Safety
Safety: Yarder Cables

Slides courtesy of Jeff Halbrook, OSU Forest Engineering PhD student
Yarder Operations

Source: Oregon OSHA, Yarding and Loading Handbook
More Yarders
Wire Rope Stress and Strain

- Fracture Point
- Endurance Limit
- Plastic Zone
- Elastic Zone

Stress vs. Strain graph

[Diagram showing stress-strain relationship for wire ropes with indicated zones and points]

Oregon State University College of Engineering
Safe Working Load

Apply a standard **Safety Factor of 3** for cable logging in Oregon (i.e. maximum allowable tension used in payload analysis)

For example:

EIPS wire rope…

<table>
<thead>
<tr>
<th>Diameter (inches)</th>
<th>Minimum breaking force pounds</th>
<th>Safe working load pounds</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8</td>
<td>15,100</td>
<td>5,033</td>
</tr>
<tr>
<td>7/16</td>
<td>20,400</td>
<td>6,800</td>
</tr>
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<td>1/2</td>
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<td>8,867</td>
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<td>9/16</td>
<td>33,600</td>
<td>11,200</td>
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<tr>
<td>5/8</td>
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<td>13,733</td>
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<tr>
<td>3/4</td>
<td>58,800</td>
<td>19,600</td>
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<td>7/8</td>
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<td>26,533</td>
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<tr>
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<tr>
<td>1 1/8</td>
<td>130,000</td>
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<tr>
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<tr>
<td>1 3/8</td>
<td>192,000</td>
<td>64,000</td>
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</table>
Safety Links: Federal Safety Standards

- United States Department of Labor
  - Occupational Safety and Health Administration
    - Regulations (Standards - 29 CFR)
    - Machine Guarding

- United States Federal Aviation Administration
  - Federal Aviation Regulations (14 CFR)
    - Airworthiness Standards (Part 25)
      - §25.1302   Installed systems and equipment for use by the flightcrew.
        - https://www.ecfr.gov/cgi-bin/text-idx?SID=5099d2056c0d030668a4eb6abd85438f&mc=true&node=se14.1.25_11302&rgn=div8
General Human Factors, User Interface Guidelines

• Displays
  - Make display representations accessible, legible, & meaningful.
  - Make representation salient in proportion to their frequency of use and immediate importance & urgency.
  - Apply the 13 Principles of Display Design (Perceptual, Mental Model, Attention, Memory)

• Awareness
  - Situation
    • Provide relevant situation information via representations located in consideration of its frequency of use and immediate importance & urgency.
  - System/Device
    • Keep the user informed of the S/D's current state & function.

• Options & Means
  - Inform the User of what can be done with/to the S/D & how to do it.

• Guidance
  - Provide additional guidance information, especially for complex procedures.

• Feedback
  - Inform the User of what he/she has just done & what the S/D is doing in response.

• Ergonomics
  - Design & locate controls & affordances in consideration of smallest & largest Users.
  - Design/select controls & affordance so as to minimize the risk of musculoskeletal disorders from sustained use.