

## Training Module: Silo Safety

**Objective:** To know the safety guidelines for working around silos to prevent accidents and diseases associated with silo gases or dust.

**Trainer's Note:** Breathing silo gases can cause lung disease or death. Review the Respiratory Problems Module. Teach employees to recognize this danger and to avoid exposure. Conduct this session near a silo. Have a respirator to show employees. Also reviewing the Lockout/ Tagout Module could be helpful.

### Background

Silos are an important part of many farming operations. However, they are also the cause of many accidents. These accidents include falls, electrocution, entanglement in augers and silo gas inhalation.

Silo gases are heavier than air and usually orange to yellow in color. They escape from the silo through chutes, cracks and drains, usually within 48 hours of filling the silo, but may continue for three weeks or longer. The gases can kill birds, livestock, and humans. The silage is safe to use as feed because the gas lowers the nitrate level.

### Safety guidelines for silos:

- Silos should be off limits to children and unauthorized personnel. Barricade or lock up silos.
- Feed storage ladders should end at least seven feet off the ground.
- Keep these ladders in good condition.
- When filling or emptying, never allow people in or around the silo.
- Easily recognizable warning decals should be on all silo filling equipment.
- Lockout the power supply on all unloading mechanisms. (Refer to Lockout/Tagout Module.)

### Silo Repair Safety

If the silo needs repairs, and there is no other way of getting the job done expect to enter the silo, there are some safety measures that should be taken.

- Apply lockout/tagout procedures.
- There should be ladders on the inside and outside of the silo.
- The person entering a silo should always use a rope and safety harness.
- When one person enters the silo, there should be two other people on the outside to provide rescue aid if needed.
- A respirator approved for toxic dust should be worn when handling moldy silage.

### Silo hazards

Silos can contain deadly gases. These gases are nitrogen dioxide ( $\text{NO}_2$ ) and carbon dioxide ( $\text{CO}_2$ ).  $\text{NO}_2$  is heavier than air and may be seen as a reddish to yellowish-brown haze. Since it is heavier than air, it can be found near the base of a recently filled silo. It has a bleach-like smell and you will experience a burning sensation in your nose, throat, and chest. Instant death may be a result of nitrogen dioxide inhalation.  $\text{CO}_2$  on the other hand, fills the headspace of the silo, replacing the air. Exposure to these two gases happens most often in the first three weeks after the silo is filled. Due to this risk of exposure, it is suggested that you stay out of the silo for the first three weeks, unless wearing a self-contained breathing apparatus.

When gases might be present:

- Wear a self-contained breathing apparatus when entering a silo within the first four to six weeks after it has been filled.
- Keep a hatch door open close to the level of silage in the silo.
- Run the blower for at least 15 minutes before entering, and keep it running to provide air movement.

Mold spores produced by spoiled hay or silage can also create a dangerous situation. When inhaled, these mold spores can irritate the tissues in the mouth and nose. The reactions can be harsh enough to cause hospitalization. A respirator that can filter fine dust particles should be worn at times when around moldy hay or silage.

To avoid inhalation of mold spores:

- Prevent mold growth by following proper filling and chopping techniques.
- To prevent moldy dust from becoming airborne, wet the top layer of silage down before moving anything.
- By handling dusty materials mechanically, it may keep you far enough away or create less dust.
- Always wear a properly fitted mechanical filter respirator. (Refer to respirator fit module.)

### **Review The Following Points**

- Silos should be off limits to unauthorized personal.
- Keep ladders inside and outside of the silo in good condition.
- Follow lockout/tagout procedures.
- If entering a silo, use a safety rope and harness, and there should be at least two people on the outside in case of an accident.
- If there is a chance silo gases are present or when working with moldy hay or silage an appropriate respirator should be worn.
- Silo gases are deadly.

**True or False Answer Key**

1. F, 2. T, 3. T, 4. T, 5. F

## Silo Safety Quiz

**True or False**

**Name** \_\_\_\_\_

- |   |   |   |
|---|---|---|
| 1. Silo gases are usually blue or green in color.   | T | F |
| 2. When one person enters a silo to make a repair, there should be at least two people on the outside of silo.                      | T | F |
| 3. Feed storage ladders should end at least seven feet off the ground.  | T | F |
| 4. If you inhale nitrogen dioxide, you will experience a bleach-like smell and a burning sensation in your nose, throat, and chest. | T | F |
| 5. It is not necessary to have the blower running while a person is in the silo.  | T | F |