



Naval Architects & Salvage Engineers

**NATIONAL SCIENCE FOUNDATION
SHIP INSPECTION PROGRAM**



2013 RVOC MEETING

Purpose

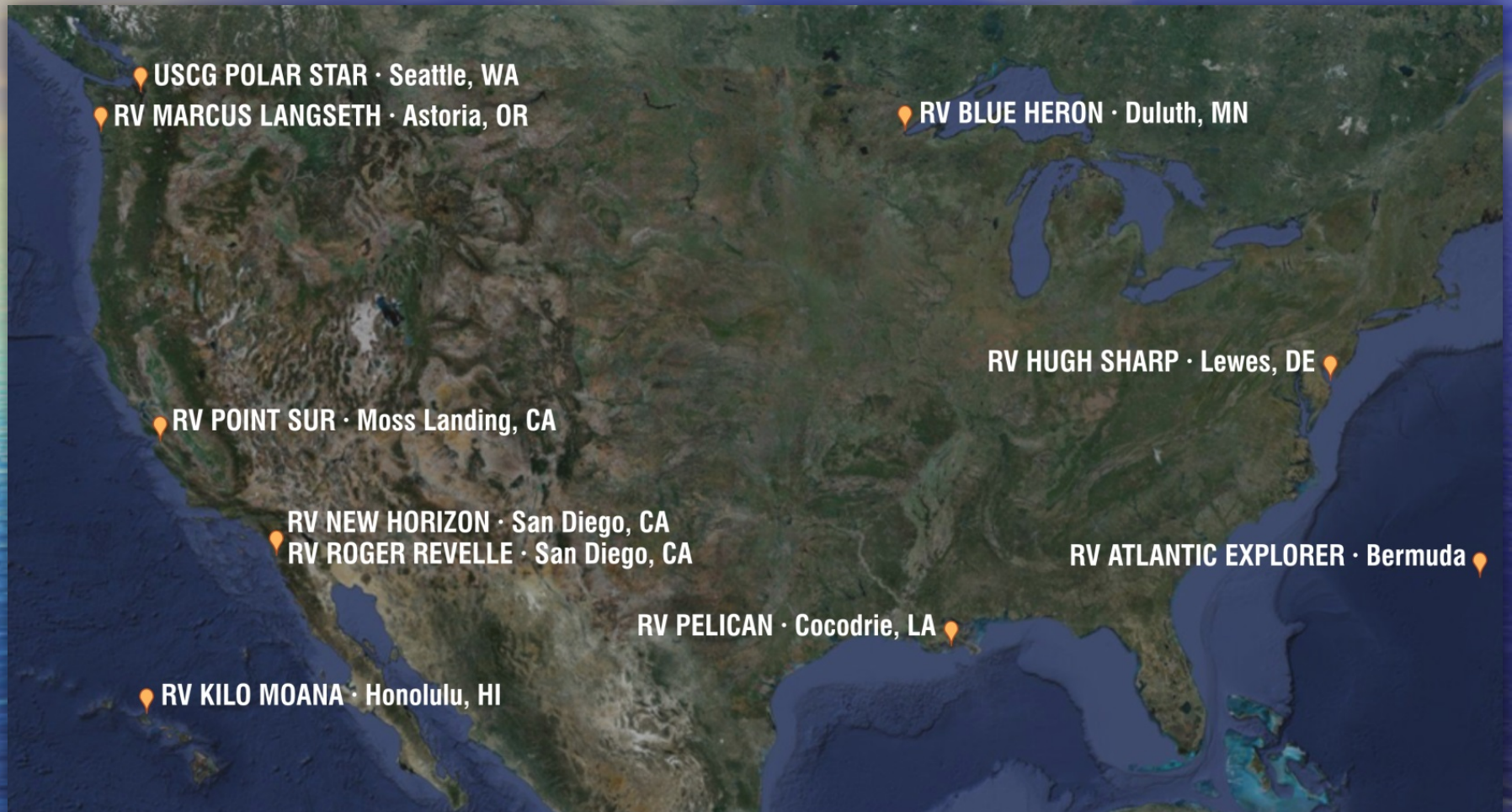
The major purposes of the NSF Ship Inspection Program are:

1. To assure that the capabilities of the research vessel and technical support meet accepted scientific community standards and expectations;
2. To assure the seaworthiness and safety of research vessels supported by NSF meet or exceed the standards set forth by the *UNOLS Research Vessel Safety Standards (RVSS)*, and applicable requirements of the International Maritime Organization, American Bureau of Shipping (ABS), the Code of Federal Regulations (CFR), and the U.S. Coast Guard;
3. To ensure NSF-owned ships as capital assets, are being adequately maintained;
4. To ensure NSF-funded science is scheduled on properly outfitted and maintained vessels.



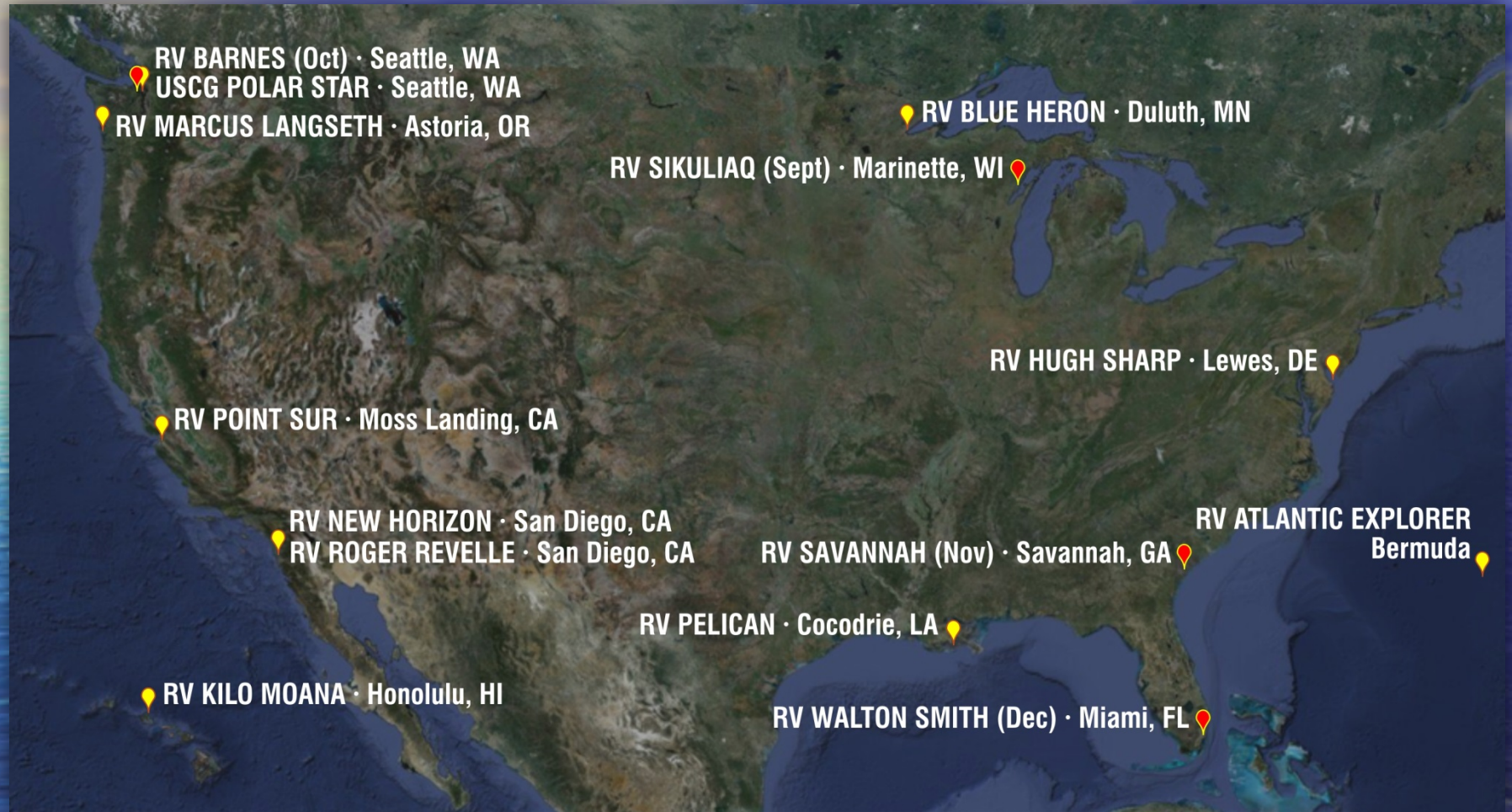
Naval Architects & Salvage Engineers

Recently Completed



Naval Architects & Salvage Engineers

Upcoming



Naval Architects & Salvage Engineers

RVSS Appendix A Compliance:

Appendix A Assist Summary for Each Wire or Cable

Appendix A Assist Summary for Each Wire or Cable (updated 3_14_2012 JMS/wec)					
Note: This is not all inclusive. See Appendix A Rev 1 for requirements.	Select Applicable Column FS				
Requirement or Attribute	FS of 5.0 or higher	FS from 2.5 to 4.99	FS from 2.0 to 2.49	FS from 1.5 to 1.99	FS= —
Post Cable/Wire SWL in clear view of the winch operator (good practice)	Applies	Applies	Applies	Applies	Y/N
General					
Determine Cable/Wire Safe Working Load (SWL) as: Assigned Breaking Load / Factor of Safety	Applies	Applies	Applies	Applies	Y/N
Tension Monitoring					
Have ability to keep load < SWL: May be calculated w/"g" factor at least 1.75 or from Tensionometer	Applies				Y/N
Have ability to keep load < SWL: Actual from monitoring system		Applies	Applies	Applies	Y/N
Tensionometer display at operator's station with 3 Hz resolution		Applies			Y/N
Tensionometer display at operator's station with 10 Hz resolution			Applies	Applies	Y/N
Tension continuously monitored using a tension trending graph			Applies	Applies	Y/N
Tensionometer logging at 3 Hz		Applies			Y/N
Tensionometer logging at 20 Hz			Applies	Applies	Y/N
Tensionometer Recalibration at least every 6 mo.		Applies	Applies	Applies	Y/N
Tension measuring system maintained with 4% accuracy		Applies			Y/N
Tension measuring system maintained with 3% accuracy			Applies	Applies	Y/N
Alarms					Y/N
Audible and visual tension alarms w/data logging Alarm at < ABL/2.8		Applies			
Audible and visual tension alarms w/data logging Alarm at < ABL/2.2			Applies		Y/N
Audible and visual tension alarms w/data logging Alarm at < ABL/1.7				Applies	Y/N
Alarm conditions automatically logged		Applies	Applies	Applies	Y/N
Sheaves and Fairlead Rollers					
Sheaves & Rollers: As large as practical	Applies				Y/N
Sheaves & Rollers: D/d ratio meet 40:1 or 400d1 whichever is greater		Applies	Applies	Applies	Y/N
Sheaves: Grooves as close to d as possible and no more than 1.5d		Applies			Y/N
Sheaves: Grooves per Ref A 1.1 (Groove size relative to nominal diameter of wire rope: 3/16" to 1/4" 3% to 6%; over 1/4" 2.5% to 5%)			Applies	Applies	Y/N
Deck Safety					
Good safety practices	Applies				Y/N
Establish danger zones / safety zones		Applies	Applies	Applies	Y/N
Warning notices posted			Applies	Applies	Y/N
Physical or visual barriers			Applies	Applies	Y/N
Doors and accesses secured			Applies	Applies	Y/N
Testing					
Tension testing up to SWL load every 2 years. Break testing not req'd at FS=5.0	Applies				Y/N
Break Testing every 2 yrs		Applies			Y/N
Break Testing every yr if 10% decrease in ABL or cutback		Applies			Y/N
Break Testing every yrs			Applies	Applies	Y/N
Break Testing every 6 mo. if 10% decrease in ABL or cutback			Applies	Applies	Y/N
Logbooks: UNOLS wire identifier: Cable Inventory/History and Running Use					
Logs stay with the wires transfer with the wire	Applies	Applies	Applies	Applies	Y/N
Log of Tension Testing to SWL	Applies				Y/N
Log of wire Break Testing		Applies	Applies	Applies	Y/N
Log Cutbacks	Applies	Applies	Applies	Applies	Y/N
Log Spooling Operations	Applies	Applies	Applies	Applies	Y/N
Log of Lubrication	Applies	Applies	Applies	Applies	Y/N
Wire Train Description	Applies	Applies	Applies	Applies	Y/N
Maximum load for each cast by calculation or monitoring (and payout).	Applies	Applies	Applies	Applies	Y/N
Winch Operator					
Operator deemed competent in writing by master and owner	Applies				Y/N
Operator "Certified Competent" in writing by master and owner renewed annually		Applies	Applies	Applies	Y/N
Master verify qualifications and designate approved operators.		Applies	Applies	Applies	Y/N
Training record for formal operator training program for winch, handling apparatus, and monitoring system.		Applies	Applies	Applies	Y/N
Suggestions: Please contact Ted@JMSnet.com					



Naval Architects & Salvage Engineers

Common Findings: Maintaining Accuracy

Need procedure for periodically verifying accuracy.

Requirement or Attribute	Select Applicable Column FS			
	FS of 5.0 or higher	FS from 2.5 to 4.99	FS from 2.0 to 2.49	FS from 1.5 to 1.99
Tension Monitoring				
Tension measuring system maintained with 4% accuracy		Applies		
Tension measuring system maintained with 3% accuracy			Applies	Applies



Naval Architects & Salvage Engineers

Common Findings: Sheave and Fairlead Roller Diameter

Older Levelwinds limit FS to 5.0

	Select Applicable Column FS			
Requirement or Attribute	FS of 5.0 or higher	FS from 2.5 to 4.99	FS from 2.0 to 2.49	FS from 1.5 to 1.99
Sheaves and Fairlead Rollers				
Sheaves & Rollers: As large as practical	Applies			
Sheaves & Rollers: D/d ratio meet 40:1 or 400d1 whichever is greater		Applies	Applies	Applies
Sheaves: Grooves as close to d as possible and no more than 1.5d		Applies		
Sheaves: Grooves per Ref A 1.1 (Groove size relative to nominal diameter of wire rope: 3/16" to 1/4" 3% to 6%; over 1/4" 2.5% to 5%)			Applies	Applies



Naval Architects & Salvage Engineers

Common Findings: Log Maximum Load for Each Cast

Log maximum load for each cast. Applies to all factors of safety

	Select Applicable Column FS			
Requirement or Attribute	FS of 5.0 or higher	FS from 2.5 to 4.99	FS from 2.0 to 2.49	FS from 1.5 to 1.99
Logbooks: UNOLS wire identifier: Cable Inventory/History and Running Use				
Maximum load for each cast by calculation or monitoring.	Applies	Applies	Applies	Applies



Naval Architects & Salvage Engineers

Best Practices: Appendix A

Log payout per cast and payout at maximum load

Drop #	Drop Date & Time	Maximum Tension Per Cast (Lbs)	Maximum Payout of Each Deployment (Meters)
0	5/5/12 13:45	2987	0
1	5/8/12 2:34	1859	1000
2	5/9/12 2:06	1568	2000
3	5/9/12 22:06	2368	4572
4	5/10/12 2:08	1364	1100
5	5/11/12 2:41	2050	4353
6	5/11/2012 5:14	1502.9	1811.5
7	5/11/2012 19:41	2312.3	4617
8	5/12/2012 3:07	2016.9	4200.3
9	5/12/2012 23:00	1604.7	2000
10	5/13/2012 13:15	2859.1	4614.8

ATLANTIC EXPLORER



Naval Architects & Salvage Engineers

RVSS Appendix B Compliance:

System level

- Develop a test plan/procedure
- Include a line diagram
- Test the system (all components) as it is intended to be used

Appendix B Assist Sheet for Overboard Handling Systems (updated 2_9_2013 JMS/wec)			
This assist sheet is to access progress toward compliance with RVSS Appendix B by the compliance date of 7/15/2014			
Page 1 System Level			
Overboard Handling System Operator's Manual	Reference	Y or N or NA	Comment
For each Overboard Handling System (OHS) Configuration	B.3.1		
System Title/Description		Y / N / NA	
System Illustration or photograph (more detail required in OHDD)		Y / N / NA	
List of Components with identifying Model & Serial #s		Y / N / NA	
System Overboard Handling System Data Document (OHDD)	B.7.3	Y / N / NA	
System Maximum Capability Document including system Maximum Permissible Tension (MPT)	B.0.6	Y / N / NA	
Operational Limit Document (Top Level Check of Assigned Breaking Load* (ABL) to System MPT).	Attachment A2 Attachment A5	Y / N / NA	
OHS Testing procedures	B.6 Attachment A5	Y / N / NA	
OHS Test Logs	B.6 Attachment A5	Y / N / NA	
OHS Training and Operator Qualification Requirements	Attachment A5	Y / N / NA	
OHS Inspection Procedures	B.2.16 & B.6 Attachment A5	Y / N / NA	
OHS Operational and Safety Precautions	B.3. & B.7.2 Attachment A5	Y / N / NA	
OHS Emergency procedures	B.3.7 Attachment A5	Y / N / NA	
Flow Chart with path highlighted and annotated where applicable	Attachment A2	Y / N / NA	

* Attachment A2 shows assigned breaking load (ABL) which is likely lower than NBL. Consider the greater of NBL or Tested Breaking Load (TBL).

Suggestions: Please contact Ted@JMSnet.com



Naval Architects & Salvage Engineers

RVSS Appendix B Compliance:

Component level

Appendix B Assist Sheet for Overboard Handling Systems (updated 2_9_2013 JMS/wec)			
This assist sheet is to access progress toward compliance with RVSS Appendix B by the compliance date of 7/15/2014			
Page 2 Component & Sub-System Level			
For each Overboard Handling System (OHS) Component in the OHS System Configuration Component MCD Booklet for each component used including:	Reference	Y / N / NA	
Component Maximum Capability Document (MCD) including:	B.5	Y / N / NA	
(1) Component Maximum Permissible Tension (MPT)	B.5	Y / N / NA	
(2) Component proof or analysis of the MPT, or Manufacturer's Certification	B.3 & B.4	Y / N / NA	
(3) Applicable Geometry	B.05 & B.5 & B.06	Y / N / NA	
(4) Component OHDD	B.3.7	Y / N / NA	
Additional contents as applicable			
(5) Footprint and bolt pattern	B.5 Attachment A5	Y / N / NA	
(6) Attachment loadings	B.5 & B.6 Attachment A5	Y / N / NA	
(7) Ship system interface requirements such as electrical power, hydraulics, data transfer	Attachment A5	Y / N / NA	
(8) Testing procedures	B.6.1 Attachment A5	Y / N / NA	
(9) Test Logs	B.6 Attachment A5	Y / N / NA	
(10) Component weight	B.7.2 Attachment A5	Y / N / NA	
(11) Overall dimensions	Attachment A5	Y / N / NA	
(12) Equipment Operator's Manual	B.5 & B.10.1 Attachment A5	Y / N / NA	
(13) Training and operator qualification requirements	B.0.5 Attachment A5	Y / N / NA	
(14) Inspection procedures	B.6 Attachment A5	Y / N / NA	
(15) Preventative maintenance	B.0.5 Attachment A5	Y / N / NA	
(16) Operational and Safety precautions	B.6 Attachment A5	Y / N / NA	
(17) Emergency procedures	Attachment A5	Y / N / NA	
(18) For portable components additionally:	B.3.2 & B.6.3 Attachment A5		
Sub-component inventory list		Y / N / NA	
Delivery check-off list		Y / N / NA	
Installation instructions		Y / N / NA	

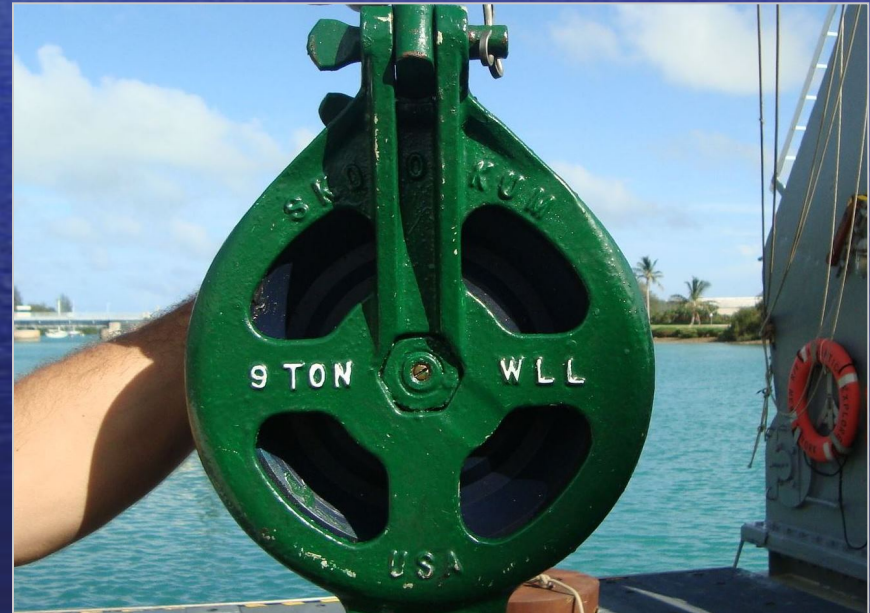
Suggestions: Please contact Ted@JMSnet.com



Naval Architects & Salvage Engineers

Common Findings: SWL Documentation

WLL or SWL identified on a block is not the same as max permissible tension. These blocks don't indicate if the WLL is for the tension member or for the shackle/block.



Naval Architects & Salvage Engineers

Best Practice

Clear indication of SWL expressed in terms of MPT.



Naval Architects & Salvage Engineers

Common Findings: Lithium batteries

- Develop policy and procedures on how to handle lithium batteries.
- The procedures should cover
 - usage
 - storage
 - disposal
 - how to respond to emergencies
- Incorporate into the cruise planning process.
- Note: Lithium batteries should not be treated the same as lithium ion batteries. Typical portable extinguishers can be used to extinguish a lithium ion fire.



Naval Architects & Salvage Engineers

Common Findings: Fuel Efficiency

Need for a ***methodical*** approach to help use fuel as cost effectively as possible. Requires the ability to take dynamic action based on real-time performance data and known benchmarks. Shipboard Energy Efficiency Management Plan (IMO requirement >400GT) comprised of strategic and tactical actions.

- Examples of strategic actions that can be adopted:
 - Repowering
 - Advanced hull coatings
 - Optimized propeller and rudder design
 - Addition of stern wedges
 - Use of shaft generators
- Examples of tactical actions that can be adopted:
 - Trim/draft optimization
 - Speed management
 - Maintenance: Tune engine compression, u/w hull cleaning, etc..
 - Energy conservation
 - Provide crew and staff guidance and awareness training



Naval Architects & Salvage Engineers

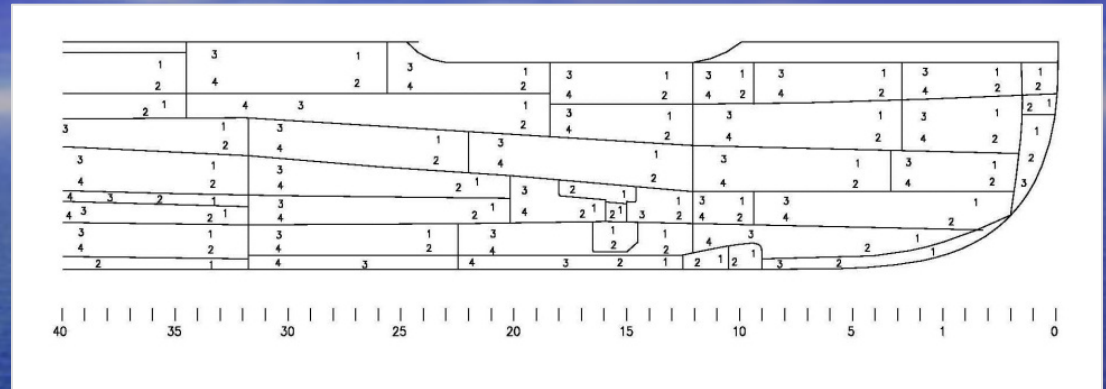
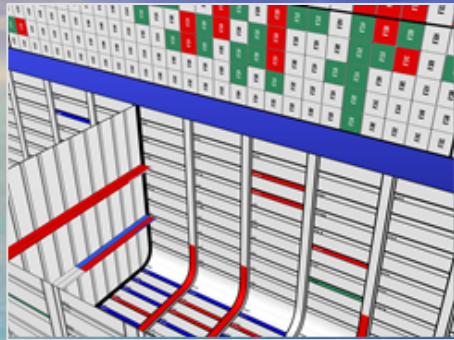
Common Findings: Shipyard Documentation

- Lack of post-shipyard documentation/reports
 - Summary of what was accomplished
 - Records of clearances, NDT, etc.
- Incomplete NDT surveys
 - “portable” equipment that hasn’t moved in years (under winch foundations, A-Frame foundations, cranes
 - bilges, machinery foundations
 - internal structure – webs, flanges
- Need to maintain/update shell expansion plans
 - Document readings *and* plate renewal

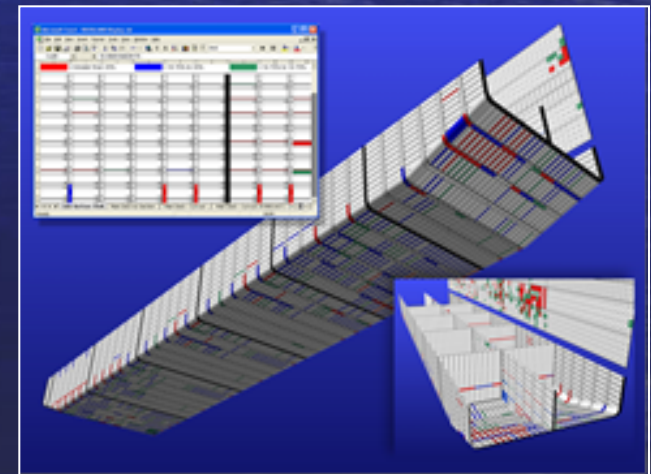


Naval Architects & Salvage Engineers

Best Practices: NDT Map



SIDE SHELL PLATING
STBD SIDE
(LKG INBD)



Naval Architects & Salvage Engineers

Common Findings: Crew Endurance Management

- The ability to maintain performance within safety limits while enduring job-related physical, psychological and environmental challenges
- System for managing the risk factors that can lead to human error and performance degradation within the unique requirements of the shipboard environment
- <http://www.uscg.mil/hq/cg5/cg5211/cems.asp>



Naval Architects & Salvage Engineers

Common Findings: ADA

- In order to be more ADA capable vessels could make improvements in the following areas:
 - Incorporate more ADA awareness and requirements into the pre-cruise planning process.
 - Improve access to science berthing from the main deck.
 - Improve markings to access the main deck from the science berthing area.
 - Improve lighting, handrails, and retro-reflective tape in stairwells and egress routes.
 - Install visual alarms to augment audible alarms.
 - Remove obstacles in the passageways.



Naval Architects & Salvage Engineers

Common Findings: Science Safety

More than just a preunderway safety brief is needed!

- Welcome aboard
- Shipboard policies
 - Sexual harassment, drug & alcohol, environmental, etc.
- General safety training information
 - RVOC Safety Training Manual & video
- Ship specific safety items
 - Use ship photos, PowerPoint or videos
- Reinforce in the Cruise Planning Manual, ship's web site, in labs and in staterooms



Naval Architects & Salvage Engineers

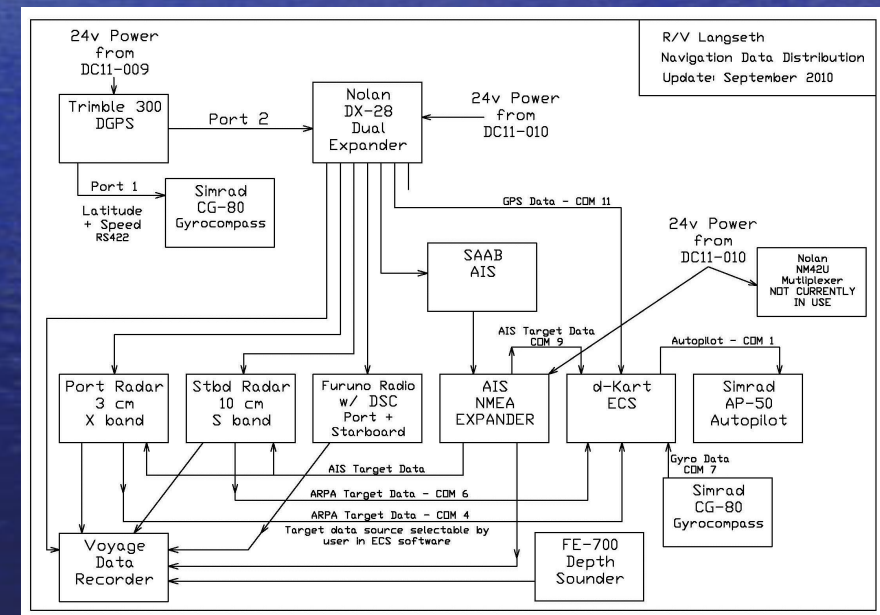
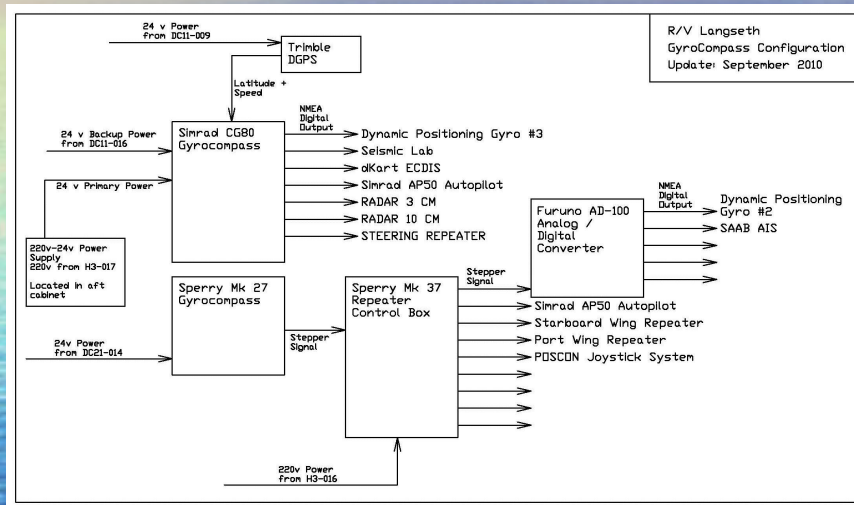
Best Practice: Hydraulic Hoses

- Tag provides the serial number of the item for cross reference in a Hose Log and installation date.
- The following information should be provided on the tag and/or log:
 - Hose serial number
 - Hydrostatic Test Pressure and Test Date
 - Installation or Replacement Date



Naval Architects & Salvage Engineers

Best Practices: System Diagrams



Naval Architects & Salvage Engineers

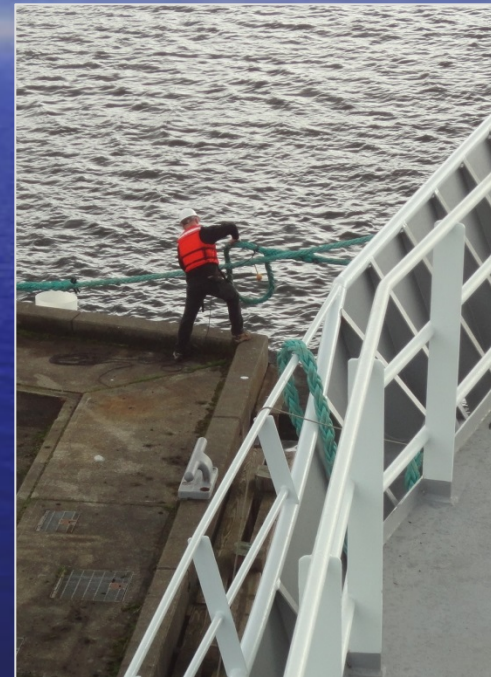
Congratulations!

Best Grub, Bilge & MOB winners



Naval Architects & Salvage Engineers

Best Line Handler Candidates:



Naval Architects & Salvage Engineers

Questions?



NAVAL ARCHITECTS
SALVAGE ENGINEERS

The sea-going naval architects.

34 Water Street
Mystic, CT 06355 USA
www.JMSnet.com

T. Blake Powell
PRESIDENT

860.536.0009 ext 14
860.536.9117 fax
860.662.2014 mobile
Blake@JMSnet.com



Naval Architects & Salvage Engineers