

# NSF UNOLS WIRE POOL

## FACTS, FICTION AND FUNCTION

Barbara Callahan



- Testing your wire
- How we can work together
- Wire Logs & Wire Pool Recommendations
- Testing your terminations

# TESTING YOUR WIRE

- The Wire Pool tests 50 to 75 wire samples per year from 26 UNOLS vessels
- When the Pool receives a wire sample and a break test request, a work order is generated and the vessel's wire is in the queue for testing
- The Wire Pool will send you an email that the sample has arrived

# TESTING YOUR WIRE

.680/.681  
Cable



9/16" 3x19  
Wire rope





# TESTING YOUR WIRE



.322 Cable



1/4" 3 x 19 Wire Rope

# TESTING YOUR WIRE

Hydraulic tensile machines: break tests, pull tests & cycle tests



CHANT



# TESTING YOUR WIRE

Hydraulic tensile machines: break tests, pull tests & cycle tests



**ROBERTS**

# TESTING YOUR WIRE Break Test Certificate

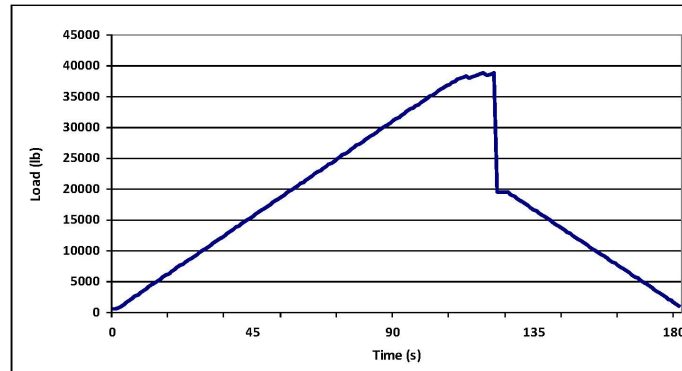


**WOODS HOLE OCEANOGRAPHIC INSTITUTION**  
**MOORING LAB**  
**WOODS HOLE, MA 02543**  
**508-289-2395**

## CERTIFICATE OF TEST

### TEST INFORMATION

<b>PROJECT</b>	Armstrong Wire Break Test
<b>TEST #</b>	03252
<b>TEST DATE</b>	8/16/2019
<b>TEST TYPE</b>	9/16" 3 x 19
<b>SAMPLE #</b>	NSF-07-T38
<b>TEST DESCRIPTION</b>	Both poured socket terminations done at WHOI.



### TEST RESULTS

**MAX LOAD** 38850 lb

Mid span break

**OPERATOR** Barbara Callahan

These products have had a load applied to them in conformance with the customer's specifications. There is no warranty, expressed or implied, by the test machine manufacturer that these goods are suitable for a purpose or use.



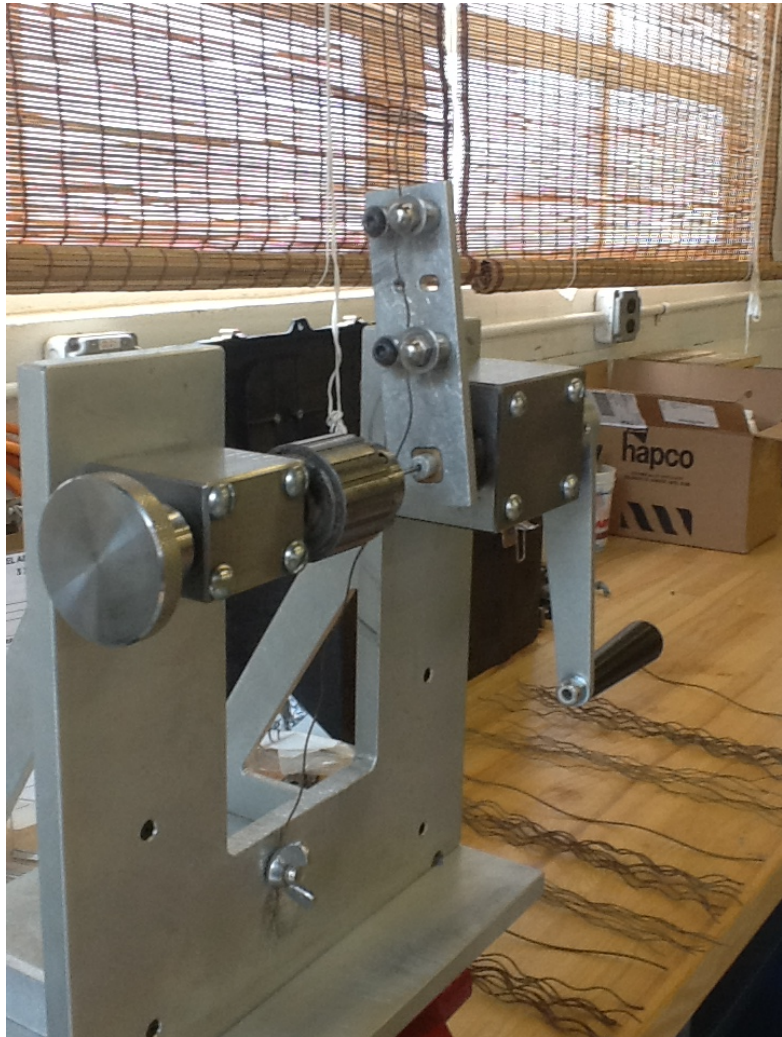
# TESTING YOUR WIRE



## The E-Kink Test

- Performed on every sample
- Accepted by the manufacturer of .322, .680 & .681 cables
- Can indicate wire degradation

# TESTING YOUR WIRE



## The Mandrel wrap test

- Performed on all 3x19 wire rope samples
- Worked with manufacturer to develop this test
- Can indicate wire degradation

- Testing your wire
- **How we can work together**
- Wire Logs & Wire Pool Recommendations
- Testing your terminations

# HOW WE CAN WORK TOGETHER

## YOU

The users of the wire must maintain the wire database

## WIRE POOL

Will test your sample and upload the results with recommendation if needed in the database



# Maintaining the wire database: Ship Report

| [Ship reports for WHOI](#) | [Atlantis Ship Report](#) | [Neil Armstrong Ship Report](#) | [Tioga Ship Report](#) | [WHOI-Unable to Identify by Reel Number Ship Report](#) | [Logout](#) |

## UNOLS WIRE POOL SHIP REPORT

Neil Armstrong

Logged in: Christopher Griner



Contact information: [unolswirepool@whoi.edu](mailto:unolswirepool@whoi.edu)

Wire Pool Manager: Rick Trask [508-289-2395](tel:508-289-2395)

Database Administrator: Andrea Harvey [508-289-3530](tel:508-289-3530)

<p>Institution: Woods Hole Oceanographic Institution  Vessel name: Neil Armstrong  Shipping address: 266 Woods Hole Road  W.H.O.I.  Woods Hole  MA 02543  Office phone: <a href="tel:508-289-2416">508-289-2416</a>  Fax: <a href="tel:508-457-2178">508-457-2178</a></p> <p><a href="#">Update information</a></p>	<p>Contact name: Timothy Twomey  Title: Director of Ship Operations  Address: 266 Woods Hole Road  MS #27  Woods Hole  MA 02543  Office phone: <a href="tel:508-289-2624">508-289-2624</a>  Cell phone: <a href="tel:203-383-9309">203-383-9309</a>  Email: <a href="mailto:twomey@whoi.edu">twomey@whoi.edu</a>  Fax:</p> <p><a href="#">  Edit contact list  </a></p>	<p>Secondary contact: Christopher Griner [<a href="#">Edit</a>]  Title: Senior Engineering Asst I  Address: MS #17  WHOI  Woods Hole  MA 02543  Office phone: <a href="tel:508-289-3587">508-289-3587</a>  Cell phone: <a href="tel:774-392-1105">774-392-1105</a>  Email: <a href="mailto:cgriner@whoi.edu">cgriner@whoi.edu</a>  Fax: <a href="tel:508-457-2107">508-457-2107</a></p> <hr/> <p>Other authorized users: Eric Benway [<a href="#">Edit</a>]  Read-only users: None</p>
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Per UNOLS Wire Pool Policy, transfer of UNOLS wire to another vessel or institution requires prior approval

[Request wire](#)

[Report a reel](#)

Wires Assigned to this Vessel							
Wire size and type	Manu. Reel No.	NSF Reel No.	Date distributed to this institution	Current length (m)	Last lubrication (see <a href="#">Policy</a> )	Wire Status	Action
0.322 EM	Q7705-C2	<a href="#">NSF-12-C161-A</a>	Dec 2012	7,401	Oct-28-2016	In use or onboard vessel	Select <input type="text"/>
0.681 PowerOptic	Q6685-C1	<a href="#">NSF-09-FO7</a>	Dec 2012	9,154	Sep-18-2019	In use or onboard vessel	Select <input type="text"/>
3/8 3x19	428-360077-1	<a href="#">NSF-12-H46</a>	Dec 2012	9,834	Oct-1-2015	In use or onboard vessel	Select <input type="text"/>
9/16 3x19	BBS1148-03	<a href="#">NSF-07-T38</a>	Dec 2012	8,756	Sep-28-2015	In use or onboard vessel	Select <input type="text"/>

# Maintaining the wire database: Ship Report

## The ship report will show:

- The date the wire was distributed to the institution
- The current length
- The date of the last lubrication
- The wire status

## You can report:

- Lubrication done
- A cutback
- End for ending done
- Splitting a wire into 2 usable lengths
- Wire status change
- Upload any documents pertaining to the wire

# Maintaining the wire database: Ship Report

Vessel Name: Neil Armstrong

## Safe Working Load Information

The wires listed below are those reported above as "In Use or Onboard Vessel", which are required to be in compliance with Appendix A: Rope/Cable Safe Working Load Standards in [UNOLS Research Vessel Safety Standards](#).

1	2	3	4	5	6	7	8	9	10	11	12	13	14
System Description	NSF Reel No.	Rope/Cable	NBL (lbs)	TBL (lbs)	Test Date	ABL (lbs)	Minimum Sheave DIA (in)	Grooving Code	D/d	Tension Logging Freq.	FS	SWL (lbs)	Comments
Fwd. Markey CAST 6	<a href="#">NSF-12-C181-A</a>	0.322 EM	10000	12960 <a href="#">[Report or request new break test]</a> Break test request pending	3/25/2019	10000	15.56 <a href="#">Edit SWL info</a> ⇒	A	48	20.0 Hz	2.0	5000	Lubed 5000 meters of this cable on 28 October 2016 - OLL D2 Corrosion Inhibitor.
Stbd. side Markey: Traction Winch DETW-9-11-48 Storage Reel - DESR-11-48	<a href="#">NSF-09-FO7</a>	0.681 PowerOptic	42000	47275 <a href="#">[Report or request new break test]</a> Break test request pending	11/25/2015 OVERDUE	42000	48.00 <a href="#">Edit SWL info</a> ⇒	B	70	20.0 Hz	2.5	16800 Not current	.681 Fiber Optic De-Rated from 48,000 lbs. Tension spooled & lubricated with OLL-D2 Corrosion Inhibitor August 2015 at Anacortes, WA.
Aft Markey CAST 6	<a href="#">NSF-12-H46</a>	3/8 3x19	14800	15560 <a href="#">[Report or request new break test]</a>	3/26/2019	14800	15.56 Information provided is not consistent with <a href="#">Appendix A</a> <a href="#">Edit SWL info</a> ⇒	B	41	20.0 Hz	2.5	5920	Tension spooled & lubricated with OLL-D2 Corrosion Inhibitor August 2015 at Anacortes, WA.
Port side Markey: Traction Winch DETW-9-11-48 Storage Reel - DESR-9-30	<a href="#">NSF-07-T38</a>	9/16 3x19	32500	38850 <a href="#">[Report or request new break test]</a>	8/16/2019	32500	30.00 <a href="#">Edit SWL info</a> ⇒	B	53	20.0 Hz	2.5	13000	Tension spooled & lubricated with OLL-D2 Corrosion Inhibitor August 2015 at Anacortes, WA.

# Maintaining the wire database: Ship Report

## **ALSO ABLE TO:**

- Request a break test
- Edit Safe Working Load (SWL) information

## **THE SHIP REPORT WILL SHOW:**

- Break test overdue
- SWL not in compliance with Appendix A



- Testing your wire
- How we can work together
- **Wire Logs & Wire Pool Recommendations**
- Testing your terminations

# WIRE LOGS

- Wire Logs are an important part of the Wire Pool's evaluation
- Appendix A requires you submit a wire log at the time of a break test request

# WIRE LOGS & Appendix A

- A.3.3 Cable test samples shall be a clean, “representative” length from the end that will be put into future use, not simply the end immediately adjacent to the existing termination. Although this may not be the location of maximum loading during operations, this represents a practical means of determining ABL from an operational standpoint.
- A.3.4 The initial ABL shall be assigned through testing by the UNOLS Wire Pool before distribution to the fleet. If the initial test results in a ABL less than the NBL, the Wire Pool shall reject the rope or cable.
- A.3.5 If subsequent testing results in a TBL that is greater than or equal to the initial ABL, the initial ABL shall be used by the Vessel Operation for the purposes of this standard.
- A.3.6 If subsequent testing results in a TBL that is less than the initial ABL, then the new TBL shall be used in lieu of the initial ABL by the Vessel Operation for the purposes of this standard.
- A.3.7 Method of determining (TBL) – Steel Wires and Cables: ASTM A931-96, “Standard Test Method for Tension Testing of Wire Rope and Strand” (Re-approved 2002) shall be used.
- A.3.8 The Vessel Operator shall send samples to a UNOLS-accepted test facility (WHOI Wire Pool as of October 2009) for consistency of testing purposes and maintaining statistics. For steel cables and wire rope, the Operation shall send a five-meter (16 ft) test sample (as described in Section 4.3) terminated on both ends with the fittings normally used in the field. If the field terminations are found to not develop full breaking strength, a test may be conducted using standard poured epoxy resin terminations.
- A.3.9 The Vessel Operator shall also provide a copy of the wire history or wire log information with the sample and, as a minimum, this should include the following:
- UNOLS wire identifier, as described in Chapter 7 UNOLS Winch and Wire Handbook, Third Edition
  - Winch and system manufacturer.
  - Number and/or duration of deployments since last test.
  - Maximum tension of each deployment.
  - Maximum payout of each deployment.
  - Description of wire train: the number of sheaves between winch and water. Sheave material and values of “D” and “w” for each sheave.
- A.3.10 A hard copy and/or electronic copy of the TBL test results and ABL will be provided to the Vessel Operator for each sample tested
- A.3.11 Method of determining (TBL) – Synthetic Ropes and Cables: [RESERVED]
- A.3.12 Electromagnetic Testing: [RESERVED]
- A.3.13 DC Resistance Testing: [RESERVED]

# WIRE LOGS: THE GOOD & NOT SO GOOD

USCGC HEALY			
Type	OTH-086	Aft .322	
Size	EM		
Manu. Design No	0.322		
Number of Deployments	A301592		
Date	Max Tension	Max Payout(n	Notes
1 31-May-18	100	50	
2 7-Aug-18	3000		Pull Test
3 8-Aug-18	400	30	
4 8-Aug-18	400	130	
5 8-Aug-18	350	36	
6 8-Aug-18	380	49	
7 8-Aug-18	400	55	
8 8-Aug-18	400	60	
9 9-Aug-18	320	70	
10 9-Aug-18	600	90	
11 9-Aug-18	400	33	
12 9-Aug-18	400	43	
13 10-Aug-18	400	39	
14 10-Aug-18	350	41	
15 10-Aug-18	300	44	
16 10-Aug-18	280	75	
17 10-Aug-18	200	62	
18 10-Aug-18	200	64	
19 10-Aug-18	200	56	
20 10-Aug-18	500	102	
21 12-Aug-18	400	36	
22 12-Aug-18	210	33	
23 12-Aug-18	210	72	
24 12-Aug-18	600	54	
25 12-Aug-18	400		
26 13-Aug-18	400	35	
27 13-Aug-18	400	36	
28 13-Aug-18	350	34	
29 13-Aug-18	300	34	
30 13-Aug-18	300	73	
31 13-Aug-18	300	65	
32 13-Aug-18	150		
33 14-Aug-18	300	34	
34 14-Aug-18	200	31	
35 15-Aug-18	250	49	
36 15-Aug-18	200	61	
37 15-Aug-18	250	66	
38 15-Aug-18	250	39	
39 15-Aug-18	275	37	
40 16-Aug-18	300	108	
41 16-Aug-18	170	94	
42 16-Aug-18	200	193	

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# WIRE LOGS

- Just this year alone, 56% of the “in use” samples we have tested had a wire log submitted at the time of testing
- The 44% that did not submit a wire log, only 1 submitted the wire log after it was requested in the recommendations



# WIRE POOL RECOMMENDATIONS

## Wire Pool recommendation

Recommendation:

[Enter/edit recommendation](#)

The wire broke at 31,425 lbs at the compressed sleeve termination done by the vessel. The mandrel wrap test had (2) wires break which represents 3% of the total cross sectional area. The e-kink test had no breaks. Since the wire did break below the manufacturers breaking strength of 32,500 lbs, we could re-test from the sample provided. please submit a new break test request if you would like the wire tested again.

## Break test for 9/16 3x19 NSF-07-T39

[Edit results](#)

Break test location: UNOLS Wire Pool

Test operator: Barbara Callahan

Test requested by: Barbara Callahan

Log test number:

Work order number: 19151

Test date: Aug-9-2019

Manufacturer's marker tape number (if any):

Manufacturer's nominal breaking load (lbs): 32500.0

Tested breaking load (lbs): 31425

Assigned breaking load (lbs): 31425

Termination 1: PouredSocketTermination

Termination 2: CompressedSleeveTermination

Comments: Broke at compressed sleeve termination done by vessel.

Modified by: Barbara Callahan

Modified date: Aug-12-2019

No break test images uploaded

[View Break Test Report](#)

## E-kink Broken wire report for 9/16 3x19 NSF-07-T39

E-kink test date: Aug 9, 2019

[Edit ekink](#)

### Broken wires

	Inner wire (27 wires)	Outer wire (27 wires)	Center wire (3 wires)
Total broken wires	0	0	0
Total metallic cross sectional area of the wire rope: 0.13933			
Cross sectional area of broken wires	0.0000	0.0000	0.0000
Total % cross sectional area failed during e-kink test: <b>0.00%</b>			
Comment:			

## Mandrel Broken wire report for 9/16 3x19 NSF-07-T39

Mandrel test date: Aug 9, 2019

[Edit mandrel](#)

### Broken wires

	Inner wire (27 wires)	Outer wire (27 wires)	Center wire (3 wires)
Total broken wires	1	1	0
Total metallic cross sectional area of the wire rope: 0.13933			
Cross sectional area of broken wires	0.8574	2.4555	0.0000
Total % cross sectional area failed during mandrel test: <b>3.31%</b>			
Comment:			

- Testing your wire
- How we can work together
- Wire Logs & Wire Pool Recommendations
- **Testing your terminations**

# TESTING YOUR TERMINATIONS

## INMARTECH OCTOBER 2018

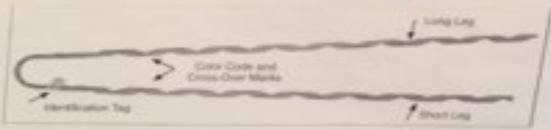
### Purpose:

- To show the different types of terminations
- Compare how they tested

**Common Mechanical Termination Styles Used on Standard UNOLS Wire Rope and Cables**


**0.681 Electro-Optical-Mechanical Cable**

- Make and Model: Rochester A302351
- Nominal Breaking Strength: 42,000 lbf
- Poured Termination Observed Breaking Strength: 44,200 (for testing purposes only)



**0.681 Fiege Fitting Termination (Electroline, Clevis Socket Fitting)**

- Nominal Breaking Strength: 41,200 lbf (Extra Improved Plow Steel Standard)
- Observed Breaking Strength: 27,150




**0.681 "Guy Grip" Termination**

- Nominal Breaking Strength: 42,000 lbf (100% of Cable Breaking Strength)
- Observed Breaking Strength: 32,700

**9/16" 3x19 Galvanized Wire Rope**

- Make and Model: Wireco Worldgroup 3X19AA 9/16" dia.
- Nominal Breaking Strength: 32,500 lbf
- Poured Termination Observed Breaking Strength: 35,500 (for testing purposes only)



**9/16" Fiege Fitting Termination (Electroline, Eye Socket Fitting)**

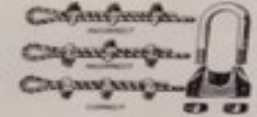
- Nominal Breaking Strength: 29,000 lbf (Extra Improved Plow Steel Standard)
- Observed Breaking Strength: 26,200

**9/16" "Guy Grip" Termination**

- Nominal Breaking Strength: 32,500 lbf (100% of Cable Breaking Strength)
- Observed Breaking Strength: 26,200

**0.322 Electro-Mechanical Cable (3 copper conductors)**

- Make and Model: Rochester A301592
- Nominal Breaking Strength: 10,000 lbf (ends free to rotate)
- Poured Termination Observed Breaking Strength: 12,300 (Field Termination)



**0.322 "Guy Grip" Termination**

- Nominal Breaking Strength: 10,000 lbf (100% of Cable Breaking Strength)
- Observed Breaking Strength: 8,700

**0.322 Crosby Clip Termination**

- Nominal Breaking Strength: 8,000 lbf (80% of Cable Breaking Strength)
- Observed Breaking Strength: 5,612 lb

**0.322 Nicopress Oval Sleeve Termination**

- Nominal Breaking Strength: 32,500 lbf (100% of Cable Breaking Strength)
- Observed Breaking Strength: 26,200

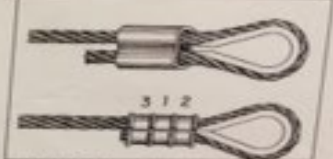



FIGURE 7-84. Typical Beak-to-eye splice





# TESTING YOUR TERMINATIONS

## WHAT WE LEARNED:

- The observed breaking strength for vessel terminations
- The vessel terminated samples broke lower than the NBL
- The Wire Pool needs to strongly recommend testing the vessel terminations

# TESTING YOUR TERMINATIONS

We invite you to:

**Send The Wire Pool (2) samples to be tested**

- One sample with both ends terminated
- One sample with no terminations

**Submit (2) break test requests**

- The first request for the vessel terminated sample
- The second request for the sample with no terminations

# TESTING YOUR TERMINATIONS

- The Wire Pool will test the vessel terminated sample first and enter the results in the wire database
- If the vessel terminated sample breaks at or above the NBL (nominal breaking load), we will use the other sample only for e-kink & mandrel wrap testing
- If the vessel terminated sample breaks below the NBL, we will terminate the other sample and test it
- The Wire Pool will enter those test results in the database

# TESTING YOUR TERMINATIONS

**PLEASE REMEMBER.....**

All wire samples need to come from the new working end and as close to the new termination as possible

## FACTS:

You will know the true strength of your vessel terminated system

## FICTION:

“Nobody looks at the wire log”  
They need to be submitted & we look at them

## FUNCTION:

We want to work with you so you can function safely



# Thank you!

