Wire and Cable Subcommittee Report

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UNOLS RVTEC 2007

Committee Members

- Richard Findley
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Everything You Didn’t Really Want To Know About Conductor Wire

Basic Characteristics

Part	OD	Breaking Strength (lb)		Weight /Kft (lb)		Working Load (lb.) @
Number	In.	Fixed	Free	In Air	In Water	.4% strain
A301592	0.322	11,600	10,000	175	144	2,500
EQ05670	0.322n	12,200	11,100	184	154	3,550
A216375	0.375	14,600	12,556	253	210	Not Provided by Manufacturer
IM 05382	0.393	16,000	13,760		217	3,400
05489	0.400	15,200	13,100	262	215	3,500
A216417	0.414	17,800	15,308	307	254	Not Provided by Manufacturer
05497	0.450	19,000	16,340	332	273	4,500
A301241	0.680	40,000	37,000	693	553	10,000
A302351	0.681	46,000	46000	747	608	10,000
A302351	0.681	46,000	46000	747	608	14,000

Weight in Water

Part	OD	Weight of wire (lb.)in H20 at various lengths (M)				
Number	In.	1600	3200	4800	6400	8000
A301592	0.322	756	1,512	2,268	3,024	3,780
EQ05670	0.322n	808	1,617	2,425	3,234	4,042
A216375	0.375	1,102	2,205	3,307	4,409	5,512
IM 05382	0.393	1,139	2,278	3,417	4,556	5,696
05489	0.400	1,129	2,257	3,386	4,514	5,643
A216417	0.414	1,333	2,667	4,000	5,333	6,667
05497	0.450	1,433	2,866	4,299	5,732	7,165
A301241	0.680	2,903	5,806	8,709	11,612	14,514
A302351	0.681	3,192	6,383	9,575	12,766	15,958
A302351	0.681	3,192	6,383	9,575	12,766	15,958

Payload At Manufactures Recommended Working Load

Part #	OD	Meters Deployed					
Number	In.	0	1600	3200	4800	6400	8000
A301592	0.322	2,500	1,744	988	232	(524)	(1,280)
EQ05670 (.47%)	0.322n	3,550	2,742	1,933	1,125	316	(492)
A216375	0.375						
IM 05382	0.393	3,400	2,261	1,122	(17)	(1,156)	(2,296)
05489	0.400	3,500	2,371	1,243	114	(1,014)	(2,143)
A216417	0.414						
05497	0.450	4,500	3,067	1,634	201	(1,232)	(2,665)
A301241	0.680	10,000	7,097	4,194	1,291	(1,612)	(4,514)
A302351(.35%)	0.681	10,000	6,808	3,617	425	(2,766)	(5,958)
A302351(.5%)	0.681	14,000	10,808	7,617	4,425	1,234	(1,958)

Payload @ 50% Free to Rotate Breaking Strength

Part	OD	Breaking Strength (lb)		Meters Deployed					
Number	In.	Fixed	Free	0	1600	3200	4800	6400	8000
A301592	0.322	11,600	10,000	5,000	4,244	3,488	2,732	1,976	1,220
EQ05670 (.47%)	0.322n	12,200	11,100	5,550	4,742	3,933	3,125	2,316	1,508
A216375	0.375	14,600	12,556	6,278	5,176	4,073	2,971	1,869	766
IM 05382	0.393	16,000	13,760	6,880	5,741	4,602	3,463	2,324	1,184
05489	0.400	15,200	13,100	6,550	5,421	4,293	3,164	2,036	907
A216417	0.414	17,800	15,308	7,654	6,321	4,987	3,654	2,321	987
05497	0.450	19,000	16,340	8,170	6,737	5,304	3,871	2,438	1,005
A301241	0.680	40,000	37,000	18,500	15,597	12,694	9,791	6,888	3,986
A302351(.35%)	0.681	46,000	46000	23,000	19,808	16,617	13,425	10,234	7,042
A302351(.5%)	0.681	46,000	46000	23,000	19,808	16,617	13,425	10,234	7,042

Payload @ 50% Free to Rotate Breaking Strength

Part	OD	Breaking Strength (lb)							
Number (strain)	Inches	Fixed end	Free to rotate	0	1600	3200	4800	6400	8000
A301592 (.4%)	0.322	11,600	10,000	5,000	4,244	3,488	2,732	1,976	1,220
EQ05670 S (.47%)	0.322s	12,200	11,100	5,550	4,742	3,933	3,125	2,316	1,508
05677 FS (.4%)	0.322 fo	12,200	10,700	5,350	4,531	3,712	2,893	2,074	1,256

DC Resistance, Ohms in Meters

Part	OD	Ohms /					
Number	Inches	meters	2000	4000	6000	8000	10000
A301592	0.322	0.031	61.6	123.2	184.8	246.4	308
EQ05670	0.322s	0.019	38	76	114	152	190
05677 FS	0.322 fo	0.039	77.6	155.2	232.8	310.4	388

History

- Winch And Wire Symposium Report (Fall 1999)
- Draft Functional Requirements For A Potential New Generation Standard UNOLS Small Diameter Electro-Mechanical (EM) Or Electro-Optical-Mechanical (EOM) Cable (February 2004)
- Load Handling System Workshop (FIC Meeting – March 2005)
- UNOLS Rope And Cable Safe Working Load Standards (August 2007, Rev 3)

WINCH AND WIRE SYMPOSIUM REPORT

TULANE/XAVIER CENTER FOR BIOENVIRONMENTAL RESEARCH
NEW ORLEANS, LA

30 NOVEMBER – 1 DECEMBER 1999

Summary Excerpts

- **Instrument demands for greater band width require a new standard fiber optic cable of the .322 size or possibly larger.** A high strength synthetic fiber cable of the .68 range is needed.
- Interchangeability of wires is important.
- Training of the crews in winch operation and wire maintenance must be an on-going process.
- **The safe working load (SWL) of .322 cable needs to be clarified.**
- Motion compensation systems such as articulated cranes are needed.
- More emphasis is needed on the portability of winches for UNOLS ships.
- Complete records of all winch and wire systems should be maintained.
- Communications between winch and wire manufacturers and the UNOLS community need to be strengthened.
- The scientific community needs to be aware of the limitations imposed by current winch and wire technology.
- There are clear advantages to making towed profiling a part of the general shipboard technical services.
- New innovations in winch and wire use such as the Curly Wurly need to be considered.

Recomendations

- UNOLS (RVOC/RVTEC) be tasked to establish a safe working load (SWL) criteria for .322 cable. NSF entertain proposals to develop specifications for a new wire to replace .322 EM cable that is stronger and provides a broader band width.
- NSF entertain proposals to develop specifications for a stronger cable to replace the .680 cable.
- NSF entertain proposals to develop specifications for a lighter .680 cable with the same breaking strength.
- UNOLS be tasked to increase and standardize operator training for winch operations, wire care and maintenance.
- UNOLS operators be encouraged to maintain a complete set of records on winches and wires and NSF include a requirement in the NSF Inspection to review these records.
- UNOLS operators be encouraged to investigate new innovations in winch and wire handling systems such as motion compensation.
- NSF fund a winch and wire symposium every five years to bring scientists, operators, technicians and manufacturers together for information exchange.

Draft Functional Requirements
for a
Potential New Generation Standard UNOLS
Small Diameter
Electro-Mechanical (EM)
or
Electro-Optical-Mechanical (EOM) Cable

Report prepared by
Mike Prince
UNOLS Office
February 16, 2004

Recommendations for Future Steps

- This report should be used by agencies, science community and manufacturers for use in soliciting and proposing solutions/designs.
- A small working group should be funded to carry out the development of a new cable.
- Verify and refine these functional requirements and develop acceptance specifications and testing requirements.
- Solicit proposals to design and/or test cables meeting these requirements.
- Obtain and test a new cable in a professional test facility, then test in the field.
- Determine if new cable will be added to the inventory or replace .322 as a standard UNOLS Cable.
- Review the requirements and the capability to meet those requirements for other Standard UNOLS cables and wires.
- Conduct a similar design and acceptance process if necessary for other cables.