Sugar Dust Explosion
Port Wentworth, GA
February 7, 2008

Step 1. Outline the Problem

<table>
<thead>
<tr>
<th>What</th>
<th>When</th>
<th>Where</th>
<th>Impact to the Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem(s)</td>
<td>Date</td>
<td>Physical Location</td>
<td>Mat/ Labor Cost</td>
</tr>
<tr>
<td>Dust explosion, fire</td>
<td>February 7, 2008</td>
<td>Imperial Sugar Refinery Port Wentworth, GA</td>
<td>Severe damage to plant</td>
</tr>
<tr>
<td>Time</td>
<td>Time</td>
<td>Work Being Done</td>
<td>Frequency</td>
</tr>
<tr>
<td>7:15 p.m.</td>
<td></td>
<td>Transporting sugar</td>
<td>4 sugar dust explosions since 1990’s</td>
</tr>
</tbody>
</table>

Safety Goal

Impacted
14 workers killed, 36 injured

Explosive concentration of sugar dust

Step 2. Analysis

Cause Map

5-Whys

Safety Goal

Impacted
14 workers killed, 36 injured

Propagation of secondary explosions, fire

Primary sugar dust explosion

Explosive concentration of sugar dust

Inadequate housekeeping

Conveyor enclosed with steel panels

Evidence: Enclosure 1/10 size of tunnel

Solutions: Consider dust hazards in facility risk assessment

Solutions: Implement comprehensive housekeeping program

Lack of regulatory oversight

Intercom system not used in refinery, packing buildings

Solutions: Consider dust hazards in facility risk assessment

Solutions: Create state regulations for dust hazards

Solutions: Create standard for all dust hazards

Accumulation of sugar dust in open areas

Evidence: Report by contractor week before explosion

Solutions: Install emergency alert system

Solutions: Require routine evacuation drills

No evacuation drills

Emergency notifications only via cell phones, radio

Inadequate housekeeping

Evidence: Multiple ignition sources identified in the enclosure

Solutions: Create standard for all dust hazards

Solutions: Train annually on dust hazards

Solutions: Require routine evacuation drills

Difficult evacuating plant

No evacuation drills

Evidence: Report by contractor week before explosion

Solutions: Install emergency alert system

Solutions: Require routine evacuation drills

Intercom system not used in refinery, packing buildings

Step 3. Solutions

Corrective Actions to be taken from this Incident that are Causally Related

<table>
<thead>
<tr>
<th>No.</th>
<th>Cause</th>
<th>Action Item</th>
<th>Owner</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Facility risk assessment did not address [dust hazards]</td>
<td>Consider dust hazards in facility risk assessment</td>
<td>Risk assessors</td>
</tr>
<tr>
<td>2</td>
<td>OSHA Safety standards limited to grain dust</td>
<td>Create standard for all dust hazards</td>
<td>OSHA</td>
</tr>
<tr>
<td>3</td>
<td>Inadequate housekeeping</td>
<td>Implement comprehensive housekeeping program</td>
<td>Imperial Sugar</td>
</tr>
<tr>
<td>4</td>
<td>No State regulations addressing dust</td>
<td>Create state regulations for dust hazards</td>
<td>State of Georgia</td>
</tr>
<tr>
<td>5</td>
<td>Very little training on dust hazards</td>
<td>Train annually on dust hazards</td>
<td>Imperial Sugar</td>
</tr>
<tr>
<td>6</td>
<td>No evacuation drills</td>
<td>Require routine evacuation drills</td>
<td>Imperial Sugar</td>
</tr>
<tr>
<td>7</td>
<td>Intercom system not used in refinery, packing buildings</td>
<td>Install emergency alert system</td>
<td>Imperial Sugar</td>
</tr>
</tbody>
</table>