NATIONAL SCIENCE FOUNDATION
SHIP INSPECTION PROGRAM

2016 RVOC MEETING

JMS
NAVAL ARCHITECTS

Naval Architecture
Marine Engineering
Marine Surveying
Salvage Engineering

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.

Recently Completed

JMS
NAVAL ARCHITECTS

Naval Architecture
Marine Engineering
Marine Surveying
Salvage Engineering

Upcoming Inspections

JMS NAVAL ARCHITECTS

Naval Architecture
Marine Engineering
Marine Surveying
Salvage Engineering

RVSS Appendix A Compliance:

Appendix A compliance appears to be coming along well.

- Almost all vessels are in compliance at a safety factor of 5.0.
- However, a factor of safety of 5.0 does not meet mission requirements for many vessels, particularly if the calculation method in the Appendix is used (g=1.75).
- Some of the vessels are limited to a factor of safety of 5.0 by sheave diameters and grooving and will also be limited by roller diameters.
- The logging requirements for each tension member are more comprehensive than historically being maintained.
- Most recent revision contains additional requirements.
- Upcoming training seminars.

RVSS Appendix A Changes:

Extenuating Circumstance procedure (or plan, A.8.4).

- Most vessels have developed a draft of the a plan once they learn of the requirement during the inspections.
- RV Barnes developed initial plans for 4 emergency scenarios while overboarding science gear including: tension member in propeller, package stuck on the bottom, winch failure, **and loss of ship's power.**
- RV Sikuliaq started with winch/overboard handling system electronic failure (getting the gear aboard).

1. Tension Member in Screw
    a. All science party off aft deck.
    b. Notify bridge
    c. Drop Anchor
    d. Pay out wire
    e. Buoy Wire and cut if necessary
    f. Call Divers
2. Package Stuck on Bottom
    a. All science party off aft deck.
    b. Notify bridge
    c. Pay out wire
    d. Buoy Wire and cut if necessary
    e. Call Divers
3. Winch Faliure
    a. All science party off aft deck.
    b. Notify bridge
    c. Pay out wire
    d. Buoy Wire and cut if necessary
    e.
4. Loss of Ship Power
    a. All science party off aft deck.
    b. Notify bridge
    c. Pay out wire
    d. _____

RVSS Appendix A Changes:

These 2 items are evaluated during the inspections, but are not considered in the criteria for compliance. Identified as referenced in the Wire Pool Wire Maintenance Policy.

- Lubricate tension member <12 months (A.5.8)

  Lubricants must comply with EPA

- Fresh Water Wash (lesser of: end of cruise or < 1 month) (A.5.9)

JMS NAVAL ARCHITECTS

Naval Architecture
Marine Engineering
Marine Surveying
Salvage Engineering

RVSS Appendix A Changes:

- Log maximum payout and load for each cast by calculation or monitoring - **"payout" was added.**
- **It's also worth recording the payout where the** maximum load occurred. **If referenced from drum end, the location won't change** with cut backs.

Wire Deployment Log: RV Sikuliaq

Cruise ID	Cast ID	Duration (HH:MM)	Max Wire Out (m)	Max LineSpeed (m/min)	Max Tension (lbs)	Time (@ max tension)	WireOut (@ max tension)	Events
SKQ201401S	1	2:23	1,011.1	51.0	1,802.9	11/27/14 23:43	-4.9	CTD
SKQ201401S	2	2:00	1,000.9	51.0	1,843.0	12/1/14 19:18	-9.5	CTD
SKQ201401S	3	1:30	1,000.0	54.2	1,642.6	12/2/14 13:44	-9.8	CTD
SKQ201401S	4	0:50	252.6	58.1	1,602.6	12/2/14 15:48	217.2	CTD
SKQ201401S	5	0:55	293.0	61.2	2,003.2	12/3/14 23:07	-4.6	CTD
SKQ201401S	6	1:45	1,385.2	51.0	2,003.2	12/4/14 1:28	-6.5	CTD
SKQ201401S	7	1:20	1,489.9	60.9	1,682.7	12/4/14 2:34	-11.0	CTD
SKQ201401S	8	1:42	1,232.3	60.9	2,003.2	12/6/14 7:03	-5.5	CTD
SKQ201401S	9	2:29	1,477.0	61.6	2,003.2	12/9/14 8:18	-6.1	CTD & wire wash

RVSS Appendix A Changes:

- Updated Appendix A Assist Summary for Each Wire or Cable

Appendix A Assist Summary for Each Wire or Cable (updated 11_3_2015 JMS/wec)

Note: This is not all inclusive. See Appendix A RVSS Edition 10 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= ___	Comments
Post Cable/Wire SWL in clear view of the winch operator (RVSS 8.6)	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	
Lubricate tension member <12 months (A.5.8)					Y/N	
Fresh Water Wash (lesser of: end of cruise or < 1 month) (A.5.9)					Y/N	
Develop Extenuating Circumstance Procedure (A.8.4)	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 Tensiometer	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 refresh rate		Applies			Y/N	
Tensionometer display at operator's station with 10 Hz refresh rate			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						
Audible and visual tension alarms w/data logging Alarm at < ABL/2.8		Applies			Y/N	
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: Groves as close to d as possible and no more than 1.5d		Applies			Y/N	
Sheaves: Groves 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 yr			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 and payout for each cast by calculation or monitoring.	Applies	Applies	Applies	Applies	Y/N	
Winch Operator						
Operator deemed competant 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						

JMS NAVAL ARCHITECTS
Naval Architecture
Marine Engineering
Marine Surveying
Salvage Engineering

Common Findings: Sheave and Fairlead Roller Diameter

	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: Groves as close to d as possible and no more than 1.5d		Applies		
Sheaves: Groves 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

Older Levelwinds limit FS to 5.0

Common Findings: Maintaining Accuracy

.	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
Tension Monitoring				
Tension measuring system maintained with 4% accuracy		Applies		
Tension measuring system maintained with 3% accuracy			Applies	Applies

One common weak area is the concept of **"maintaining"** calibrations within 4% or 3% depending on the factor of safety selected. There is a need for a standard protocol that may be shared within the fleet.

RVSS Appendix B Compliance:

The BIG picture:

For inspected vessels:

The Overboard Handling System (OHS) should be designed, maintained, tested, and operated to be strong enough to part the tension member before the OHS fails.

For uninspected vessels:

The Overboard Handling System (OHS) should be designed, maintained, tested, and operated to be strong enough to part the tension member, weak link, or activate render before the OHS fails.

RVSS Appendix B Compliance:

UNITED STATES COAST GUARD
U.S. Department of Homeland Security

MARINE SAFETY ALERT

Assistant Commandant for Prevention Policy

June 20, 2012
Washington, DC

Alert 02-12

OVERLOADED LIFTING GEAR ON FISHING VESSELS

Recently, several catastrophic failures of masts, booms, and lift cables have occurred on purse seine fishing vessels that have resulted in loss of life and severe injuries. Over the years many casualties have occurred onboard all types of fishing vessels attempting to haul in catches that exceeded the capacity of their winches, hoists, and associated equipment. These types of casualties are not unusual. This alert serves to remind all purse seine fishing vessel owners/operators and other fishing segments to ensure safe use of the haul equipment particularly matching the size and the capacity of the nets to the rated size and capacity of the winch/haul/hoist equipment, taking into account safety factors for various species, and other concerns such as the variable platform that a rolling fishing vessel and variable catch presents.

Owners / operators, and vessel *Insurers* must ensure that vessel winch, haul and hoist systems are not modified by crew members to increase the lifting capacity beyond the rated design which in some cases can be done very easily. Such boosting of hydraulic systems must be prohibited and certain components should be protected with special seals. The machinery should be properly maintained and records kept in a historical log. It is imperative that owners / operators ensure every load bearing structure and its associated components are maintained in original condition, that they will be operated as designed using all appropriate safety margins for anticipated working conditions. All such equipment will experience fatigue over time and as result must be inspected and monitored routinely. Bearings, limit switches, brakes, safety devices, sheaves, cables and other components, should be routinely inspected by certified organizations.

Overloaded Lifting Gear:

Several catastrophic failures of masts, booms, and lift cables have occurred on vessels that have resulted in loss of life and severe injuries.

The Coast Guard strongly recommends:

* Know the design limits of load bearing structures and winches, hoist, and haul components;
* Ensure they are inspected and tested on a regular basis;
* Evaluate and revise operational procedures as needed.

RVSS Appendix B Compliance:

Although vessels are making progress toward compliance with Appendix B, we have yet to see a complete package for an entire overboarding handling system.

- Many Maximum Capability Documents (MCDs) completed.
- Next step for these vessels: Develop the:

  Overboard Handling System Operator's Manual

  Supported by Component Booklets.
- Assist sheets are available for the system level and component level.
- Compliance July 2016.

RVSS Appendix B Compliance:

Appendix B contains the following aspects of overboard handling systems:

- System and component descriptions *
- Operational procedures *
- Maintenance procedures *
- Structural analysis (typically requires original design documentation or expert help)
- Testing (may require expert help)

* Typically can be accomplished from shipboard experience and manuals (no need to wait for experts).

RVSS Appendix B Changes:

- Revised Appendix B provides some clarity.
- Appendix A and B are better aligned.
- Almost all documentation accomplished for the previous version of Appendix B will be useful in the new version.
- The exception is emergency OHS procedures are not specifically retained in the new version, but extenuating circumstances has now been added in Appendix A.

RVSS Appendix B Changes:

- A MCD can be established by testing for some existing equipment where: SWT<Test load/1.5.
- We have not seen the testing in lieu of calculation option in the newest edition of the RVSS used yet in inspections since the RVSS release (July 2015), but this could be a big benefit to older uninspected vessels.
- Some testing frequencies have been decreased.
- If components are not used as part of a OHS system then Appendix B does not require testing.
- OHS manual is not required for OHS systems containing portable **"temporary use" components.**

Best Practices: Safety Brief

More than just a preunderway safety brief is needed!

- Welcome aboard
- Safety Brief
  - Pre underway is best
- 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

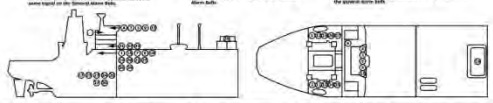
Best Practices: Muster List

F1270 – 97 (2013)

MUSTER LIST

GENERAL INSTRUCTIONS

FIRE AND EMERGENCY STATIONS



Designation: F1270 – 97 (Reapproved 2013)

An American Natio

Standard Practice for Preparing and Locating Emergency Muster Lists[1]

This standard is issued under the fixed designation F1270; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

INTRODUCTION

Title 33 and Title 46 of the Code of Federal Regulations (CFR) and the Safety of Life at Sea Convention (SOLAS) contain requirements for muster lists. Emergency muster lists are required to be on board tank vessels, passenger vessels, cargo vessels, oceanographic research vessels, nautical school ships, mobile offshore drilling units (MODUs), and outer continental shelf (OCS) facilities other than MODUs. This practice is a consolidated source for muster list requirements, combining requirements from all of the subparts of the Code of Federal Regulations listed above and SOLAS 1974 as amended through 1996.

Emergency Muster Plan

Crew Position	Alarm Dismissal 3 short signals on ship's whistle followed by the same signal as general alarm.	Fire Alarm Continuous signal for 10 seconds on ship's whistle followed by continuous signal on general alarm.	Man Overboard 3 long signals 4 times on ship's whistle followed by the same signal on general alarm.	Flooding Continuous signal for 10 seconds on the ship's whistle followed by continuous signal on general alarm.	Abandon Ship 7 short signals and one long on ship's whistle followed by the same signal on general alarm.
Master	In charge on the bridge	In charge on the bridge	In charge on the bridge	In charge on the bridge	In charge starboard raft
First Mate	In charge on the scene	Winch operator	In charge of damage control team	In charge port raft, distress signals	
Second Mate	Nozzle man	First aid, ladder	Damage control team	EPIRB, radio starboard raft	
Engineer	Shut vents	Pointer recovery	Damage control team	Deploy starboard raft	
Marine Technician	Hose man	Rescue swimmer	Damage control team	Release RHIB, deploy port raft	
Chief Scientist	Muster science crew, assist engineer	Muster science crew, bring blanket	Muster science crew	Muster science crew aft deck, port raft	
Scientists Cabins 1, 3 and 5	Muster aft deck, starboard side.	Muster aft deck, starboard side	Muster aft deck, starboard side	Muster aft deck, starboard raft	
Scientists Cabins 2 and 4	Muster aft deck, port side	Muster aft deck, port side	Muster aft deck, port side	Muster aft deck, port raft	

Emergency Station Assignments

- Life Raft Embarkation - Aft deck, starboard and port sides
- Immersion Suit Locations - In the dry lab and wheel house
- Life Jacket Locations - In each cabin and on the Aft deck to your right when exiting the dry lab.
- Debarkation Ladder

When alarm sounds, report immediately to your assigned assembly station, fully dressed with life jacket on.
STB side cabins muster on STB side. P side cabins muster on P side.
In case of abandon ship alarm, you should also bring an immersion suit in hand.

Muster Station Locations

JMS NAVAL ARCHITECTS

Naval Architecture
Marine Engineering
Marine Surveying
Salvage Engineering

Best Practices: Realistic Drills

JMS
NAVAL ARCHITECTS

Naval Architecture
Marine Engineering
Marine Surveying
Salvage Engineering

Areas for Improvement:

- Realistic means to recover a MOB
- Lithium Battery policies and procedures
- VGP compliance and use of Environmentally Acceptable Lubricants. Annual Report must identify the complete brand names of EALs used. The vessel should also maintain a copy of certificates and technical data sheets for each EAL. Applies to wire rope.
- Full compliance with Appendix A & B.

Congratulations!
Fastest MOB Recovery, Best Grub & Cleanest Bilge Winners

JMS NAVAL ARCHITECTS

Naval Architecture
Marine Engineering
Marine Surveying
Salvage Engineering

Questions?

JMS
NAVAL ARCHITECTS

Naval Architecture
Marine Engineering
Marine Surveying
Salvage Engineering