 AGAINST THE GRAIN

Safe Grain Storage and Handling Practices for Young and Beginning Workers

Unit 3-Summary of Grain-related Incidents Involving Youth

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Objectives

- Explain the scope and magnitude of the U.S. grain industry.
- Explain the proportion of victims involved in agricultural confined spaces under the age of 21.
- Describe the nature and characteristics of incidents involving agricultural confined spaces.
- Describe the characteristics of youth that make them so vulnerable to grain-related incidents.
- Identify the regions of the U.S. where most grain entrapments occur.
- Explain the role that out-of-condition grain has on the frequency of grain entrapments.
- Explain the reasons why youth are the most frequent victims of grain transport vehicles.
Introduction

Approximately one out of five documented agricultural confined space fatalities or injuries involves a person, just like you, under the age of 21.
There are better ways to be remembered than being the victim of a grain-related incident.
Dr. Field Data Video
Incidents in Agricultural Confined Spaces Are Much Too Common!

• Over the last 40 years no fewer than 1,700 cases have been documented.
• There are many other cases that have gone unreported.
• Over 1,100 of the documented cases have related to grain storage and handling.
• Over one in five victims were children and youth under the age of 21.
• Over 97% were male.

Source: Purdue University
Why Focus on Grain Storage and Handling Facilities?

- Grain Storage Facilities: 71%
- Ag. Transport Vehicles: 9%
- Manure Storage Structures: 9%
- Forage Storage Structures: 3%
- Other / Unknown: 8%
Grain/Feed Entrapments and Engulfments in the United States

Every year about 36 workers die/or are injured from grain bin entrapments in the United States

Red - Fatalities
Black - Injuries
Age distribution of documented grain entrapments

Number of Grain Entrapment Incidents

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Non-Fatal</th>
<th>Fatal</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-10</td>
<td>63</td>
<td>24</td>
<td>87</td>
</tr>
<tr>
<td>11-20</td>
<td>121</td>
<td>30</td>
<td>151</td>
</tr>
<tr>
<td>21-30</td>
<td>8</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>31-40</td>
<td>10</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>41-50</td>
<td>14</td>
<td>1</td>
<td>15</td>
</tr>
<tr>
<td>51-60</td>
<td>20</td>
<td>1</td>
<td>21</td>
</tr>
<tr>
<td>61-70</td>
<td>12</td>
<td>1</td>
<td>13</td>
</tr>
<tr>
<td>71-80</td>
<td>10</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>81-90</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

n = 830
Do you remember why youth are so vulnerable to being involved in grain-related incidents?

- Inability to assess risk
- Natural risk takers
- Lack of training
- Immaturity
When are younger workers most likely to be exposed to grain-related hazards?
Grain Entrapments Incidents by Month for Ages 1-20

n= 235

Month

Jan  9
Feb 10
Mar  5
Apr 11
May  8
Jun 29
Jul 19
Aug 18
Sep 19
Oct  54
Nov  32
Dec 11
Unknown 13

# of Grain Entrapment Incidents
Distribution of Grain Entrapment Incidents By State for Age Group 1-20.
Most Frequent Types of Flowing Grain/Feed Entrapments

- Entrapment in a free flowing column of grain
- Bridging/crusted horizontal surface entrapment
- Collapse of vertically crusted grain surface (avalanche entrapment)
- Entrapment in free standing pile of material (avalanche entrapment)
- Entrapment in grain transport vehicle
- Entrapment due to unintended release of material or structural failure
- Entrapment while using a grain vacuum machine
Entrapment in a Flowing Column of Grain
Collapse of Horizontally Crusted or Bridged Grain Surface
Collapse of Vertically Crusted Grain
Entrapment in Free-Standing Pile of Grain
Entrapment in Grain Transport Vehicles
Grain Entrapment Incidents Involving Grain Transport Vehicles

Number of Grain Entrapment Incidents

Age Group: 1-10, 11-20, 21-30, 31-40, 41-50, 51-60, 61-70, 71-80, 81-90

- Non-Fatal
- Fatal

n = 109
Why do so Many Entrapments in Grain Transport Vehicles Involve Children?

http://web.extension.illinois.edu/agsafety/equipment/grainbinsafety.cfm
Entrapment Due to Unintended Release of Material or Structural Failure
Entrapment While Using Grain Vacuum Machines
The Single Most Important Contributing Factors to Grain Entrapment is Out-of-Condition Corn
Factors Influencing the Trend in Grain-Related Entrapments

- Increasing production of grain
- Longer term storage of grain increasing potential for spoilage
- More storage being built at exempt facilities
- Increased rate of grain handling
- Increased size of storage structures
- Expanded use of grain for energy production
- Changing workforce
- Increased cost of drying grain
Summary

• 1 out of 5 injuries/fatalities involve youth under age of 21
• Nearly all victims are male
• Entrapments involving GTVs occur mostly to males under age of 21
• Most entrapments happen in October during harvest season
• Corn is the grain most likely involved
• Most entrapments occur in Midwest
• Out-of-condition corn is a significant contributor
Questions