

# UQ CONFINED SPACES MANAGEMENT PLAN



<b>The University of Queensland Confined Spaces Management Plan</b>			
<b>Division</b>	UQ Wide		
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## Introduction

The purpose the Confined Spaces Management Plan (the Plan) is to outline the University of Queensland's (UQ) expectations in regards to work health and safety (WHS) requirements when conducting work in and around confined spaces and in accordance with Queensland [Work Health and Safety Act 2011](#) (the Act), the [Work Health and Safety Regulation 2011](#) (the Regulations) and the [Confined Space Code of Practice 2021](#), as well as other relevant legislation. UQ aims to proactively meet its WHS obligations through the implementation of this plan.

This document and its supporting tools, set the framework for the minimum safety standard required for the management of work in and around confined spaces and serves as reference for the processes to be undertaken by UQ, subject to what is reasonably practicable in each context.

The Plan describes the systems developed by Organisational Units to identify and mitigate the risks associated with work in and around confined spaces and provides the detailed framework for the implementation of [Confined Space Operational Procedure](#).

## Objectives

The objective of this Plan is to minimise the risks to workers who work in or near UQ confined spaces. It provides a clear description of systems which needs to be developed by Organisational Units to ensure the risks in and around confined spaces have been eliminated or where this is not possible, reduced to a level that is as low as is reasonably practicable. Organisational Unit must have effective and adequate systems in place to:

- Eliminate risks of falling inside the confined spaces.
- If eliminating the risks of entering and working in the confined spaces is not reasonably practicable, minimise these risks as far as reasonably practicable.
- Identify hazards that may cause injury and assess risks associated with these hazards.
- Implement adequate risk control measures and review them for effectiveness.
- Specify roles and responsibilities regarding management of risks for entering and working inside the confined spaces by third party contractors.
- Develop regular audit schedule for auditing the management processes of the Confined Spaces for approved contractors.

## Scope

This document applies to all UQ workers (staff, students, and volunteers) at all UQ campuses and sites. For the purposes of this Plan, and as described in *the Regulations*, a confined space means an enclosed or partially enclosed space that:

- Is not designed or intended primarily to be occupied by a person;
- Is, or is designed or intended to be, at normal atmospheric pressure while any person is in the space; and
- Is or is likely to be a risk to a person's health and safety from –
  - an atmosphere that does not have a safe oxygen level
  - contaminants, including airborne gases, vapours and dusts, which may cause injury from fire or explosion
  - harmful concentrations of any airborne contaminants or

- engulfment.

## Regulatory requirements

The confined spaces risks control at Queensland (QLD) workplaces is laid down in several pieces of legislation. Any confined space entry and procedures associated with UQ shall be performed in accordance with all relevant State and Commonwealth acts, regulations, advisory standards, codes of practice and industry standards, including, but not limited to the following;

- Work Health and Safety Act 2011
- Work Health and Safety Regulations 2011
- Confined Space Code of Practice 2021
- Australian Standard AS 2865-2009 – Confined spaces.

## Determination of a confined space

A confined space is determined by the structure and a specific set of circumstances. The same structure may or may not be a confined space depending on the circumstances when the space is entered. Entry to a confined space is considered to have occurred when a person's head or upper body enters the space. A space may become a confined space if work that is to be carried out in the space would generate harmful concentrations of airborne contaminants.

Temporary control measures such as providing temporary ventilation or achieving a satisfactory pre-entry gas test will not cause a confined space to be declassified. For a confined space to be declassified as a non-confined space, it needs to have undergone sufficient changes in structure and use to eliminate all inherent hazards that define a confined space.

To help identify a confined space a flow chart from Safe Work Australia's Model Code of Practice: Confined spaces October 2018 has been included in this document in [Figure 1](#). A table showing confined space criteria for different confined spaces is given in *Appendix B - Confined space criteria*.

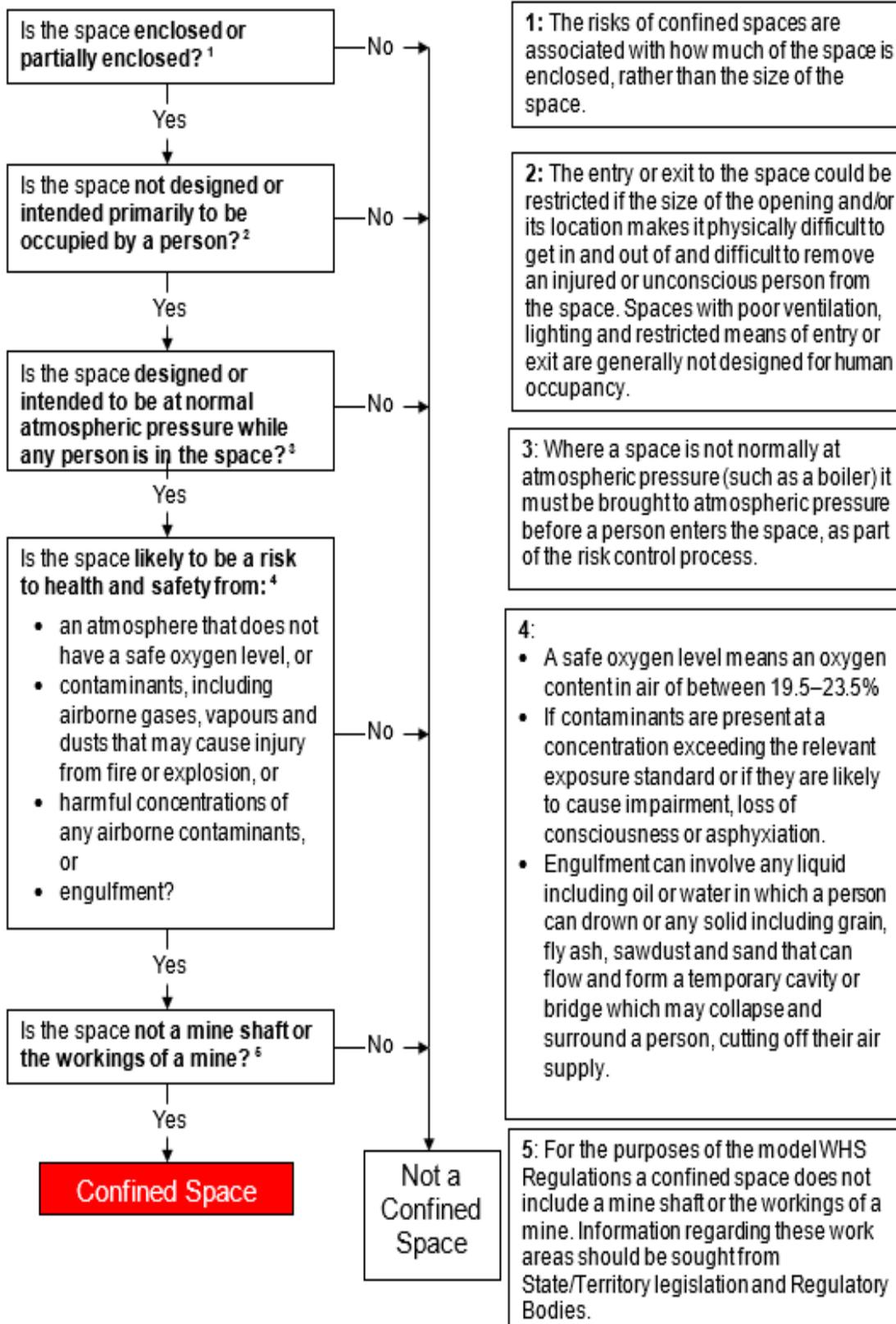


Figure 1 Confined space flow chart - Safe Work Australia, 2018.

## Risk Management Process

The environments in confined spaces have the potential to cause significant injury, illness or even death. The hazards are not always obvious and may change upon entry or exit from one occasion to the next. A risk assessment involves considering what could happen if someone is exposed to a hazard and the likelihood of it happening. A risk assessment can help with:

- identifying which workers are at risk of exposure
- determining what sources and processes are causing the risk
- identifying if, and what kind of control measures should be implemented
- checking the effectiveness of existing control measures.

### Identifying the hazards

Identification of the hazards involves finding things and situations that could potentially cause harm to workers. It is expected that all reasonably foreseeable task hazards are identified prior to entering a confined space. This includes:

- access to the areas where work is to be carried out
- walking around the workplace and talking to workers to find out what are the hazards present
- reviewing the available information, including incident records of previous injuries and near miss incidents related to working in confined spaces.

The types of substances stored in a confined space may result in a lack of oxygen, airborne contaminants or a flammable atmosphere within the confined space. Other hazards may arise from:

- physical work environment
- equipment, materials and substances used
- work tasks and how they are performed
- work design and management.

Local Health Safety and Wellness (HSW) Managers and Work Health and Safety Coordinators (WHSCs) will be able to provide advice to their Organisational Units in identifying the confined space hazards specific to their area.

### Assessing the risks associated with these hazards

Organisational Unit's management must ensure a competent person conducts a risk assessment to assess health and safety risks associated with the identified hazards of working in and around the confined space.

In assessing the likelihood of harm occurring the following questions should be considered:

- how often are workers required to enter the confined space
- how long might the workers be required to be in the confined space
- how effective are current controls
- what changes to the workspace or area may increase the likelihood of harm
- what other hazards are present that may cause harm

The risk assessment for a confined space must be completed in [UQSafe](#), it should also be reviewed and revised by a competent person as per the *Appendix C - OHS risk evaluation criteria* or whenever any risks change. For information on how to complete a risk assessment refer to the [HSW website](#).

## Implementation of control measures

The hierarchy of control must be applied in implementing the risk control measures. This may involve a single control measure or a combination of two or more different controls with higher order controls being the prioritised.

**Elimination** of the risk must always be the aim. For example, by eliminating the need to enter a confined space. If eliminating the hazards and associated risks is not reasonably practicable, you must minimise the risk by applying one or more lower order controls.

**Substitution** is to minimise the risk by substituting or replacing a hazard or hazardous work practice with something that gives rise to a lesser risk. For example, changing work methods to minimise time inside the confined space, therefore reducing likelihood of heat stress.

**Isolation** is to minimise the risk by isolating or separating the hazard or hazardous work practice from any person exposed to it, for example by isolating moving or electric parts.

**Engineering** controls are physical control measures to minimise risk, for example forced extraction ventilation for large spaces, tanks, vessels.

**Administrative** controls are one of the lowest order controls and should not be relied on as the only means of controlling the risk. For example, providing training relevant to working in confined spaces.

**Personal protective equipment (PPE)** controls are one of the lowest order controls and should not be relied on as the only means of controlling the risk. For example, respiratory protective equipment when oxygen levels are outside the safe range.

Administrative control measures and PPE do not control the hazard at the source. They rely on human behaviour and supervision and used on their own tend to be the least effective in minimising risks. In some cases a combination of control measures may be necessary, for example using a safety harness attached with davit and breathing apparatus (BA), while working inside the confined space.

## Maintaining and monitoring control measures

The Organisational Unit must have a regime in place to ensure the contractor implements control measures by scheduling planned program of inspections to verify that confined space work are carried out appropriately. The inspection regime should include details of:

- the equipment to be inspected
- the frequency and type of inspection (pre-use checks, detailed inspections)
- action to be taken on finding defective equipment
- means of recording the inspections
- monitoring the effectiveness of the control measures
- training of users.

## Reviewing effectiveness of risk control measures

As per *Section 38 of the Regulations*, the control measures that are put in place must be reviewed and revised if necessary. to make sure they work as planned and to maintain a safe working environment. The control measures must be reviewed;

- when the control measure does not control the risk so far as is reasonably practicable
- before a change at the workplace that is likely to give rise to a new or different health and safety risk that the control measure may not effectively control
- if a new hazard or risk is identified

- if the results of consultation indicate that a review is necessary
- if a health and safety representative requests a review.

Control measures may be reviewed using the same methods as the initial hazard identification step. UQ workers and the work group Health and Safety Representative (HSR) should be consulted to consider the following:

- are the control measures working effectively in both their design and operation
- are all foreseeable hazards identified
- are workers using the control measures in accordance with the instruction and training that has been provided.

## Training and competency framework

Workers and their supervisors must have the skills and knowledge to understand the hazards associated with working in and around confined spaces, the content of confined space entry permit, and the control measures implemented.

Contractors who work in and around confined spaces at UQ are required to have completed a nationally accredited training course. They must have the skills and knowledge to understand the hazards associated with the tasks and the requirements of their own confined space entry permits and their associated control measures.

## General confined space hazards

The types of substances previously stored in a confined space (however briefly) will indicate the sorts of hazards that may be present. Substances stored in a confined space may result in a lack of oxygen, airborne contaminants, or a flammable atmosphere within the confined space. Other hazards may arise from work activities, products, or by-products in or around the confined space. Some of the hazards associated with confined spaces are as follows.

### Restricted entry or exit

Particular attention must be paid to the confined space entry and exit points e.g. size, location, accessibility, etc. This is important for not only entry and exit purposes of persons and equipment but especially for emergency situations (including rescuing an injured worker). Small entrances and exits make it difficult to rescue injured workers or to get equipment in or out of the confined space. In some cases, entrances and exits may be very large but their location can make them difficult to access. For example, accessing pits or openings high up in silos may require the use of ladders, hoists or other devices, and escape and rescue from such spaces may be difficult in emergencies.

### Harmful airborne contaminants

Harmful airborne contaminants could be present in the confined space due to naturally occurring decay of organic material which can release harmful concentrations of hydrogen sulphide and methane into the surrounding atmosphere. This issue is particularly found with sewers, storm-water pits and drains. Similarly, waste water can also pool in unexpected areas like lift shafts, emitting harmful gas over time. Additionally, any activities in the confined space that may contribute to a harmful atmosphere should also be considered e.g. activities involving the use of paints, solvents, cleaning products, welding or brazing can produce toxic fumes and will require controls to be put in place when the tasks are performed.

Air monitoring must be undertaken in the confined space to ascertain the risks and develop subsequent controls if there is a possibility of harmful airborne contaminants or if there is a likelihood the work being undertaken will produce harmful airborne contaminants. Refer to *Appendix A - Harmful atmospheres present in confined spaces*.

### Unsafe oxygen levels

Oxygen levels during any activity being undertaken in confined space must be tested to ascertain the risks and subsequent controls. Air normally contains 21% oxygen by volume, although oxygen levels of 19.5% - 23.5% by volume are considered to be safe. Some situations can cause the level of oxygen to dramatically decrease leading to an oxygen-deficient atmosphere and possible asphyxiation. Moreover, oxygen levels below 12% can cause unconsciousness, and below 6% will cause immediate death. This may occur, for example, if oxygen in the atmosphere is:

- displaced by gases produced during biological processes, for example, methane in a sewer
- displaced during purging of a confined space with an inert gas to remove flammable or toxic fumes
- depleted inside metal tanks and vessels through surface oxidation (for example, when rust forms)
- consumed during combustion of flammable substances
- absorbed or reacts with grains, wood chips, soil or chemicals in sealed silos
- physical activity.

Alternatively, too much oxygen can increase the risk of fire and explosion. Oxygen-enriched atmospheres may occur if:

- chemical reactions cause the production of oxygen, for example certain reactions with hydrogen peroxide
- there is a leak of oxygen from an oxygen tank or fitting while using oxy-acetylene equipment.

### Fire and explosion

When the concentration of gas, vapour or mist is present in an atmosphere, it is capable of ignition causing fire and explosion. This may be caused from the evaporation of flammable residue, flammable materials, a chemical reaction e.g. formation of methane in sewers, or from the presence of combustible dust. A flammable atmosphere is one in which the flammable gas, vapour or mist is likely to exceed 5% of its lower explosive limit (LEL).

Flammable atmospheres in confined spaces may result from the evaporation of a flammable residue, flammable materials used in the space, a chemical reaction (such as the formation of methane in sewers), or from the presence of combustible dust (such as that in grain silos). If an ignition source, such as a sparking electrical tool or static on a person, is introduced into a space containing a flammable atmosphere, an explosion is likely to result. Flammable airborne contaminants levels must be maintained at a safe level along with the control of ignitions sources, as per the *Confined Spaces Code of Practice 2021*.

### Biological hazards

Contact with micro-organisms, such as viruses, bacteria or fungi, may result in infectious diseases, dermatitis or lung conditions such as hypersensitivity pneumonitis. Sewers, grain silos and manure pits are examples of confined spaces where biological hazards may be present.

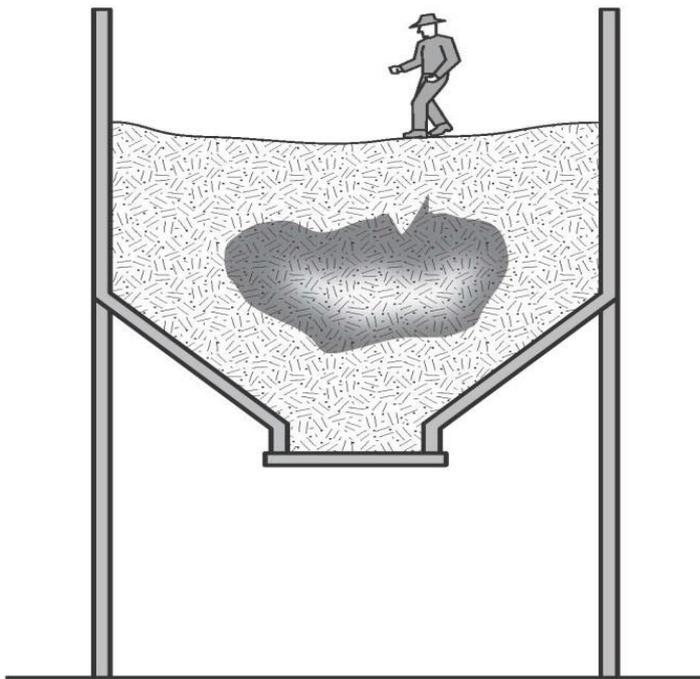
### Uncontrolled introduction of substances

The uncontrolled introduction of substances such as steam, water or other liquids, gases or solids may result in drowning, being overcome by fumes or other harm depending on the nature of the substance. Vehicles and LPG forklifts operating close to the opening of the confined space can cause a build-up of exhaust gases, including carbon monoxide, in the space.

## Engulfment

Engulfment means to be swallowed up in or be immersed by material, which may result in asphyxiation. Examples of materials that may pose a risk of engulfment include plastics, sand, liquids, fertiliser, grain, coal, coal products, fly ash, animal feed and sewage.

Stored materials such as sand and grain can form a crust or bridge when a container is emptied from below, leaving the top layer in place. Workers walking on the bridge or working below the bridge on the floor of the container may be engulfed if a bridge collapses as seen in figure 2.



*Figure 2 Example of 'bridging' which may result in engulfment*

## Additional hazards

Confined spaces may include a range of biological, environmental, mechanical or electrical hazards due to the nature and purpose of the confined space and the nature and purpose of any work being performed in a confined space. Other hazards which should be considered in the risk assessment are:

- plant and equipment used in or near the space
- microorganisms
- electricity
- noise
- manual tasks and other physical hazards
- temperature extremes
- individual physiological and psychological demands of working in confined space.

Consideration must be given to whether the work tasks to be performed in the confined space will give rise to additional hazards (e.g. hazardous fumes from painting, cleaning, welding or machinery use in the confined space).

## Work in UQ confined spaces

This section applies to the planning, preparation and conduct of work for working in and around UQ confined spaces, the maintenance of confined space equipment and structures, and the movement of those working and entering the confined spaces at UQ campuses and sites.

The risk management process is important - identify the hazards, assess the risks, control the risks and then review the control measures. The most important step in the risk management process involves controlling risks by eliminating them so far as is reasonably practicable, or if that is not possible, by minimising the risks so far as is reasonably practicable.

The ways of controlling risks are ranked from the highest level of protection and reliability to the lowest as discussed in *Implementation of control measures*. *The Regulations* require duty holders to work through this hierarchy to achieve the highest level of protection that is reasonably practicable in the circumstances.

### Eliminate the need to enter a confined space

Risks associated with work in a confined space must be eliminated, so far as is reasonably practicable. Eliminating the need to enter the confined space would be the best option, work could be carried out from outside the confined space. Examples include:

- installing fixed or temporary cleaning devices (e.g. spray balls using high-pressure hoses inserted through an access hatch to clean the inside of a tank)
- using remote cameras or a mirror attached to a probe for internal inspection of vessels
- using remotely operated rotating flail devices, vibrators or air purge to clear blockages in silos
- using a hook, long-handled clasp or magnet on a string to retrieve an object dropped into a confined space.

### Minimise the risks

If entering a confined space cannot be avoided, then a safe system for working inside the space must be implemented. The identified hazards from a risk assessment will help determine what controls are needed to minimise any risk associated with working in the confined space. Under *the Regulations*, the following matters must be considered.

#### *The nature of the space*

The nature of a confined space may contribute to the risks associated with it, for example:

- whether the number, size and location of entrances and exits are adequate to enable the rapid exit and rescue of workers from the space
- the temperature of the space so that it will not cause heat stress
- adequate lighting if there is poor visibility.

#### *The concentration of oxygen or airborne contaminants*

The level of oxygen and airborne contaminants is a significant contributor to the risk of working in a confined space, therefore:

- the level of oxygen should be maintained at a safe level and any airborne contaminants in the space are minimised by ventilating prior to and/or during entry
- any changes that may occur to oxygen or airborne contaminants are determined by testing the atmosphere

- where the atmospheric conditions cannot be maintained at a safe level, appropriate respiratory protective equipment must be provided.

#### Work method

Consideration should be given to whether the proposed work or work process will introduce any new hazards or contribute to the risks of working in the confined space. Ignition sources must not be introduced into a space that contains a flammable atmosphere. Work processes should:

- minimise the release of harmful airborne contaminants into the space
- reduce the time spent in the space or the number of people that have to enter the space
- eliminate the risk of engulfment.

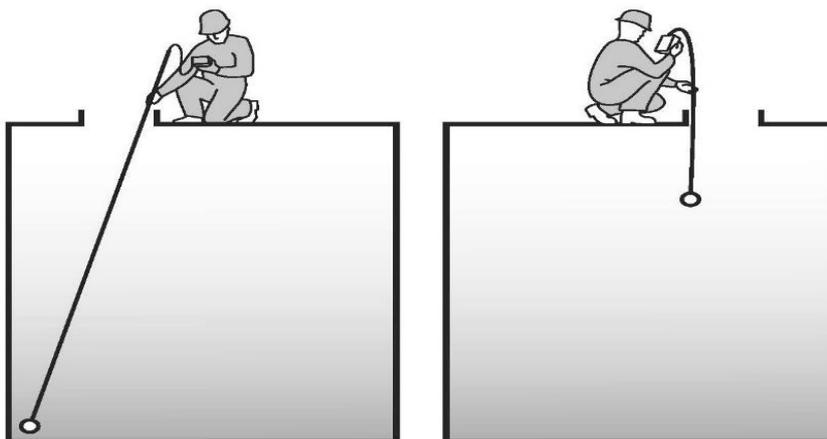
Consider any risks associated with the use of personal protective equipment (PPE) in a confined space. Using PPE may introduce new risks for those working in the space, for example the weight or discomfort of protective clothing and hearing protection.

#### Continued confined space atmospheric testing and monitoring

Testing and monitoring the atmosphere inside a confined space is a routine part of determining appropriate control measures. Any air monitoring in a confined space should be carried out by a competent person using a suitable, correctly calibrated gas detector. It may be necessary to test the atmosphere for:

- oxygen content
- airborne concentration of flammable contaminants
- airborne concentration of potentially harmful contaminants (e.g. hydrogen sulphide H<sub>2</sub>S).

A person's senses should **never be used** to determine if the air in a confined space is safe. Many toxic or flammable gases and unsafe oxygen levels cannot be detected using one's senses. Initial testing should be done from outside the confined space by inserting a sample probe and/or portable gas detection device at appropriately selected access holes, nozzles and openings. Because contaminants can settle at different levels, each part of the confined space should be tested, side to side and top to bottom as seen in Figure 3.



*Figure 3 Atmospheric testing of remote regions and different levels within the confined space.*

For example, some gases (such as H<sub>2</sub>S) are heavier than air and in unventilated areas will settle to the bottom of the space, while other gases (such as methane CH<sub>4</sub>) are lighter than air and will collect at the top of the space. Testing should be carried out on a sufficient number of points to accurately reflect areas of the space that is likely to be accessed.

Lighter gases may be vented into the breathing zone of the person conducting the tests. Some gases may be dissolved in liquids and released when the liquid is disturbed or a crust over the liquid is broken and it may therefore be necessary to agitate liquids before monitoring.

If it is necessary to enter the space to test remote regions away from entrances or access holes, then air-supplied respiratory equipment **should be** worn, and the entry must be undertaken in accordance with *the Regulations* using a Confined Space Entry Permit. Re-testing and continuous monitoring of the air may be necessary if the risk assessment indicates that conditions may change due to the work being done or the disturbance of hazardous material in the confined space.

### Isolation of hazardous services

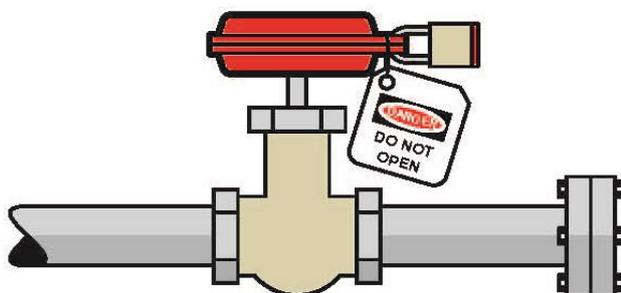
All potentially hazardous services should be isolated as per the [UQ Lock Out Tag Out Isolation Safety Guideline \(LOTO\)](#) prior to any person entering the Confined Space to prevent. All potentially hazardous services should be isolated prior to any person entering the confined space to prevent:

- the introduction of contaminants or conditions through piping, ducts, vents, drains, conveyors, service pipes and fire protection equipment
- the activation or energising of machinery in the confined space
- the activation of plant or services outside the confined space that could adversely affect the space (for example heating or refrigerating methods)
- the release of any stored or potential energy in plant
- the inadvertent use of electrical equipment.

If liquids, gases or vapours could enter the confined space the pipe work should be physically isolated. Isolation measures, for example physically locking, tagging, closing and blanking should be supervised or checked at each isolation point. Isolation measures should be supported by systems to ensure that the isolation measures are not removed until all work is complete and all workers have left the space. Refer to Lockout-Tagout.

Methods of isolation from materials, contaminants or conditions include isolating in accordance with one of the methods described below or by an alternative method ensuring at least an equivalent level of safety:

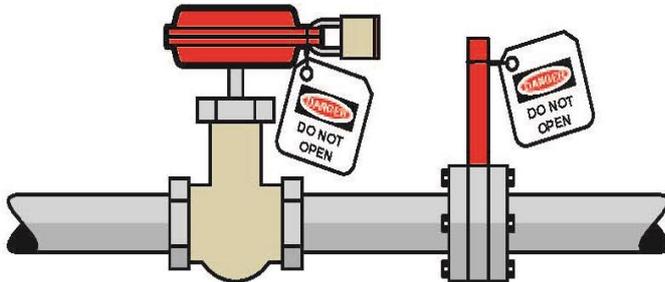
- Removing a valve, spool piece or expansion joint in piping leading to the confined space (as close as practicable to the space) and blanking or capping the open end of the piping as seen in Figure 4. The blank or cap should be tagged to indicate its purpose.



*Figure 4 Open end of pipe capped. Nearest valve closed locked and tagged.*

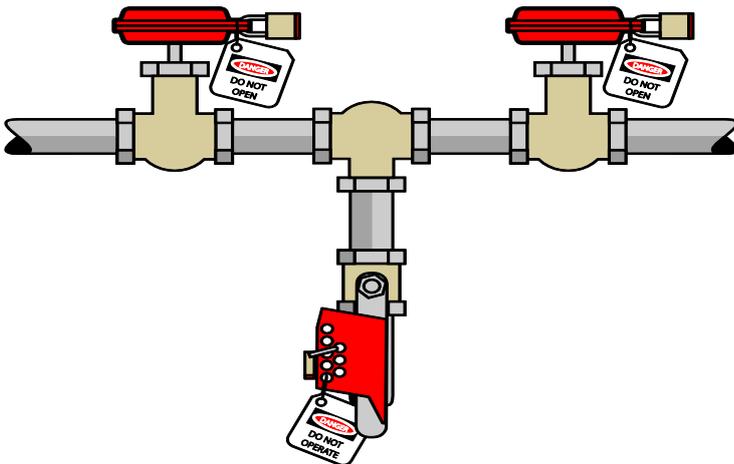
- **Blanks or caps** should be made of a material that is compatible with the liquid, vapour or gas with which they are in contact. The material should also have sufficient strength to withstand the maximum operating pressure, for example surges, which can build up in the piping.

- Inserting a suitable **full-pressure spade or blank** in piping between the flanges as close as practicable to the confined space as seen in Figure 5. The full-pressure spade or blank should be tagged to indicate its purpose.



*Figure 5 Insertion of full pressure spade or blank. Nearest valve closed, locked and tagged. Spade is also tagged to indicate its purpose.*

Closing, locking and tagging at least two valves in the piping leading to the confined space as seen in Figure 6. A drain or vent valve between the two closed valves should be **locked open to atmosphere** as part of this method.



*Figure 6 Closing, locking and tagging at least two valves.*

### Respiratory protective equipment

If it is not reasonably practicable to ensure the confined space contains a safe oxygen level, or safe levels of airborne contaminants, then appropriate respiratory protective equipment must be provided. The respiratory protective equipment should be provided and worn in situations where there is no exposure standard for a substance, or where the substance is present in an unknown concentration.

### Communication and safety monitoring

A communication system is needed to enable communication between people inside and outside the confined space and to summon help in an emergency. Depending on the conditions in the confined space, communication can be achieved by voice, radio, hand signals or other suitable methods.

Before a worker enters a confined space, a stand-by person must be assigned to continuously monitor the wellbeing of those inside the space, if practicable, observe the work being carried out and initiate appropriate emergency procedures when necessary as shown in Figure 7.

The stand-by person should:

- understand the nature of the hazards inside the particular confined space and be able to recognise signs and symptoms that workers in the confined space may experience
- remain outside the confined space and do no other work which may interfere with their primary role of monitoring the workers inside the space
- have all required rescue equipment (for example, safety harnesses, lifting equipment, a lifeline) immediately available
- have the authority to order workers to exit the space if any hazardous situation arises
- never enter the space to attempt rescue.



Figure 7 Standby person monitoring the confined space with rescue equipment and sign in place.

### Entry and exit procedures

For the entire period the Confined Space Entry Permit is valid, procedures should be in place to indicate when any worker is in the space, for example by using tags, a system of signing in and out on the entry permit and having a standby person record who is in the space.

### Signage and barricading

Where work is being undertaken in a confined space, and there is a risk of inadvertent entry to the space, the area must be controlled by warning signage and/or barriers as per [UQ Temporary Barricading and Signage Guideline](#). Barricading and signage must be used to ensure, as far as practicable, all non-essential personnel and equipment is kept clear of any confined space work area.

Before any work in relation to a confined space starts, signage must be erected to prevent entry of persons not involved in the work. Signs must warn against entry by people other than those who are listed on the

Confined Space Entry Permit, and must be placed at each entrance to the confined space. Signs must be in place while the confined space is inaccessible, including when preparing to work in the space, during work in the space and when packing up on completion of the work. Signposting alone should not be relied on to prevent unauthorised entry to a potential confined space. Security devices, for example locks and fixed barriers, should be installed.

### Maintenance of confined space entry equipment

The following contractor's confined space entry equipment must be inspected to ensure that it is certified:

- atmospheric testing and sampling equipment
- personal protective equipment including respirators
- ventilation equipment
- safety harness and lines
- emergency rescue equipment.

### Fall protection systems for confined spaces

In confined spaces where persons are working at heights, the standard risk management process of identifying fall hazards, assessing the risk of a fall occurring, and controlling the risks must be adopted. Organisational Units must ensure that risk assessments are completed for tasks and activities that require entering a confined space to account for:

- the risk of falling from one level to another; and
- risks from falling objects.

Many confined spaces require a confined space entrant to wear safety harness and/or fall arrest system depending upon the height and work. These fall protections systems provide two things:

- Rescue the entrant in case of emergency and,
- Safe lowering/entering.

Fall arrest systems and the structures to which they are connected, should be designed and selected to resist maximum likely force. AS/NZS 1891.4 Industrial fall arrest systems Part 4 – Selection, use and maintenance specifies that the ultimate capacity of a single fall arrest anchorage point for one person is 15 kN (or approximately 1500 kg). AS/NZS 1891.4 specifies capacity requirements for other situations, apart from proprietary static lines (i.e. horizontal lifelines), whose anchorage loads are provided by the supplier as they can depend on the system design. Davits and anchorage points should be inspected in accordance with AS/NZS 1891.4, either on a scheduled basis or prior to use (if used infrequently).

## Confined Space Entry and Rescue Permit

A Confined Space Entry Permit provides a formal check to ensure all elements of a safe system of work are in place before workers can enter the confined space. It also provides a means of communication between UQ management and those contractors carrying out the work. The contractors must obtain authorisation from UQ management for contractor confined space access request form PF721 from P&F or the engaging UQ organisational unit to access the Confined Space and will work under their own permit systems.

### Outsourcing confined space work to contractors

Organisational Units must contract out all confined space work to expert contractors to ensure the work is conducted in a safe manner. If a contractor requires access to one or multiple confined spaces, they must seek the approval from the Organisational Unit's HSW Manager (authorised person). To do this Organisational Unit's authorised person coordinating the work must confirm the contractor:

- is a verified contractor. If the contractor is not on the verified contractor list they must fulfil all the criteria of competency for health and safety in the contractor engagement process prior to undertaking any work at UQ. They have to demonstrate they have access to a health and safety management system that can effectively manage the risk associated with this type of work, they must have the correct training and competency to undertake confined space work.
- has undertaken the specific confined space hazard induction.
- acknowledges they are competent and have the expertise to perform the confined space work safely and have confined space emergency rescue capabilities independent of UQ security, workers and Queensland emergency services.

Once this has been completed the contractor may be granted access to Organisational Units controlled confined spaces. Contractors will work under their own permit systems after getting authorisation from Organisational Unit.

The contractors with long term access to one or multiple confined spaces must notify the relevant Organisational Unit's authorised manager of each entry, and if access is frequent (daily or multiple accesses weekly), the contractor will notify the authorised person of all entries each week.

It is the responsibility of any Organisational Unit's authorised person who engages the services of an external person or organisation to ensure they are following the required Queensland codes and regulations.

### Preparing for work to commence

Before work commences, all controls outlined in the confined space JHA and the risk assessment must be put in place and checks made to ensure that no new hazards have been introduced. To control risks, preparing for the commencement of work should include checking or assessment of:

- access to and from the workplace
- the climatic and environmental conditions – e.g. moisture, lichen or dust, wind, weather forecast
- fall prevention systems – e.g. ladders, davits, scaffolding, guardrails
- PPE
- induction training
- specific instructions for workers
- electrical practices – e.g. portable electrical tools and equipment
- emergency and rescue procedures
- structural and supporting structures soundness.

### High risk construction work

Confined space tasks which fall in the high-risk construction work require mandatory Safe Work Method Statements (SWMS) as outlined in *Section 299 of the Regulation* prior to any work commencing. Construction work that involves a risk of a person entering the confined space is included in the list of high-risk construction work under *Section 291 of the Regulation*.

#### *Safe work method statement (SWMS)*

High risk construction work inside the confined space task must have a SWMS and workers must have access to the relevant SWMS in order to complete the risk assessment for that task.

## Emergency response plan (ERP)

When things go wrong in a confined space, people may be exposed to serious and immediate danger. Effective arrangements for raising the alarm and carrying out rescue operations in an emergency are essential and is a requirement of the Act for UQ to ensure that all emergency procedures are implemented and regularly practiced.

**WHS Act Section 74 (1):** A person conducting a business or undertaking must—

- a) establish first aid procedures and rescue procedures to be followed in the event of an emergency in a confined space; and
- b) Ensure that the procedures are practised as necessary to ensure that they are efficient and effective.

The confined space considerations when developing an emergency plan is given in *Appendix F - Considerations when preparing a confined space emergency plan* and the UQ confined space rescue plan is provided in **Error! Reference source not found.**. This first aid and rescue procedure must be initiated from outside the confined space. If a worker inside a confined space has been overcome by lack of oxygen or airborne contaminants (or if this is suspected), it should always be assumed that entry for rescue is unsafe unless air-supplied respiratory protective equipment is used.

*The Regulation* and the *Code of Practice* stipulate the need for emergency and rescue procedures when working in confined spaces. Consideration should be given to:

- communications
- rescue and resuscitation equipment
- capabilities of rescuers
- first aid
- local emergency services.

All workers who may be involved with rescues from a confined space must be made aware that rescue procedures are to be followed at all times. This training will include procedures where:

- employees are uninjured and evacuate themselves
- employees are injured but still capable of self-evacuation
- entry is required to provide treatment
- employees are assisted to evacuate by persons remaining outside the confined space
- emergency entry is required in order to evacuate employees.

Different confined spaces exist at UQ and the plans and procedures appropriate to the types of situations that may arise from work in a confined space should be put in place using the information from the risk assessment. It is necessary to coordinate the emergency plan with UQ Security, however, it must be kept in mind that UQ security does not have the capability for confined space rescue.

## Confined spaces local risk register

Organisational Units will maintain a local risk Confined Space Register (the Register) for all known confined spaces under their management or control. The Register shall identify any likely contaminants within the confined spaces, is to be signed and dated by the Organisational Unit's authorised person and reviewed annually. This is to aid in the development of confined space risk assessments and the development of standard operating procedures (SOPs) for specific tasks to their areas where required.

Access to confined spaces must be:

- restricted by means of locked access (keys must remain with the Organisational Units authorised person controlling access – e.g. the relevant P&F CFM or Organisational Unit authorised person)
- clearly signed at the entry to notify UQ workers and the general public of the confined space.

## Roles and responsibilities

### *Heads of Organisational Units*

Are responsible for:

- managing the risk of confined space entry in their areas of responsibility in accordance with the Confined Space procedure and this Plan
- seeking advice from UQ's Occupational Hygiene Adviser on implementing the requirements of the Confined Space Procedure or the Plan, and notifying the HSW Division of any difficulties in implementing the procedure or Plan
- ensuring that Managers and Supervisors in their areas of responsibility, who manage any workers or contractors requiring access to confined spaces, are aware of the procedure and this Plan, and provide resources to meet the competency and training requirements required.

### *Managers and Supervisors*

Managers and Supervisors are responsible for ensuring for areas under their responsibility:

- UQ workers under their supervision conducting work in and around confined spaces are suitably qualified and trained (refer to section 3.4) and have been informed of confined space procedure and this Plan
- records of inspections and maintenance of all equipment is maintained and kept with the equipment
- managing locks and keys for restricted access confined spaces
- risk management process are undertaken and provide appropriate supervision, support and guidance for WHS risk management
- provision and maintenance of effective WHS risk controls
- provision, maintenance, training and proper use of PPE
- consult with workers, review and approve risk assessments
- ensure post-incident corrective actions are implemented and review risk management documentation accordingly.
- review and update WHS risk management provisions in relation to change in the work activities.

### *Confined space work supervisors*

Confined space work supervisors must be trained and competent as required in section 3.4 of this procedure and are responsible for ensuring:

- risk assessments are conducted in consultation with UQ workers
- any equipment controlled and managed in their Organisational Unit (e.g. harnesses, tripods, ropes, fall restraint devices and rescue equipment) is inspected and maintained in accordance with *AS/NZS1891 Industrial fall-arrest systems and devices*.
- required permits and documentation is completed as required

### *HSW Managers and Work Health and Safety Coordinators (WHSC)*

HSW Managers and Work Health and Safety Coordinators are responsible for:

- providing advice and guidance to supervisors and managers in their Organisational Unit on how to implement and operationalise the procedure
- assisting Managers, Supervisors and UQ workers to conduct and review risk assessments for work in confined spaces
- consulting with HSW Division on any constraints to implementing the requirements of the procedure or the Plan
- HSW Managers are the authorised person for signing permits.

### *Property and Facilities Division (P&F)*

Property and Facilities Division (P&F) is responsible for:

- maintaining a risk register for P&F managed or controlled confined spaces
- conducting risk assessments for P&F managed or controlled confined spaces and reviewing these risk assessments annually
- inspecting and maintaining UQ's facade access systems (Davit Systems) for P&F managed or controlled confined spaces.

### *Client Facilities Managers*

P&F Client Facilities Managers are responsible for managing confined spaces within their precincts including:

- managing locks and keys for restricted access confined spaces
- authorising access to confined spaces to competent contractors.

### *Health, Safety Wellness (HSW) Division*

Health, Safety and Wellness (HSW) Division is responsible for:

- provide guidance and advice to Organisational Units, in collaboration with P&F, on the implementation of the Plan.

### *Occupational Hygiene Advisor*

The Occupational Hygiene Advisor within the HSW Division, will provide advice to Organisational Units on confined space identification, local procedure preparation, training, ventilation and testing arrangements.

## **Reference**

- Work Health and Safety Regulation 2011.
- Work Health and Safety Act 2011.
- Managing the risk of falls at workplaces Code of Practice 2021.
- AS/NZS 1892.5:2020 Portable Ladders-selection, safe use and care

## Appendices

### Appendix A - Harmful atmospheres present in confined spaces.

The following table from (obtained from Confined Spaces Code of Practice 2021) illustrates the kinds of harmful atmospheres that may be present in a confined space and how they may be created.

Source	Examples
Substance stored in the confined space or its by-product(s)	<ul style="list-style-type: none"> <li>• Build-up of hydrogen sulphide in sewers and pits</li> <li>• Release of toxic substances e.g. hydrogen sulphide in tanks of decomposing organic material, especially when the material is disturbed</li> </ul>
Work performed in the confined space	<ul style="list-style-type: none"> <li>• Use of paints, adhesives, solvents or cleaning solutions</li> <li>• Welding or brazing with metals capable of producing toxic fumes</li> <li>• Exhaust fumes from engines used in the confined space</li> </ul>
Entry of natural contaminants e.g. groundwater and gases into the confined space from the surrounding land, soil or strata	<ul style="list-style-type: none"> <li>• Acid groundwater acting on limestone with the potential to produce dangerous accumulations of carbon dioxide</li> <li>• Methane released from groundwater and from decay of organic matter</li> </ul>
Release of airborne contaminants	<ul style="list-style-type: none"> <li>• When sludge, slurry or other deposits are disturbed or when scale is removed</li> </ul>
Manufacturing process	<ul style="list-style-type: none"> <li>• Residues left in tanks, vessels etc., or remaining on internal surfaces can evaporate into a gas or vapour</li> </ul>
Entry and accumulation of gases and liquids from adjacent plant, installations, services or processes	<ul style="list-style-type: none"> <li>• The contamination of underground confined spaces by substances from plant in the vicinity of the confined space</li> <li>• Carbon monoxide from the exhaust of LPG-powered forklifts operating in, or in the vicinity of, the confined space.</li> <li>• Carbon monoxide from the exhaust of internal combustion engine</li> </ul>

## Appendix B - Confined space criteria

Description of the space and activity	Confined space criteria						Confined space?  If the answer to A, B, C and at least one of D is yes, then the space is a confined space.
	A	B	C	D			
	Is the space enclosed or partially enclosed	Is the space not designed or intended to be occupied by a person	Is the space designed or intended to be, at normal atmospheric pressure while any person is in the space	Does the space present a risk from:			
				Harmful airborne, flammable contaminants	An unsafe oxygen level	Engulfment	
Sewer with access via a vertical ladder	✓	✓	✓	✓	✓	✓	Yes
Dislodging grain from a silo with sole access through a manhole at the top	✓	✓	✓	✓	✗	✓	Yes
Cleaning spilled cadmium pigment powder in a shipping container	✓	✓	✓	✓	✗	✗	Yes
Inspecting a fuel tank in the wing of an aircraft	✓	✓	✓	✓	✗	✗	Yes
Dislodging a sludge blockage in a drain pit	✓	✓	✓	✓	✓	✓	Yes
Internal inspection of a new, clean tank prior to commissioning	✓	✓	✓	✗	✗	✗	No
Internal inspection of an empty cement silo through a door at ground level	✓	✗	✓	✗	✗	✗	No
Stocktake using an LPG forklift in a fruit cool store	✓	✗	✓	✓	✗	✗	No
Installing insulation in a roof cavity	✓	✓	✓	✗	✗	✗	No

Appendix C - OHS risk evaluation criteria

Table 2: OHS Risk Evaluation Criteria					
Level of Risk	Risk Level Acceptability	Immediate action required	Risk Treatment Priority	Oversight / reporting level	Formal review period
<b>Extreme</b>	No	Task must not proceed. Appropriate and prompt action must be taken to reduce the risk to an acceptable level.	1st	Vice Chancellor, VCRCC, VCC & SR&AC Vice Chancellor, VCRCC, VCC & SR&AC	Operational: 2 days. Corporate: Biannual.
<b>High</b>	No	Task can only proceed in extraordinary circumstances** and provided there is authorisation by relevant Head of Function* and a plan is in place to promptly reduce the risk to an acceptable level.	2nd	Relevant USMG member and Head of Function* (the risk may be reported by ERS to Vice Chancellor, VCRCC, VCC and SR&AC)	Operational: Biannual. Corporate: Annual.
<b>Medium</b>	Broadly acceptable	Task can proceed upon approval of the risk assessment by relevant Line Manager or Supervisor is received. It is recommended that a plan is developed to reduce the risk within a reasonable timeframe.	3rd	Relevant Line Manager or Supervisor	Operational: Annual. Corporate: Biennial.
<b>Low</b>	Yes	Task can proceed upon approval of the risk assessment by relevant Line Manager or Supervisor is received.	4th	Relevant Line Manager or Supervisor	Operational: 5 yearly. Corporate: 5 yearly.
<p>* Relevant Head of Function; Head of school, Institute Deputy Director or Division Director</p> <p>** Extraordinary circumstances are opportunities for the University that align with its strategic mission and RAS.</p>					

## Appendix D - Definitions, terms, and acronyms

**Airborne Contaminant** – means a contaminant in the form of a fume, mist, gas, vapour or dust, and includes microorganisms, the presence of which may be harmful to health and safety.

**Breathing zone** means a hemisphere of 300 mm radius extending in front of a person's face and measured from the midpoint of an imaginary line joining the ears.

**Competent person** is one who has acquired through training, qualification or experience, the knowledge and skills to carry out this task.

**Exposure Standard** represents the airborne concentration of a particular substance or mixture that must not be exceeded. The exposure standard can be of three forms: 8-hour time weighted average (TWA), short term exposure limit (STEL) or peak limitation.

The following terms are used in calculating levels of atmospheric contaminants:

- (a) 8-hour Time weighted average (TWA) – The maximum average airborne concentration of a particular substance when calculated over a normal 8-hour workday, for a 5-day work week.
- (b) Short term exposure limit (STEL) A 15 minute TWA exposure which should not be exceeded at any time during a work day even if the eight hour TWA average is within the TWA exposure standard. Exposure at the STEL should not be longer than 15 minutes and should not be repeated more than 4 times a day. There should be at least 60 minutes between successive exposures at the STEL
- (c) Peak limitation– A maximum or peak airborne concentration of a particular substance determined over the shortest analytically practicable period of time, which does not exceed 15 minutes.

**Flammable range** – the range of flammable gas or vapour (percentage by volume) in air in which an explosion in air can occur upon ignition. Expressed by lower explosive limit (i.e. the concentration of contaminant in air below which the propagation of a flame does not occur on contact with an ignition source, and upper explosive limit (i.e. the concentration of contaminant above which the propagation of a flame does not occur on contact with an ignition source.

**Hot work** – welding, thermal or oxygen cutting, heating, and other fire producing or spark producing operations that may increase the risk of fire or explosion.

**Project Manager** at UQ includes a Construction Project Manager, a Client Facilities Manager, Energy, Engineering, Cleaning, Property, Planning, Traffic and Parking, UQ Centre

**Safe oxygen level** – a minimum oxygen content in air of 19.5 percent by volume, and a maximum oxygen content in air of 23.5 percent by volume, under normal atmospheric pressure.

**Stand-by person** – a competent person assigned to remain on the outside of, and in close proximity to, the confined space and capable of being in continuous communication with and to observe those inside, if practicable. In addition, where necessary, initiate rescue procedures, operate, and monitor equipment used to ensure safety during entry and work in the confined space.

## Appendix E - Factors to be considered when undertaking a confined space risk assessment

When undertaking a risk assessment to determine the risks requiring control the following factors should be considered from Confined Spaces Code of Practice 2021.

- the atmosphere in the confined space, including whether testing or monitoring is to be undertaken
- the risk of engulfment of a person
- all proposed work activities, particularly those that may cause a change to the conditions in the confined space
- the number of persons occupying the space
- the soundness and security of the overall structure and the need for lighting and visibility
- the identity and nature of the substances last contained in the confined space
- any risk control measures needed to bring the confined space to atmospheric pressure
- the number of persons required outside the space:
  - to maintain equipment essential for the task being undertaken within the confined space
  - to provide continuous communication with the persons within the confined space
  - to properly initiate emergency response procedures
- risks associated with other hazards, such as noise or electricity
- arrangements for emergency response, for example first aid and resuscitation
- the physiological and psychological demands of the task and the competency of persons involved in the tasks or emergency response duties
- the adequate instruction of persons in any required procedure, particularly those that are unusual or non-typical, including the use and limitations of any personal protective equipment and other equipment to be used
- the availability and adequacy of appropriate personal protective equipment and emergency equipment for all persons likely to enter the confined space
- the need for additional risk control measures, including:
  - prohibiting hot work in adjacent areas
  - prohibiting smoking and naked flames within the confined space and adjacent areas
  - avoiding contamination of breathing air from operations or sources outside the confined space, for example, from the exhaust of an internal combustion engine
  - prohibiting movement of equipment in adjacent areas, for example forklifts
- prohibiting spark-generating equipment, clothing and footwear
- whether purging or cleaning in the confined space is necessary
- whether hot work is necessary
- Conditions that could impede entry and exit or the conduct of the tasks in the confined space, for example, plant layout, dimensions, manual handling and ergonomic aspects of the task activity.

## Appendix F - Considerations when preparing a confined space emergency plan

Considerations	Questions
<b>Location of the confined space</b>	What is the geographic location of the space, how accessible is it in an emergency and how far away is it from appropriate medical facilities?
<b>Communications</b>	<p>How can workers working inside the space communicate to people outside in an emergency?</p> <p>Exactly how will the alarm be raised and by whom?</p> <p>Planning needs to ensure that rescue and emergency personnel can access the workplace during night shift, weekends and holiday periods.</p>
<b>Rescue and resuscitation equipment</b>	<p>What kinds of emergencies are contemplated?</p> <p>The provision of suitable rescue and resuscitation equipment will depend on the potential emergencies identified. Selected rescue equipment should be kept in close proximity to the confined space so that it can be used immediately.</p>
<b>Capabilities of rescuers</b>	<p>Are rescuers properly trained, sufficiently fit to carry out their task and capable of using any equipment provided for rescue (e.g. breathing apparatus, lifelines and fire-fighting equipment)?</p> <p>How will rescuers be protected during the emergency operation?</p>
<b>First aid</b>	<p>Is appropriate first aid available for immediate use?</p> <p>Are trained first aid personnel available to make proper use of any necessary first aid equipment?</p>
<b>Local emergency services—if they are to be relied on for rescue</b>	<p>How will the local emergency services (e.g. fire brigade) be notified of an incident?</p> <p>What information about the particular dangers in the confined space will be given to them on their arrival?</p> <p>Have prior arrangements been made with local emergency services to ensure they are able to respond in a reasonable time and have the specialist confined space retrieval equipment readily available?</p>