Rigging Hardware
The Eye

- Two Major Types of eyes
  - Flemish Eye
  - Turnback Eye
- Components of the Eye
  - Thimble
  - Sleeve
End fitting Inspection

- Inspect for broken wires
- Inspect the throat
- Inspect for wear
The Flemish Eye

- The strongest type of eye.
- The wire rope is split into two parts and folded back on itself.
- The Flemish eye is finished off with a swaged fitting.
- If the swaged fitting was to fail, the eye would still support the load.
The Flemish Eye Splice
Shackles

- Always purchase drop forged screw pin anchor shackles.
- Can be purchased with a galvanized finish.
- Most common brand is Crosby.
- When ordering shackles you will be asked if you want domestic or foreign.
- Never buy a shackle if it is not clearly marked.
- Shackles are the most highly used connection device used in the rigging industry.
- Most shackles have a 6:1 safety factor always check manufactures specifications.
(Screw Pin Anchor Shackles, rings, and hooks comprise 95% of the hardware used. All hardware must be properly load-rated.)
Screw Pin Anchor Shackle
Most Common Shackles Types

- $\frac{1}{2}'' = 2$ ton working load
- $\frac{5}{8}'' = 3 \frac{1}{4}$ ton working load
- $\frac{3}{4}'' = 4 \frac{3}{4}$ ton working load
Construction Types

- Drop Forged
  - Drop Forging is the process of hammering a piece of heated steel into a mold. (punch & die) This process is preferred because of its strength.

  Die= Contains the shape of the finished product.
Construction Types

- **Malleable Cast Iron**
  - Malleable Iron rope clips are to be used for light duty, non-critical applications only. Typical uses include guard lines and fencing.
  - A type of casting. Metal is heated and poured into a die which consists of two parts.
  - More susceptible to fractures leading to failure.
Wire Rope Clips

- Must use drop forged for overhead lifting.
- When properly installing wire rope clips they provide 80% of the rated capacity of wire rope.
- Never use wire rope clips to connect two straight pieces of wire.
- Always consult manufactures chart for proper number of fittings.
  - calculating number of clips
  - $3 \times \text{wire rope diameter} + 1 = \text{Number of clips}$
  - $6 \times \text{wire rope diameter} = \text{Spacing between clips}$
Wire Rope Clips

Never Saddle a dead horse!!!

Make sure when using two clamps you push the second one as close to the thimble as possible.
## Wire Rope Clips

<table>
<thead>
<tr>
<th>Rope Diameter</th>
<th>Minimum # of Clips</th>
<th>Amount of Rope to Turn Back From Thimble</th>
<th>Torque in lbs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/8”</td>
<td>2</td>
<td>3 1/4”</td>
<td>4.5</td>
</tr>
<tr>
<td>3/16”</td>
<td>2</td>
<td>3 3/4”</td>
<td>7.5</td>
</tr>
<tr>
<td>1/4”</td>
<td>2</td>
<td>4 3/4”</td>
<td>15</td>
</tr>
<tr>
<td>5/16”</td>
<td>2</td>
<td>5 1/2”</td>
<td>30</td>
</tr>
<tr>
<td>3/8”</td>
<td>2</td>
<td>6 1/2”</td>
<td>45</td>
</tr>
<tr>
<td>7/16”</td>
<td>2</td>
<td>7”</td>
<td>65</td>
</tr>
<tr>
<td>1/2”</td>
<td>3</td>
<td>11 1/2”</td>
<td>65</td>
</tr>
<tr>
<td>9/16</td>
<td>3</td>
<td>12”</td>
<td>95</td>
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</table>
Compression fittings

- **swaged fittings**
  - **Nicropress brand**
    - Provides 100% load if done properly.
    - Inexpensive and quick.
    - Can be either copper or aluminum.
    - Use cooper fittings for overhead lifting.
    - Always consult manufactures instruction for proper number of fittings.
    - Always use a go no go gauge.

- **Machine swaged**
  - Strongest type of fittings.
  - Always the recommended way.
  - Swaging machine is very expensive.
Compression fittings

Step 1: Make sure you are using the proper sleeve size the you wire rope selection.
Step 2: Slide one end of the wire through the sleeve.
Step 3: Place the proper sized thimble to create the eye.
Step 4: Place the end of the wire back through the sleeve.
Step 5: Slide the sleeve until it is snug against the thimble.
## Compression fittings

<table>
<thead>
<tr>
<th>Cable Diameter</th>
<th>Oval Sleeves</th>
<th>Stop Sleeves</th>
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</thead>
<tbody>
<tr>
<td>3/64”</td>
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<td>1</td>
</tr>
<tr>
<td>1/16”</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>3/32”</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>1/8”</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>5/32”</td>
<td>3</td>
<td>2</td>
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<td>4</td>
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</tr>
<tr>
<td>1/4”</td>
<td>4</td>
<td>3</td>
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<tr>
<td>9/32”</td>
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<td>3</td>
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