

## 9.0 Slurry storage and gas poisoning with organic matter

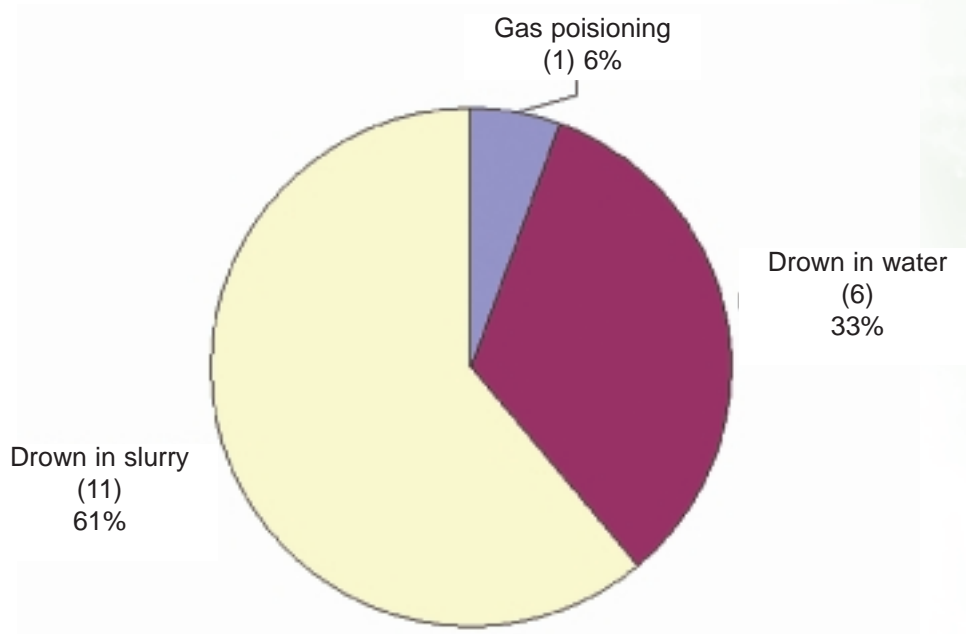
### Risk assessment

In Ireland, over 40 million tonnes of slurry are stored, handled and spread each year. This presents two particular safety and health problems. Drowning in slurry, and water and gas poisoning, caused 18 (10%) farm deaths between 1996 and 2005.

### 9.1. Drowning in slurry

- Drowning is by far the most common cause of death involving slurry.
- Between 1996 and 2005, 12 deaths involving slurry occurred: 11 due to drowning and one to poison gases.
- 7 of these deaths were of young people under 16.

**Figure 8: Causes of slurry/drowning deaths**



### **Protect against drowning in slurry by taking the following precautions:**

- Open slurry tanks should be protected by an unclimbable fence or wall at least 1.8 metres high, with locked gates. When the tank has to be emptied, consider having an adequately constructed access platform with safety rails.
- Covered or slatted tanks require access manholes that children cannot open easily. Fit a safety grid below the manhole to give secondary protection.



**All slurry tanks should be adequately fenced.**

## 9.2. Drowning in water

SIX people drowned in water on farms between 1996 and 2005. Where possible, fence off water hazards and take a cautious approach when working near water tanks, ponds, rivers or lakes.

## 9.3. Gas poisoning

DECAY of slurry or any organic liquid produces a mixture of dangerous gases, including hydrogen sulphide, methane, carbon dioxide and ammonia. Some, like methane, are flammable. One in particular, hydrogen sulphide, is poisonous. All these gases are heavier than air, so they displace oxygen. This can lead to suffocation when a person enters a tank.

When slurry is disturbed by agitation, the gases within are released. Gas release happens mainly in the first 30 minutes after agitation begins.

Gases can build up in partially emptied tanks above the slurry, so never enter a tank for any reason.

Smell is no indicator of the absence of gas, as many gases are odourless. Hydrogen sulphide has a 'rotten egg' smell at low levels, but cannot be smelt at higher levels. High levels can be released when slurry is agitated. One breath or lung-full at this level causes INSTANT death.

Gas release from slurry is greatest in the following circumstances:

- within 30 minutes of agitation beginning, especially after the surface crust is broken
- when effluent has been added, leading to acidification of the slurry
- when slurry has been stored for a long period
- when jetting is used rather than sub-surface agitation
- when slurry is agitated in deep tanks
- when slurry is mixed with cold water

### Precautions

- Only agitate where there is good air movement.
- Evacuate all livestock and make sure no person or animal is in or near the building.
- Open all doors and outlets to provide a draught.
- At least two people should be present and should stand up-wind.
- Never stand over slats or near tank access points when agitation is in progress.
- Avoid vigorous agitation in confined spaces.
- Do not allow slurry to rise within 300mm of the slats or tank covers.
- Keep all people away from the agitation point for 30 minutes after starting agitation.
- Avoid naked flames, as the gas mixture can be highly flammable. Slurry agitation



**Evacuate and ventilate before you agitate.**

### **Confined spaces**

Never enter, or allow others to enter, any tank or confined space without breathing apparatus. Gas build-up due to fermentation of organic matter can lead to poisonous gases and lack of oxygen. Death can be instant. Rescue may be impossible as any rescuer must wear breathing apparatus. Rescue attempts have led to multiple deaths.

## **9.4. Storage and handling of spent mushroom compost**

MUSHROOM compost stored in large heaps, especially when not turned for aeration, produces dangerous levels of hydrogen sulphide gas in the interior of the heap. Precautions when handling this material include:

- Never handle the spent mushroom compost in an enclosed space, such as sheds, tanks or trailers, where the toxic gas can build up. Make sure that there is good thorough ventilation when moving compost.
- Children should not have access to stored spent mushroom compost and should be kept off site during any handling or removal.
- Only handle compost on a windy day when there is good air movement and keep persons not directly involved in the work well away from the work area.
- Persons using machinery to move spent mushroom compost should keep cab doors and windows closed and a Hydrogen Sulphide monitor should be used inside the cab.
- If it's possible that hydrogen sulphide is present, as indicated by the smell of rotten eggs, certified fresh-air breathing apparatus should be used, in addition to the controls listed previously.
- Never work alone when dealing with spent mushroom compost.