Assessing Hazards in Manure Storage & Handling Systems

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More regulations... Isn’t there enough already?
Today’s Discussion

• OSHA Standard and Application

• Job Hazard Analysis

• Developing a Safety Program

OSHA Dairy LEP:
1. Manure Storage Facilities and Collection Structures

Fatal or serious drowning hazards may exist where farm vehicles such as tractors, manure spreading trucks, manure pumps/agitators, and skid-steers are operated in near proximity to waste storage impoundments and structures without the benefit of control measures, such as:

1) safety stops and/or gates at manure push-off ramps and load-out areas to prevent accidental entry of machinery; and
2) warning signs, fences, ladders, ropes, bars, rails and other devices to restrict the accidental passage of vehicles and personnel across outdoor earthen manure storages.
3) Fatal or serious inhalation hazards of gases including hydrogen sulfide (H₂S), carbon dioxide (CO₂), methane (CH₄), and ammonia (NH₃) may exist where manure gases are generated through the handling of liquid or semi-solid manure through activities such as pumping, mixing, agitating, spreading, or cleaning-out. Oxygen (O₂) deficiency hazards are an additional related concern.
OSH Act General Duty Clause (5a1)

Section 5(a)(1) of the Act
"...that each employer shall furnish...employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees."

Applies when there is no specific standard

Consensus Standards

- ANSI/ASSE Z117.1-2009 Safety Requirements for Confined Spaces
- ASAE EP470.1 OCT2011 Manure Storage Safety
- NCRS Waste Storage Facility (No.) Code 313
- ANSI/NFPA 70, National Electrical Code
- ASAE EP270, Design of Ventilation Systems for Poultry and Livestock Shelters
- ASAE EP393, Manure Storages
- ASAE S412, Ladders, Cages, Walkways, and Stairs
- ASAE S441, Safety Signs
- ANSI/ASABE S607, Ventilating Manure Storages to Reduce Entry Risk
Safety and Health Programs
4 Components

Management Involvement  Hazard Assessment
Prevention and Control  Training

What’s your Employee Exposure?

Chemical  Electrical  Mechanical  Biological
Noise  Temperature  Falls  Fire
Animals  Chemical  Biological  Electrical  Mechanical

Employee Exposure??
What is the employee’s EXPOSURE?

• To the Hazard
  • What is the work activity or task?
  • How often is the employee exposed?
  • Has the employee received training and was the employee informed about the hazard?
  • What are the exact distances to between worker and hazard?

• Did the hazard cause harm to the employee?

• Was there employer knowledge of the hazard?

• Are there existing standards? If not, can the general duty clause (5.a.1) be applied?

JHA 4 Basic Steps

• Select job to be analyzed
• Break down job into a sequence of steps (10 steps or less)
• Identify potential hazards
• Determine preventive measures to address hazards
Priority Jobs

- Jobs with frequent injuries or infrequently but severe injuries
- Potential for severe injuries
- New jobs
- Modified jobs - new hazards introduced
- Non-routine jobs

Prioritize Tasks

<table>
<thead>
<tr>
<th>Probability</th>
<th>Minor</th>
<th>Serious</th>
<th>Fatality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Likely</td>
<td>3</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>Likely</td>
<td>2</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>Unlikely</td>
<td>1</td>
<td>4</td>
<td>7</td>
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</tbody>
</table>

Risk Assessment Code
Intersection of Probability and Severity

Oregon OSHA
Sequencing Job

<table>
<thead>
<tr>
<th>Sequence of Job</th>
<th>Potential Hazards</th>
<th>Preventive Measures</th>
</tr>
</thead>
<tbody>
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• Be sure worker knows the job or task is being evaluated – not worker performance

Potential Hazards

• Body part can get caught in or between objects?
• Tools, machines, or equipment used present hazards?
• Worker contact with harmful contact with object?
• Slip, trip or fall
• Strain from lifting, pushing or pulling
• Extreme heat or cold
• Noise or vibrations
• Falling objects
• Weather
• Hot, toxic, or caustic substances
• Dust, fumes, mists or vapors in the air
## Common Hazards

<table>
<thead>
<tr>
<th>Stressor</th>
<th>Hazard Type</th>
<th>Hazard Type</th>
<th>Hazard Type</th>
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</thead>
<tbody>
<tr>
<td>Chemical</td>
<td>Corrosive</td>
<td>Fire</td>
<td>Toxic</td>
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<td></td>
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<td>Explosion</td>
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<tr>
<td>Electrical</td>
<td>Shock</td>
<td>Short Circuit</td>
<td>Fire-Static</td>
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<tr>
<td>Mechanical</td>
<td>Moving Parts</td>
<td>Failure</td>
<td>Noise</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Pressure</td>
</tr>
<tr>
<td>Ergonomic</td>
<td>Strain</td>
<td>Human Error</td>
<td>Fatigue</td>
</tr>
</tbody>
</table>

Source: OSHA.gov Worksite Hazard Analysis

## Preventive Measures

1. Eliminate Hazard
2. Contain the Hazard
3. Revise Work Procedures
4. Reduce exposure
CAUTION
MACHINERY MUST BE LOCKED OUT PRIOR TO SERVICING
What is a confined space?

A confined space is a space that:

1. Is large enough and so configured that a person can bodily enter and perform assigned work;
2. Has limited or restricted means for entry or exit;
3. Is not designed for someone to continually be in it;

What is a permit required space?

1. Contains or has a potential to contain a hazardous atmosphere;
2. a material that has the potential for engulfing an entrant;
What is a **permit** required space?

3. Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section, or

4. Contains any other recognized serious safety or health hazard.

**OSHA 29 C.F.R 1910.146**

It requires facilities to:

- Compile a **written program** that identifies confined spaces that may pose hazards to employees and spell out implementation procedures;
- **Train** all affected employees;
- **Post** any space determined to be a confined space under the standard, and
- **Retain** record and review programs annually.
Manure Gases

- Methane
- Carbon Dioxide
- Ammonia
- Hydrogen Sulfide