Fact Sheet No. 3 Proper Inspection of Wire Rope used on Hoists

Trained personnel should inspect wire rope on hoists on a regular basis in accordance with the manufacturer’s recommendation. In addition, the operator is responsible to complete visual inspections before each shift and before lifting a load. This fact sheet provides information to determine if a wire rope is damaged and should be replaced. The use of worn or damaged wire rope can lead to a failure and a drop of a load, which could result in serious injury or death.

Definition

- **Wire Rope:** A flexible rope composed of many steel wires or hemp fibers in groups. A wire is first twisted about a center to form strands, several of which are again twisted together about a core to form a rope.
- For example, wire rope is designated by:
  - Number stands x number of wires per strand
    - 6 x 37, 6 x 19
  - Core
    - Independent Wire Rope Core (IWRC), hemp or fiber, steel
  - Material
    - Improved Plow Steel (IPS) or Extra Improved Plow Steel (EIPS)
  - Lay
    - Right or Left Hand
  - Nominal diameter
    - The rope diameter as stated in the catalog for a given rope size, measured across the high points of the rope.

Measuring Wire Rope Diameter

Replace wire rope if the diameter reduction is greater than the allowable reduction listed below

<table>
<thead>
<tr>
<th>Rope Diameter (Ø)</th>
<th>Allowable reduction from nominal</th>
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</thead>
<tbody>
<tr>
<td><strong>Inches</strong></td>
<td><strong>mm</strong></td>
</tr>
<tr>
<td>Ø ≤ 5/16</td>
<td>Ø ≤ 8</td>
</tr>
<tr>
<td>5/16 &lt; Ø ≤ 1/2</td>
<td>8 &lt; Ø ≤ 13</td>
</tr>
<tr>
<td>1/2 &lt; Ø ≤ 3/4</td>
<td>13 &lt; Ø ≤ 19</td>
</tr>
<tr>
<td>3/4 &lt; Ø ≤ 1 1/4</td>
<td>19 &lt; Ø ≤ 29</td>
</tr>
</tbody>
</table>

Measure rope diameter across the high points of the strands, NOT across the flats.
Wire Rope Visual Inspection

Replace wire rope if one of the following conditions exists.

**Broken wires or excessive wear**
- 12 randomly broken wires in one lay of rope
- 4 broken wires in one strand in one lay
- 1 outer wire is broken at the contact point with the core, which has worked its way out
- Wear on individual wires to of 1/3 of original diameter

**Kinks**
- **Tight kinks**
  - Shortens lay
- **Open kinks**
  - Opens the lay
  - Caused by sudden release of the load
  - Hoist operating in restricted area

**Other examples of damaged rope that should be replaced:**

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