UNOLS Wire Pool
2017 Update

Rick Trask
UNOLS Wire Pool Manager
Topics to be Discussed

- Wire Pool Database – New Features
- Efforts to Extend the Life Span of UNOLS Wire
- Update on the Evaluation of Synthetic Rope as a potential alternative to wire rope.
Wire Pool Database – New Features

*Improved speed  *Read-only option

*Pull down menu on Ship Report page
  – Lubrication (tracks date of last lubrication)
  – Cut back/re-termination
  – End for end wire
  – Split reel
  – Update wire status
  – Upload documents

<table>
<thead>
<tr>
<th>Wire size and type</th>
<th>Manu.Reel No.</th>
<th>NSF Reel No.</th>
<th>Date distributed to this institution</th>
<th>Current length (m)</th>
<th>Last lubrication (see Policy)</th>
<th>Wire Status</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.322 EM</td>
<td>Q7705-C2</td>
<td>NSF-12-C161-A</td>
<td>Dec 2012</td>
<td>9.578</td>
<td>Oct-28-2016</td>
<td>In use or onboard vessel</td>
<td>Select</td>
</tr>
<tr>
<td>0.681 PowerOptic</td>
<td>Q6585-C1</td>
<td>NSF-09-F07</td>
<td>Dec 2012</td>
<td>9.154</td>
<td>Sep-29-2015</td>
<td>In use or onboard vessel</td>
<td>Select</td>
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<tr>
<td>3/8 3x19</td>
<td>428-360077-1</td>
<td>NSF-12-H46</td>
<td>Dec 2012</td>
<td>9.868</td>
<td>Oct-1-2015</td>
<td>In use or onboard vessel</td>
<td>Select</td>
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<tr>
<td>9/16 3x19</td>
<td>EBS1148-03</td>
<td>NSF-07-T38</td>
<td>Dec 2012</td>
<td>9.309</td>
<td>Sep-28-2015</td>
<td>In use or onboard vessel</td>
<td>Select</td>
</tr>
</tbody>
</table>
Efforts to Extend the Life Span of UNOLS Wire

Evaluation of “Used” Wire that has potential for additional use.

- Evaluation of conductors
- End for end evaluation and measurement
- Break, e-kink, mandrel testing
- Lubrication

Ready for distribution or loan
Distribution vs. Loan of Wire

Distribution
Wire to be wound on to a UNOLS vessel’s winch as a permanent installation.

Vessel is responsible for the wire
Making sure it is properly maintained and lubricated
Testing is kept up to date

Loan
Appropriate for single, short term operation

Wire is loaned with the expectation that it will be returned to the Wire Pool

Wire pool maintains wire (testing, lubrication)
Synthetic Evaluation Update
Initial Synthetic Evaluation
April 2016

Heavy Lift tests conducted using 2 Synthetic Ropes

• Phillystran PST 9/16” diameter Technora Aramid Fiber
• Samson DM 20 9/16” diameter Dyneema DM-20 Fiber

Included lifting 5,000, 10,000, 15,000 lbs. using traction winch on R/V Endeavor

Gravity Coring Cruise on R/V Endeavor, April 2016, utilizing the both ropes as tension members.

Heavy lift tests on a 3rd sample, following the Endeavor cruise:

• Cortland B-O-B 5/8” diameter

Lifting 25,000 lbs. using traction winch on R/V Endeavor
Additional Synthetic Evaluation
2016/2017

• More Traction Winch Tests
• In House Laboratory Testing
Additional Synthetic Evaluation 2016/2017

Traction Winch Tests
Repeat of lift tests using the traction winch of R/V Neil Armstrong

• 5/8” Cortland B-O-B
• 9/16” Samson Product with DM-20 fiber
• 9/16” Cortland Plasma® HiCo
20,000 lbs. lift on R/V Neil Armstrong using Synthetic Rope
Additional Synthetic Evaluation 2016/2017

In House Laboratory Testing

Thousand Cycle Load Level Determination for 4 Rope Samples

• 5/8” Cortland B-O-B
• 9/16” Samson Product with DM-20 fiber
• 9/16” Phillystran PST w/ Multiplex jacket
• 9/16” Cortland Plasma® HiCo
Thousand Cycle Load Level

Theoretical Load Level at which failure would occur at 1,000 cycles
Expressed as a % of the manufacturer’s minimum breaking strength

• 1,000 cycles @ 50% of breaking strength, if it survives
• 1,000 cycles @ 60%, if sample survives
• 1,000 cycles @ 70%, if sample survives
• 2,000 cycles @ 80%

Using Predetermined Equivalents:
• 1,000 cycles @ 50% = 251 cycles @ 60%
• 1,000 cycles @ 50% + 1,000 cycles @ 60% = 215 cycles @ 70%
• 1,000 cycles @ 50% + 1,000 cycles @ 60% + 1,000 cycles @ 70% = 113 cycles @ 80%

CTF= Number of Cycles to Failure
TLL = Test Load Level at which CTF occurred

TCLL can be calculated: 
\[ TCLL = 100\% - \left(\frac{6.91 \times (100\% - TLL)}{\ln CTF}\right) \]
# Thousand Cycle Load Level Test Results

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Product</th>
<th>TCLL [% MBS]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cortland</td>
<td>B-O-B</td>
<td>71.4</td>
</tr>
<tr>
<td>Phillystran</td>
<td>PST</td>
<td>79.4</td>
</tr>
<tr>
<td>Samson</td>
<td>DM-20</td>
<td>81.9*</td>
</tr>
<tr>
<td>Cortland</td>
<td>Plasma® HiCo</td>
<td>81.9</td>
</tr>
</tbody>
</table>

* Used an estimated minimum breaking strength
Now Hear This!
Questions?