NATIONAL SCIENCE FOUNDATION
SHIP INSPECTION PROGRAM

2018 RVOC MEETING

JMS NAVAL ARCHITECTS
Naval Architecture
Marine Engineering
Marine Surveying
Salvage Engineering

NSF Ship Inspection Program: Purpose

The Ship Inspection Program constitutes both a “condition” and “assistance” survey to ensure overall safety and operational effectiveness in support of oceanographic research. The program objectives are to ensure that:

- The vessels are compliant with the University-National Oceanographic Laboratory System (UNOLS) *Research Vessel Safety Standards* (RVSS) and applicable regulatory requirements;
- The vessels are being properly maintained as a capital asset when compared with other similar vessels within the Academic Research Fleet based on a standardized NSF evaluation system;
- The vessels are capable of effectively conducting NSF-sponsored research cruises. In particular, that the scientific equipment and systems are both fully operational and state-of-the-art with those being utilized within the scientific community and industry; and
- The vessel operators are able to effectively pursue a continuous maintenance and improvement program.

The inspections also provide NSF with current information and documentation that assists in developing funding objectives for maintaining the vessels and the scientific equipment in a high degree of operational readiness to meet oceanographic research objectives.

Recently Completed

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Upcoming Inspections

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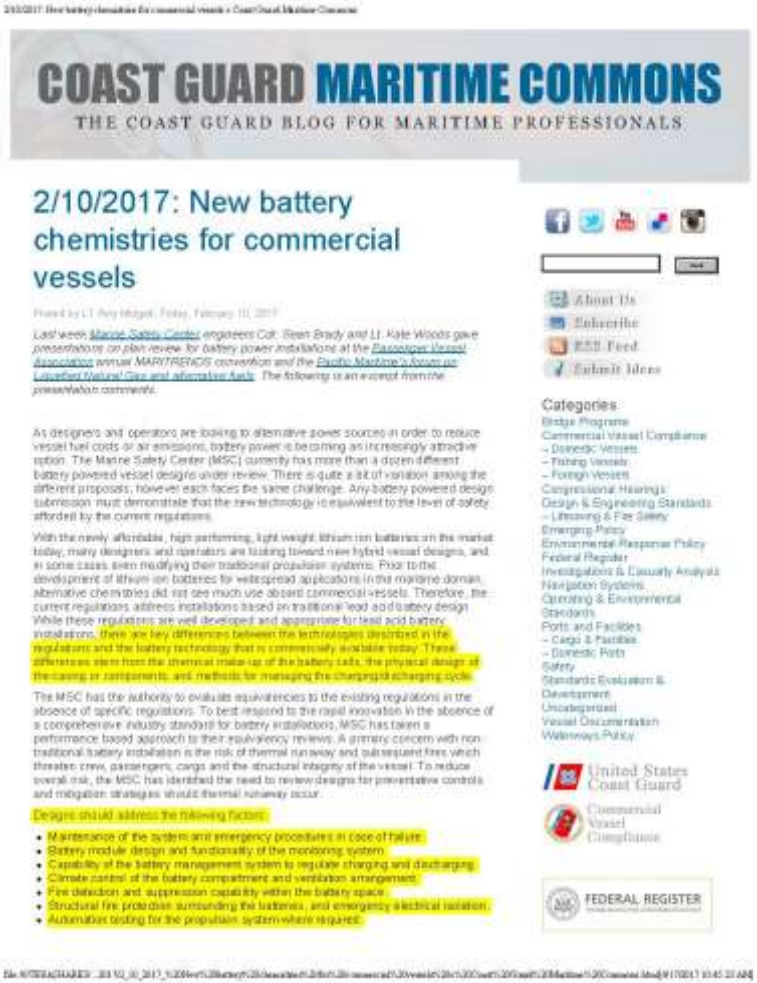
New Policies, Best Practices & Areas for Improvement:

- Lithium Battery policies and procedures
- Appendix A areas for improvement
- New Appendix B Overboard Handling Systems
- Use of Environmentally Acceptable Lubricants and Fluids. VGP 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.
- Effective safety briefs

Best Practices: Lithium Batteries



COAST GUARD MARITIME COMMONS

THE COAST GUARD BLOG FOR MARITIME PROFESSIONALS

2/10/2017: New battery chemistries for commercial vessels

Last week Marine Safety Center engineers Cdr. Sean Brady and Lt. Kate Woods gave presentations on plan review for battery power installations at the Passenger Vessel Association annual MARITREMDS convention and the Pacific Maritime's forum on Liquefied Natural Gas and alternative fuels. The following is an excerpt from the presentation comments:

As designers and operators are looking to alternative power sources in order to reduce vessel fuel costs or air emissions, battery power is becoming an increasingly attractive option. The Marine Safety Center (MSC) currently has more than a dozen different battery powered vessel designs under review. There is quite a bit of variation among the different proposals, however each faces the same challenge. Any battery powered design submission must demonstrate that the new technology is equivalent to the level of safety afforded by the current regulations.

With the newly affordable, high performing, light weight lithium ion batteries on the market today, many designers and operators are looking toward new hybrid vessel designs, and in some cases even modifying their traditional propulsion systems. Prior to the development of lithium ion batteries for widespread applications in the maritime domain, alternative chemistries did not see much use aboard commercial vessels. Therefore, the current regulations address installations based on traditional lead acid battery design. While these regulations are well developed and appropriate for lead acid battery installations, there are key differences between the technologies described in the regulations and the battery technology that is commercially available today. These differences stem from the chemical make-up of the battery cells, the physical design of the casing or components, and methods for managing the charging/discharging cycle.

The MSC has the authority to evaluate equivalences to the existing regulations in the absence of specific regulations. To best respond to the rapid innovation in the absence of a comprehensive industry standard for battery installations, MSC has taken a performance based approach to their equivalency reviews. A primary concern with non-traditional battery installation is the risk of thermal runaway and subsequent fires which threaten crew, passengers, cargo and the structural integrity of the vessel. To reduce overall risk, the MSC has identified the need to review designs for preventative controls and mitigation strategies should thermal runaway occur.

Designs should address the following factors:

- Maintenance of the system and emergency procedures in case of failure
- Battery module design and functionality of the monitoring system
- Capability of the battery management system to regulate charging and discharging
- Climate control of the battery compartment and ventilation arrangement
- Fire detection and suppression capability within the battery space
- Structural fire protection surrounding the batteries, and emergency electrical isolation
- Automation testing for the propulsion system where required

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Policy should account for:

- Maintenance/handling of the system and emergency procedures in case of failure.
- Fire detection and suppression capability.
- Climate control of the battery compartment and ventilation arrangement.
- Structural fire protection surrounding the batteries.
- Battery module design and functionality of the monitoring system.
- Capability of the battery management system to regulate charging and discharging.

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Appendix A:
Most Common Findings

- Extenuating Circumstances Plan (SOP). *Operators shall develop a procedure on how, and under what circumstances, the vessel will safely continue operations in the event the operating requirements are not met*.
- Procedures to test audible, visual and automatic recording of tension alarms;
- Procedures to maintain the tension monitoring system within 3% tolerance limits;
- Formal operator training and certification renewed annually so that each operator receives training on the winch, the overboarding apparatus, and the tension monitoring system;
- Visible and physical danger areas on the aft deck and overboarding areas to secure the areas during operation.

Overboard Handling Systems:

New and improved Appendix B

The BIG picture :

The Overboard Handling System (OHS) should be designed to withstand and operate in excess of the breaking strength of the strongest section of tension member to be used in any condition of loading with an appropriate factor of safety.

- Understand the design limits of load bearing structures, winches, wires, cranes and frames;
- Ensure appropriate operational procedures are in place to mitigate risk;
- Ensure the load handling systems are inspected and tested on a regular basis.

Best Practices: Environmentally Acceptable Lubricants [EAL]

- All vessels (not only new vessels) must use environmentally acceptable lubricants (EALs) in all oil-to-sea interfaces, unless technically not feasible.
- EPA defines EALs as lubricants that are “biodegradable” and “minimally-toxic” and are “not bioaccumulative”.
- The vessel’s 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.
- EALs are only mandated for use in specific oil-to-sea interfaces. Vessels are not required to change to an EAL for above deck equipment, but EPA strongly encourages the use.

Oil-to-Sea Interfaces include:

- Controllable pitch propeller
- Thrusters
- Stern tubes
- Thruster bearings
- Stabilizers
- Rudder bearings (excluding head bearing)
- Azimuth thrusters
- Wire rope
- Mechanical equipment subject to immersion (including dredges and grabs)

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Best Practices: Safety Orientation

It's more than just a preunderway briefing

- Welcome aboard handout
  - ATLANTIS
- Reinforce in the Cruise Planning Manual, ship's web site, in labs and in staterooms
- Ship-specific safety information
  - Use ship photos, PowerPoint or videos
  - ATLANTIC EXPLORER, SALLY RIDE, PELICAN
- Safety Brief
  - Pre underway is best
  - Provide information prior to cruise
  - Keep it Real! One of the biggest criticisms of safety briefs is that it can sometimes feel a abstract or unrealistic. One of the best ways to combat that impression is to incorporate real life examples
  - If your brief sounds complacent, your audience's attitude towards safety will be complacent too

Safety:

Don’t let complacency ruin your cruise

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Congratulations!
Bilge, Grub & MOB Winners

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Questions?

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