Hunter Sand & Gravel, LLC.
Dredge IV
Livingstone County, KY

December 10, 2013

Slip or Fall of Person
Overview

• Surface sand and gravel operation (2013: 31,154 h worked approximately and 17 employees)
• 27-year-old deck hand
• Victim was working on a dredge that had a barge attached to it. He stepped on the barge to measure the amount of material in it (take a draft reading), and fell into the water
• Tugboat pilot saw victim falling and maneuvered the tugboat near the visible light in the water. As the tugboat came closer to the light the deck hand on board saw the victim sink out of sight before a rescue could be made.
• Slips, trips and falls caused 73 fatalities between 2000 and 2008
Overview

• Shift started at 6:00 p.m. on the day before and accident happened at approximately 2:45 a.m.
• Temperature at the morning of the accident was 23 °F and had been below freezing since the last 4 days. A 4 ft rise in the river on the previous day made the current swift with water temperature at 40 °F and wind speed averaging 7 mph with gusts up to 18 mph
Hypothermia

• Happens when the core temperature goes below 95 °F (35 °C)
• Affects every organ system
• Caused approximately 1,500 deaths in 2010
• Depends mainly on surface area, age, body fat and sex
• Early symptoms: shivering, fatigue, loss of coordination, confusion and disorientation
• Late symptoms: no shivering, blue skin, dilated pupils, slowed pulse and breathing, loss of consciousness
• “It is impossible to get hypothermic in cold water unless you are wearing flotation, because without flotation – you won’t live long enough to become hypothermic” - Mario Vittone, U.S. Coast Guard former helicopter rescue swimmer instructor
Hypothermia

- Responses to cold water immersion
  - Cold shock (0-2 min): gasp reflex, tachycardia, hyperventilation. Around 20% of the deaths happen at this stage
  - Functional disability (2-15 min): loss of effective use of fingers, arms and legs for any meaningful movement
  - Hypothermia (>15 min): mild, moderate, severe and profound
Hypothermia

- Classification

<table>
<thead>
<tr>
<th>Degree</th>
<th>Temperature</th>
<th>Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild</td>
<td>90-95 °F (32-35 °C)</td>
<td>Physical and mental impairments, awake and shivering</td>
</tr>
<tr>
<td>Moderate</td>
<td>82-90 °F (28-32 °C)</td>
<td>Abnormal heart beats, drowsy, not shivering</td>
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<tr>
<td>Severe</td>
<td>68-82 °F (20-28 °C)</td>
<td>Loss of consciousness, vital signs reduced or absent, spontaneous ventricular fibrillation or cardiac arrest</td>
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<tr>
<td>Profound</td>
<td>&lt;68 °F (20 °C)</td>
<td>No vital signs</td>
</tr>
</tbody>
</table>
Hypothermia

- Expected survival time in cold water

<table>
<thead>
<tr>
<th>Water temperature</th>
<th>Exhaustion or unconsciousness in</th>
<th>Expected survival time</th>
</tr>
</thead>
<tbody>
<tr>
<td>70-80 °F (21-27 °C)</td>
<td>3-12 hours</td>
<td>3 hours – indefinitely</td>
</tr>
<tr>
<td>60-70 °F (16-21 °C)</td>
<td>2-7 hours</td>
<td>2-40 hours</td>
</tr>
<tr>
<td>50-60 °F (10-16 °C)</td>
<td>1-2 hours</td>
<td>1-6 hours</td>
</tr>
<tr>
<td>40-50 °F (4-10 °C)</td>
<td>30-60 minutes</td>
<td>1-3 hours</td>
</tr>
<tr>
<td>32-40 °F (0-4 °C)</td>
<td>15-30 minutes</td>
<td>30-90 minutes</td>
</tr>
<tr>
<td>&lt;32 °F (0 °C)</td>
<td>Under 15 minutes</td>
<td>Under 15-45 minutes</td>
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</table>
Hypothermia

• First aid
  ▫ Request medical assistance
  ▫ Move the victim into a warm and dry place
  ▫ Remove their wet clothing
  ▫ Warm the center of their body – first chest, neck, head and groin – using an electric blanket if available, or use skin-to-skin contact under loose, dry layers of blankets, clothing, towels, or sheets
  ▫ Warm beverages may help increase the body temperature, but do not give alcoholic beverages. Do not try to give beverages to an unconscious person
  ▫ After their body temperature has increased, keep the victim dry and wrapped in a warm blanket, including the head and neck
  ▫ If victim has no pulse, begin cardiopulmonary resuscitation (CPR)
Non-Fatal Days Lost (NFDL) Incidence Rate

Year:
- 2004
- 2006
- 2008
- 2010
- 2012
- 2014

NFDL Incidence Rate:
- 0
- 2
- 4
- 6
- 8
- 10
- 12
- 14
- 16

Operator
Mine Type National
Barge

Illustrative purpose only. Not equipment involved in the accident
Findings

- Victim had over 4 years of mining and/or river experience. All training records were up to date
- Victim left the break room to take a draft reading without a life jacket
- Barge had no outside railings
- Snow and ice were partially covering the rigging along the walkway, making it a slip and trip hazard. Management was aware of the situation but took no action
- Barges were not included in the workplace examinations
- Employees were not provided with and required to use safety belts and lines
Root causes

• Management failed to provide a safe working environment for the miners on the barges. Specifically, the operator failed to identify the hazard of snow and ice accumulation on the barge decking. This accumulation also covered the hidden danger of slip and trip hazards. Additionally, management failed to enforce a life jacket policy.
New procedures

• Each personal flotation device (PFD) should have the wearer’s name written or affixed to it.
• The barge’s walkway conditions should be promptly determined as soon as it arrives at the dredge. Hazards should be properly abated by a Competent Person before any employee uses the walkway.
• No activity is allowed at the barge unless the proper fall-arrest system is utilized.
Best practices

- Always wear a life jacket where there is a danger of falling into the water
- Remove snow and ice from work areas
- Ensure safe access is provided where persons are required to work or travel. Maintain three points of contact
- Install and use lifeline tie-off runs and fall protection
- Provide communication devices and establish procedures requiring persons to alert coworkers when they are outside the dredge’s handrails
- Task train all persons to recognize all potential hazardous conditions and ensure they understand safe job procedures for elimination of the hazards before beginning work
On December 4, 2007, three coal miners were seriously injured in separate incidents as a result of falling approximately 25-30 feet.

30 CFR §77.1710(g) requires safety belts and lines where there is danger of falling.

Did you know? Thus far in 2007, 5 coal miners and 4 metal/nonmetal miners have died from falls.

Don't become a statistic!! Always tie off!!
Proper fall protection