



HEALTH AND SAFETY
AUTHORITY

Confined Spaces in Agriculture

Steps to Manage
the Risks





Our Vision:
Healthy, safe and
productive lives
and enterprises

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Introduction

This publication illustrates the types of confined spaces that can be found on farms where you work. Confined spaces are areas large enough for a worker to enter and perform work and have a limited or restricted means of entry or exit. In the following pages you will find information to help you identify confined spaces on farms and guidance on how to reduce the associated risk.

- Step 1** **Identify confined spaces**
- Step 2** **Understand the hazards**
- Step 3** **Manage the risks**
- Step 4** **Incident prevention**



Step 1 Identify confined spaces

A confined space is an enclosed or partially enclosed area that is big enough for a person to enter. The space may be enclosed on all sides (e.g. a bin or tank), or as few as two sides (e.g. an enclosed conveyor).

You can recognise a confined space because it will **not** have things you would normally find in a workspace such as:

- Permanent utilities (e.g. ventilation systems, lighting and plumbing services)
- Wall coverings and furniture
- Easy access (e.g. large doorways and shallow staircases).

Confined spaces are not designed for someone to work in regularly. They are spaces where entry may be needed from time to time for inspection, cleaning, maintenance or repair.

Examples of the most common hazardous gases typically generated on farms include methane and hydrogen sulphide (slurry and waste effluent), elevated levels of carbon dioxide with oxygen depletion (feedstuff fermentation and/or decomposition), and carbon monoxide (combustion engine exhaust).

Examples of confined spaces:

- Grain and feed storage facilities
- Corrugated steel bins
- Silos
- Manure storage tanks
- Manure/bio/digester units
- Manure transport vehicles (tanks and applicators)
- Bulk transport vehicles
- Sprayer and chemical transport vehicles
- Feed mixers/grinders
- Storage and mixing tanks, bins and silos
- Fermentation vessels
- Environmentally controlled fruit and vegetable storage units
- Bulk liquid storage tanks
- Wells, cisterns, dry wells, septic tanks
- Grain dryers
- Fuel storage tanks
- Forage wagon
- Sumps and tunnels
- Forage storage

Step 1 Identify confined spaces



Grain and feed storage facilities, Crawl spaces or cellars

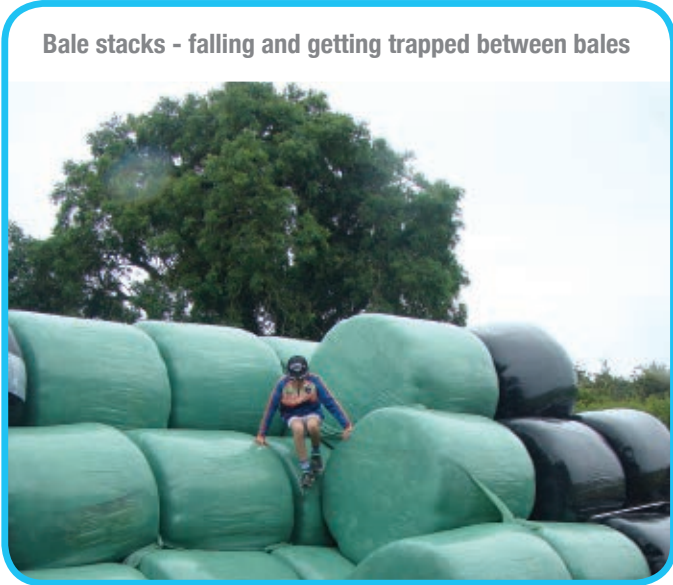


Slurry store



Feed bin

Step 1 Identify confined spaces



Slurry, slatted tanks, agitation, guarding



Step 1 Identify confined spaces



Slurry spreader



Diesel tanks and bulk liquid storage tanks



Dairy tank



Dairy



Step 2

Understand the hazards

Different hazards can exist in confined spaces. There could be toxic gases, lack of oxygen, or moving parts or equipment that could harm you or your co-workers. Hazards may not be obvious, so a qualified person who has proper training and experience must look carefully at every confined space on the farm where you work to identify possible hazards.

Some common hazards found in confined spaces:

Toxic gases

Toxic gases can be produced in a confined space by liquids or solids, such as liquid manure or compost. They can also be produced because of work that is being done, such as painting or welding. At high enough levels, even a brief exposure to some gases can cause permanent health effects, such as brain, heart or lung damage.

If you are exposed to toxic gases in a confined space, you may become dizzy or lose consciousness and be unable to escape. This can happen quickly which is why it is important to know about the toxic gases that may exist in a confined space.

Oxygen levels

Lack of oxygen is a leading cause of death for workers in confined spaces. You cannot detect low oxygen levels by sight or smell, but they can cause brain damage and stop your heart after a few minutes. Confined spaces are sometimes made worse by restricted access. In a confined space something as simple as rusting metal can cause low oxygen levels.

Too much oxygen in a confined space is also dangerous because it increases the risk of fire or explosion. Materials that would not catch fire or burn in normal air may do so quickly and easily where there is a high level of oxygen.

Moving parts of equipment and machinery

Mechanical equipment such as augers, mixers or rotating tanks can be dangerous to work near. Even when equipment is shut off someone else could accidentally turn it on. The machine could contain remaining energy, such as accumulated pressure. Equipment that has not been locked out and de-energised could also move unexpectedly, especially if it is not properly balanced.

Explosive atmospheres

Vapours or gases in confined spaces can ignite, resulting in fires or explosions. Keep fuel containers away from confined spaces. Grain and wood dusts may also explode when there is enough dust in the air.

Entrapment and engulfment

Grain or compost that is being stored can be a risk to you or your co-workers because you could get trapped or buried. Compost or grain especially if moist can form 'bridges' with empty spaces underneath them or 'shoulders' that are overhead. If you walk on the surface of one of these bridges or under a shoulder, it could collapse and bury or trap you.

Bins and hoppers are especially dangerous. You could be trapped or crushed when material is accidentally discharged into an empty bin or hopper.

Biological hazards

On a farm any enclosed or poorly ventilated space where feedstuffs or organic matters (grain, apples, manure) stored or allowed accumulate potentially presents a confined space risk.

Composted material and manure can release bacteria, mould spores, allergens and other biological material into the air. If you are exposed to lower levels of these materials, you may notice symptoms such as coughing, itchy eyes, stuffy nose, sneezing or sore throat. For anyone who has asthma or a sensitized immune system the health effects can be more severe.

Electrical hazards

Electrical shock can result from defective extension cords, welding cables or other electrical equipment. Work done in metal enclosures or wet conditions can be particularly dangerous. When solid material, such as dry grain or feed flow or move (through pipes, augers or hoppers) dry conditions can cause electrostatic arcs. Electrostatic arcs can ignite dust clouds.

Substances entering through piping

Pipes connected to or entering confined spaces may contain liquids, gases or other harmful substances including:

- Toxic gases
- Hot substances that could cause burns (e.g. steam)
- Liquids that could cause drowning (e.g. milk or liquid manure)
- Solids that could trap, crush or bury (eg grain or feed)

Temperature extremes

Some confined spaces have very high temperatures. Heat stress can produce sweating, muscle weakness, cramps, fatigue, thirst and in severe situations heat stroke. Untreated heat stroke can lead to death.

If you're exposed to low temperatures, cold stress may result. Shivering is a common symptom of cold stress. In confined spaces, ventilation systems can be dangerous because they can cause you to lose more body heat quickly.

Noise

Noise in confined spaces can harm you because it reflects off walls. If noise levels cannot be reduced, you must wear hearing protection.

Drowning

Before you or others work in a confined space, the space should be fully drained and dry to prevent drowning. Workers have drowned in confined spaces after being knocked out by toxic gas, a lack of oxygen or from a head injury that caused them to fall to the floor.



Step 3 Manage the risks

Keep out!

If you see a confined space or a space you think might be a confined space - stay away. It could be dangerous for you to enter. You may not be able to tell if the air inside is safe to breathe.

For work in a hazardous confined space, first consider if the work can be done using an alternative method which avoids the need for entry.

You should also stay away from entrances or openings to confined spaces. If a confined space has toxic gases or not enough oxygen, even putting your head inside the space or near the opening could be dangerous.

Look out for warning signs and stay out of secured spaces

The farmer/employer should have signs posted around the farm identifying all confined spaces. These signs are there to stop people from entering confined spaces that may be dangerous because of toxic gases or other hazards.

In many cases confined spaces will be locked or secured. If you see a fence, barrier or guardrail, it is there for a reason. If you think you need to enter a secured space first ask the farmer/employer or supervisor if it is safe.

Proper training and equipment is necessary in rescue situations

If someone enters a confined space and loses consciousness or is unable to move, this confined space may contain toxic gases that may cause you to lose consciousness too or kill you in seconds.

When is it safe to enter a confined space

Do not enter any confined space unless you can say 'yes' to all of the following:

- You have been formally trained to enter and work in confined spaces.
- The farmer/employer has a confined spaces programme and a rescue plan specific to your farm.
- Equipment is available to safely enter the space and rescue injured workers in an emergency.
- Machinery has been locked out and pipes have been isolated where necessary.
- The atmosphere in the confined space has been tested to ensure it is safe to enter.
- The space is properly ventilated
- A designated standby person is stationed at or near the entrance to the confined space.

Always tell the farmer/employer if you see a possible confined space.

Now that you know more about confined spaces, look out for possible confined spaces on the farm where you work. There could be confined spaces that the farmer/employer or supervisor doesn't know about.

Don't ignore a possible confined space. It doesn't hurt to ask about it. Alerting the farmer/employer or supervisor to spaces that they may not already know about could save lives.

Step 4

Incident prevention

Employers involved in agriculture operations can take the following precautions to reduce worker exposures to confined spaces:

Identify and label all confined spaces.

Evaluate all confined spaces to identify if they contain any actual or potential hazards.

Train workers to never enter a confined space before the hazards and the steps to address the hazards to provide for safe entry and exit have been identified.

Ensure workers review, understand and follow the procedures before entering confined spaces and know how and when to exit. Ensure there is a safe means to enter and exit the space such as using ladders.

Consider chemical reactions that could occur based on the materials in the confined spaces and potential by products that could create a hazardous atmosphere.

Ensure air sampling is conducted prior to anyone entering the space.

Ensure that sampling equipment can measure potential byproducts.

Use an appropriate routine and simple detection approach. A 4-gas meter will only detect oxygen deficiency and three additional hazards (usually flammability, carbon monoxide and hydrogen sulphide). Detector tubes or a simple hand-held meter such as a photoionisation detector may also be needed.

Use a written confined space entry system that covers the following:

- Before entry, identify any hazards, including physical within the space.

- Before and during entry, test and monitor for oxygen content, flammability, toxicity and explosion hazards.
- Ensure confined spaces are properly ventilated.
- Ensure workers entering confined spaces maintain contact at all times with a trained attendant either visually, by phone, or by two-way radio.
- Use appropriate equipment (fall protection, rescue, air-monitoring, lighting and communications) according to entry procedures.
- If unsure, seek professional assistance.

The Law

The Safety, Health and Welfare at Work (Confined Spaces) Regulations 2001 cover all work in relation to confined spaces.

Regulation 5 states that:

- A person shall not carry out work in Confined Spaces if it is reasonably practical that it could be avoided.
- If the work must be carried out Hazard Identification and Risk Assessment must be carried out prior to the work commencing.
- A person shall not enter a confined space unless there is a system of work in place that has been planned, organised, performed and maintained so as to render that work safe and without risk to health.
- Anyone entering a confined space must be provided with appropriate information, training and instruction appropriate to the particular characteristics of the proposed work activities.

What are the legal requirements in relation to emergency arrangements for confined spaces?

Regulation 6 of the Confined Space Regulations 2001 states that:

- A person shall not enter a confined space unless there are suitable and sufficient arrangements made for the rescue of persons in the event of an emergency which are appropriate to the Confined space in question.
- The emergency arrangements shall include:
 - all practical measures necessary to ensure the health and safety of those taking part in the rescue,
 - the provision of a suitable and reliable means of raising the alarm in the event of an emergency,
 - having all necessary rescue equipment nearby and in a well maintained, good condition,
 - the provision of information, instruction and training to all involved in rescue procedures, and
 - the provision of equipment and training for resuscitation procedures if there is a foreseeable risk that they will be needed.
- Further information can be found in the Code of Practice for Working in Confined Spaces published in accordance with Section 60 of the Safety, Health and Welfare at Work Act 2005.



Further Information and Guidance:

Visit our website at www.hsa.ie, telephone our contact centre on **1890 289 389** or email wcu@hsa.ie

Use BeSMART, our free online risk assessment tool at www.besmart.ie

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