Overview of Solids Separation for Odor and Emission Control

Air Management Practices
Assessment Tool (AMPAT)

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Funded by:

Lesson Outline

• Description of Manure Solids Separation
• Why Separate
• Separation Types
• Nutrient and Pathogen Fate

Solids Separation

Manure solids separation is used to reduce odor and air pollutant emissions from manure storages.

Why Solids Separation

Solids separation can reduce manure odor and opens up other manure treatment opportunities.

Solid Separation

Separation Technology

• Gravity systems - Sedimentation
• Mechanical
• Coagulation and Flocculation
• Chemical Amendments
Gravity (or Sedimentation)
- How does it work?
  - Reduce flow velocity
  - Solids settle out by gravity or weight
- Settling basin design criteria
  - Minimum hydraulic retention time
  - Solids separation rate based on basin depth

Mechanical Separation
- Screens
  - Statically inclined, Vibrating, rotating
- Centrifuge
  - Centrifuge, hydrocyclone
- Filtration/Pressing
  - Roller, Belt, Screw & filter

Inclined Screens

Rotating screen

Solid Separation

Solid Separation
Solid Separation

Effectiveness

<table>
<thead>
<tr>
<th>Component</th>
<th>Reduction</th>
<th>Notes</th>
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<tbody>
<tr>
<td>NH₃</td>
<td>0 to 10%</td>
<td>Generally little nitrogen separation achieved</td>
</tr>
<tr>
<td>H2S</td>
<td>0 to 20%</td>
<td>Some sulfur is separated to solid fraction, but usually low separation efficiency</td>
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<tr>
<td>Odor</td>
<td>20 to 30%</td>
<td>Separation is less effective, depends on how effective organics removal is</td>
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<tr>
<td>Particulate Matter</td>
<td></td>
<td></td>
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<tr>
<td>Volatile Organic Compounds (VOC)</td>
<td></td>
<td></td>
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<tr>
<td>Cost</td>
<td>$5 to $55</td>
<td>Depends on the solid separation system utilized and the characteristics of your manure</td>
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For Further Information:

- If you are an educator and wish to have copies of PowerPoint files, contact Dan Andersen (dsa@iastate.edu).

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