Personal Fall Protection Equipment. Descender Devices for Rescue

<http://www.hse.gov.uk/confinedspace/>