

# Marine Safety Engineering



## A Note From The Director

Greetings! As with previous editions, this Newsletter highlights a few of our talented people, their organizations, their roles, and current activities. I hope you find it enjoyable and informative.

I recently travelled to China, where I met with their government's maritime safety authorities and spoke to a conference of maritime industry executives. A week later, I flew in the other direction to Sweden to speak at a conference of leaders of the maritime industry. By the time you read this, I will be in London heading up the U.S. delegation to the International Maritime Organization's (IMO) Marine Environmental Protection Committee (MEPC). There, we will discuss standards for a wide range of issues, including ship safety and pollution prevention in the polar regions, ballast water discharge standards, air emissions from ships, ship recycling, reduction of underwater noise from ships, and the identification of particularly Sensitive Sea Areas around the world, to name a few.



A common theme I see in my travels is that people representing industry and other governments around the globe continue to view the United States as a key player in marine safety, maritime security and environmental protection. In doing so, they recognize the leading role the U.S. Coast Guard plays in the development of international standards. This includes standards for transporting people and goods in the frigid, remote and pristine Arctic environment; for cruise ship stability, fire safety, and lifesaving equipment; for improvements in air quality via reduction of sulfur dioxide and nitrous oxide in ships' exhaust emissions; for enhancements to water quality through the reduction of invasive species transported in ballast water; and, for innovative ship propulsion systems that use Liquefied Natural Gas as fuel. These are just a few of the issues in our world of work that are currently being addressed on an international level.

Coast Guard Marine Safety Engineers are central to the success of this international work. The Service relies on our "techies" to keep us on the cutting edge of maritime sector innovations, developing U.S. policy to address new developments in shipping. Fortunately, this challenging work attracts a steady stream of new talent to our ranks. The MSE "Class of 2013" is 17 strong and will be joining us after completing their postgraduate studies in a wide range of engineering disciplines at 11 different leading colleges and universities. To those who are inbound, "Welcome Aboard"! To our departing personnel, I thank you for your dedicated service, applaud your many outstanding achievements, and wish you and your families the best in your next assignment!

Regards,

Jeff Lantz,  
*Director of Commercial Regulations and Standards*

## MSC Technical Field Support: Taking the Technical Game to the Field...Again!

by LT Zach Robertson, Master's Degree in Mechanical Engineering



LT Robertson inspecting a fire-damaged turbocharger aboard CARNIVAL TRIUMPH.

The Coast Guard Marine Safety Center (MSC) is responsible for reviewing and approving design plans for commercial vessels regulated by the Coast Guard. Additionally, the MSC provides technical support to the field, including salvage engineering response, automation testing, and fire investigation assistance. Over the past few months, the MSC assisted in several high-profile field activities.

LT Zach Robertson, a Mechanical Engineer assigned to MSC's Machinery Branch, recently deployed to Sector Mobile and joined the Coast Guard team investigating a fire onboard the Carnival cruise ship TRIUMPH. After meeting TRIUMPH underway, LT Robertson collected physical and digital evidence and participated in depositions of the crew's engineering department. His engineering experience and technical expertise assisted the investigation team with the identification of the probable cause and the initial assessment of the performance of the fire detection, containment and suppression systems.

When the arctic mobile offshore drilling rig KULLUK parted her towline and ran hard aground on Sitkalidak Island, AK, MSC dispatched two naval architects to assist. LT Jarred Hinton initially deployed to the Incident Command Post (ICP) in Anchorage, where he served as a Technical Advisor to the Federal On-Scene Coordinator before heading to a remote command post in Kodiak, close to the scene. LT Matthew Sexton arrived in Anchorage and took over the Technical Advisor role. He and LT Hinton worked closely together with commercial salvage engineers to develop a plan to refloat the grounded vessel. Once KULLUK was refloated, LT Hinton assisted with the on board damage survey to evaluate the vessel's structural and watertight integrity. They were supported by other members of MSC's Salvage Engineering Response Team (SERT), who created detailed computer models and simulated damage scenarios. This combination of on-scene and remote engineering technical support helped ensure the safe and successful refloating of the damaged rig.



Arctic mobile offshore drilling rig KULLUK, aground on Sitkalidak Island, AK.

When Sector San Diego sought technical assistance with automation testing as part of its inspection of the Military Sealift Command's MLP-1 propulsion system, the MSC provided two engineers from the Electrical Branch to assist -- LT Andre Douglas and Mr. David O'Donnell. Working with San Diego inspectors, NASSCO engineers, ABS Surveyors, and GE contractors, they were able to assist in the verification of the ship's Design Verification and Periodic Safety Test Procedures to ensure the vessel's automated vital systems provide a level of safety equivalent to that of similar systems under direct manual control.

Postgraduate Education  
Season for AY 2014

Do you know an officer who would be a good candidate for the Marine Engineering, Fire Protection Engineering, Chemical Engineering, Mechanical Engineering, or Electrical Power & Controls Engineering Advanced Education Programs? Encourage them to apply and earn their post-graduate degree under the Marine Safety Engineering program!

This year, the Marine Safety Engineering Advanced Education program will select 7 officers to attend graduate school to earn Master of Science degrees in a variety of disciplines, including:

- Marine Engineering
- Naval Architecture
- Ocean Engineering

Additionally, one officer will be selected to earn a Master of Science degree in each discipline below:

- Chemical Engineering
- Fire Protection Engineering
- Electrical Power & Controls Engineering
- Mechanical Engineering

Interested officers may check the following links for more information or contact the Marine Safety Engineering Program Manager.

[Advanced Education Opportunities](#)

[OPM-1 Post Graduate Information](#)

Marine Safety Engineering Program Manager:  
LT Amy Harman

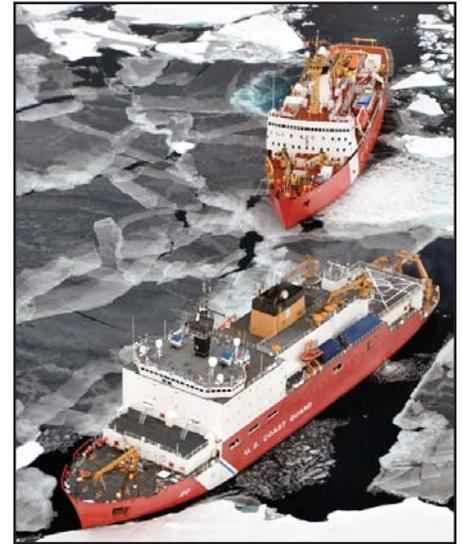
IMO Polar Code Development

By LT Andrew Gibbons, Master's Degree in Naval Architecture and Mechanical Engineering

Maritime shipping associated with tourism and the development of natural resources in Arctic and Antarctic waters has increased in recent years. This trend is expected to continue due to longer summer sea ice conditions, as a new summertime minimum for Arctic ice cover was recorded in September 2012. While vessel traffic is expected to increase at both poles, international and national regulatory bodies recognize that these areas still present significant hazards for the maritime industry and warrant particular regulatory consideration.

The International Maritime Organization (IMO) developed guidelines for ships operating in polar waters in 2010 and is working on a mandatory code expected to be complete in 2014. The Coast Guard's Office of Design and Engineering Standards is currently leading national efforts to develop the mandatory Polar Code. This code will contain ship specific safety and environmental protection requirements applicable to all SOLAS ships operating in polar waters and will be implemented via SOLAS and MARPOL amendments as well as other applicable Conventions.

Hazards in polar regions include ice cover, heavy weather, low temperatures, limited readily available resources, reduced communications coverage, and a lack of hydrographic information. In addition, lower temperatures reduce decomposition rates of operational discharges in ecosystems that have been minimally affected by shipping traffic to date. The unique environmental conditions coupled with a challenging operating area require Marine



**The Canadian Coast Guard Ship LOUIS S. ST-LAURENT makes an approach to CGC HEALY in the Arctic Ocean. The two ships were taking part in a multi-year, multi-agency Arctic survey to help define the North American continental shelf.**



**CGC WILLOW transits Nares Strait with a Danish naval vessel in the background.**

Safety Engineers to research and develop novel international standards across a broad spectrum of engineering disciplines.

Marine Safety Engineers coordinate between various Coast Guard offices as well as interagency representatives in the State Department, DOD, EPA, NSF, and NOAA. Recent work has focused on new discharge requirements under MARPOL Annexes I (oily mixtures), IV (sewage), and V (garbage) as well as researching the feasibility and long term cold water performance of water-based and non-toxic biodegradable through hull lubricants. These efforts were aided by a U.S. organized international workshop for the Arctic nations resulting in a joint submission to the IMO Ship Design and Equipment Sub-Committee (DE). This submission was accepted as a base document for future work in the Polar Code. Additional emphasis will evaluate adequate design, testing, and operational temperatures of ship systems in addition to analyzing ship structural design standards.

## Where Are They Now? LCDR Robert Compher

By LT Meghan Sinclair, Master's Degree in Mechanical Engineering



**LCDR Robert Compher**  
**M.S. Naval Architecture & Marine**  
**Engineering,**  
**M.S. Industrial & Operations Engineering.**

**“MSEs are in high demand. We need folks with strong technical skills at all levels of the organization.”**

**MSE:** *Congratulations on your current assignment to the U.S. Naval War College. Can you provide us with a background of your career so far and how it led you to the U.S. Naval War College?*

**RC:** I graduated from CGA with a degree in Civil Engineering, and I was assigned as a student engineer on the CGC DAUNTLESS for my first tour. I was then assigned to MSU Galveston, where I gained experience and qualifications in pollution, foreign and domestic vessel inspections, and finished my tour as a Senior Investigating Officer. Under the Marine Engineering postgraduate program, I earned dual masters degrees in Naval Architecture and Marine Engineering and Industrial and Operations Engineering at the University of Michigan. Following grad school, I was assigned to the Marine Safety Center (MSC). After MSC, I was the Commanding Officer at MSU Lake Charles. Currently, I am at the Naval War College, pursuing an MA in National Security and Strategic Studies, and I will transfer this summer to U.S. Northern Command to be the Maritime and Arctic Exercise Branch Chief.

**MSE:** *How do you think becoming a Marine Safety Engineer has helped or hindered your career?*

**RC:** It has absolutely helped it. We get a tremendous amount of respect within the Prevention community and among industry professionals for having these technical skills, which are limited throughout much of the Marine Safety workforce. I have been involved in many discussions regarding the right time to pursue the Marine Engineering post graduate program. I had a prevention field tour prior to grad school. There were some definite advantages to having this field knowledge once I got to my payback tour. However, there are many other examples of officers who went straight to grad school with no prevention field experience, and they have done remarkably well too. These individuals have the advantage of getting into the field with MSE credentials at the O-3 level. The bottom line is that it really doesn't matter all that much. MSEs are in high demand. We need folks with strong technical skills at all levels of the organization.

**MSE:** *What has been the most enjoyable aspect of your Coast Guard career so far?*

**RC:** I absolutely loved my four years at the MSC in the Small Vessel branch and as a member of SERT. I had the opportunity to deploy on some big salvage cases – the COUGAR ACE RoRo capsizing, the flooding of the TONG CHENG, and Hurricane Katrina. These cases were technically challenging and really highlighted the benefit MSEs bring to the field and incident command staffs. The thing I miss most about MSC is the technical discussions and debates that occurred daily within the bullpen.

**MSE:** *What advice would you offer to junior officers entering the MSE community?*

**RC:** Continuously challenge yourself and seek out opportunities to expand your base of engineering knowledge and experience. Professional society memberships, participation in conferences, and TAD training and schools are all good places to start. Learn as much about the maritime industry as you can. Pursue PE licensure in your engineering field. This greatly enhances your credibility with industry professionals. Being a Marine Safety Engineer is challenging work, but very rewarding.

**MSE:** *Thank you so much for your time. Do you have any closing thoughts?*

**RC:** The MSE community is a great place to be. I take a lot of pride in my “techie” credentials, and I am fortunate to be a part of this tremendous group of officers and civilians.

**MSEs: Where are they going?**  
**By LT Amy Harman,**  
**Master's Degree in Ocean Engineering**

Every year, Marine Safety Engineers are sent to the field after developing technical knowledge and expertise attained while assigned to the Coast Guard Headquarter's Office of Design & Engineering Standards and the Marine Safety Center. Their hard work and dedication at one of the most intellectually-challenging tours pays off as they are sent to fill high-profile Prevention positions throughout the world. Take a look below to see where our MSEs are headed:

CDR Scott Kelly  
 Prevention Dept Head  
 SEC Baltimore

LCDR Ron Caputo  
 Prevention Dept Head  
 SEC Sault Saint Marie

LCDR Heather Mattern  
 Chief, Inspection Div  
 SEC New York

LCDR Latasha Pennant  
 Baltimore Asset Project Office

LT Beth Newton  
 Inspection Div  
 SEC New York

LT Al Giordano  
 Inspection Div  
 SEC Houston

LT Sean Peterson  
 Inspection Div  
 Activities Europe

LCDR Mark Neeland  
 Supervisor, MIDET Singapore

LT Joe Morgans  
 MSFO Lafayette

LT Judson Wheeler  
 Inspection Div  
 SEC New Orleans

LT Nick Woessner  
 Inspection Div  
 SEC Delaware Bay

LT Tony Cao  
 Inspection Div  
 SEC LA/LB

**Engineer in the Spotlight: LT Andre Douglas**

By LT Brian Meadowcroft, Master's Degree in Electrical Engineering

LT Andre Douglas is an engineer in the Marine Safety Center's Electrical Branch. He graduated from the Coast Guard Academy with a degree in Mechanical Engineering in 2008. As an Engineering Officer in Training (EOIT) aboard the USCGC VILGILANT, LT Douglas began to



**LT Douglas aboard MLP-1 during generator automation testing.**

understand the complexities of electrical engineering while serving as the Electrical Division Officer during two emergency replacements of ship's service generators, and as an inspector during VILGILANT's life extending the Mission Effectiveness Project.

LT Douglas received dual Masters of Science in Engineering (MSE) degrees in Naval Architecture and Marine Engineering (NAME) and Mechanical Engineering (ME) from the University of Michigan through the Marine Safety Engineering post graduate education program.

Both degrees focused on structures, leading him to complete research into crack propagation in structural aluminum and steel plating and the effectiveness of repairs using a carbon fiber and adhesive mixture. While this repair method is common on interstate highway bridges, its application in the marine field is relatively new.

Upon graduation in 2012, LT Douglas' initial assignment was to the Electrical Branch. Andre quickly qualified in T-boat and barge plan review, and then focused on the more challenging aspects of electrical work, such as design verification testing procedures (DVTPs) of automated shipboard control systems. Recently, he and a senior MSC electrical engineer assisted Sector San Diego with the automation testing of the Military Sealift Command's Mobile Landing Platform (MLP-1). In addition to plan review duties, he is pursuing qualification as a Salvage Engineering Response Team (SERT) member. Outside of work, LT Douglas enjoys mentoring and tutoring high school students at his local community center.

LT Douglas' training is far from over. This summer, as part of a program to expose officers to various aspects of MSC work, he will shift gears and work for the Small Passenger Vessel Branch reviewing hull construction and stability plans and, as a secondary responsibility, help field units mitigate emergent vessel casualty situations as a SERT member. When its time to move on, LT Douglas, like many MSC engineers before him, will be well positioned for success as a marine inspector. Marine Safety Engineers depart MSC with well-honed engineering skills and intimate familiarity with the design, construction and operation regulations that Marine Inspectors enforce.

## USCG Hazardous Materials Standards Division (CG-ENG-5)

By Patrick Keffler, Chemical Engineering Subject Matter Expert



**From left to right: Patrick Keffler, LT Jodi Min, LT Elizabeth Newton, Amy Parker, Cynthia Znati, and CDR Luis Roldan.**

The Hazardous Materials Division is the most recent addition to the Office of Design and Engineering Standards and is responsible for developing and maintaining regulations and standards related to the carriage and handling of hazardous materials by vessel. They provide technical expertise and support to the Commandant, Coast Guard units, U.S. Governmental agencies, other national governments, industry and the public. In addition, they represent the U.S. at the International Maritime Organization (IMO). The Division is comprised of three teams: (1) Bulk Liquids and Gases; (2) Packaged Hazmat and Bulk Solid Cargoes; and (3) Vapor Control Systems (VCS).

The Bulk Liquids and Gases Team is responsible for classifying cargoes, determining their compatibility with other bulk liquids, and developing carriage standards for tankships, tank barges and offshore supply vessels. They attend the BLG Subcommittee meetings at IMO to represent the U.S. position on the development of the International Chemical Carrier Code (IBC), the International Gas Carrier Code (IGC), the classification of cargoes under tripartite agreements, and the development of international standards for offshore supply vessels that carry noxious liquid substances. They also support spill response by developing the OPA 90 oil and oil-like cargoes list, and maintaining the Chemical Hazards Response Information System (CHRIS) Manual.

The Packaged Hazardous Materials and Solid Bulk Cargoes Team develops standards for transport of hazardous material and bulk cargoes. The team reviews and processes special permit and exemption requests, drafts competent authority approvals, and coordinates with DOT Pipeline and Hazardous Materials Safety Administration (PHMSA) on areas of common interest. Additionally, the team represents the U.S. at the IMO's Dangerous Goods, Solid cargoes and Containers (DSC) Subcommittee, where it assists with the development of both the International Maritime Dangerous Goods Code (IMDG) and International Maritime Solid Bulk Cargoes Code (IMSBC). Team members also participate in the Transportation Research Board Committee on the Transportation of Hazardous Materials and the Hazardous Materials Cooperative Research Program.

The Vapor Control Systems Team develops standards and makes policy determinations for marine vapor control systems. They also process VCS applications, provide guidance to certifying entities, and review facility certification reports.

## Managing the Ship Structure Committee

By LCDR Ron Caputo, Master's Degree in Fire Protection Engineering

The Ship Structure Committee (SSC) is an interagency organization that supports the active pursuit of applied research and technology development in order to identify and resolve knowledge gaps in the design, fabrication, maintenance and inspection of marine structures. Formed in 1943 with a charter to determine the causes of the brittle fracture experienced by welded merchant ships, its membership has grown from the five original organizations, those being the American Bureau of Shipping, the U.S. Coast Guard, the U.S. Maritime Administration, the U.S. Military Sealift Command, and the U.S. Naval Sea System Command, to now include the Office of Naval Research, the Defense Research and Development Canada,

## ASME / USCG Workshop

By LCDR Ken Hettler

On July 24-25, 2013, the Systems Engineering Division (CG-ENG-3) and the American Society of Mechanical Engineers (ASME) will host the next session of the ASME/USCG Marine Technology and Standards Workshop in Arlington, VA. The workshop exemplifies the Coast Guard's Office of Design and Engineering Standards (CG-ENG) fundamental role in voluntary consensus standards development and industry outreach. This event provides a unique opportunity for classification societies, industry groups, standards development organizations, government agencies, and other interested members of the public to come together for a professional exchange of information.

Workshop topics range from advances in new technologies and their impacts on the marine industry, to coverage in related codes, standards and federal regulations. For more information about the workshop, visit:

[www.uscg.mil/marine\\_event](http://www.uscg.mil/marine_event).

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If you have any comments about this e-newsletter, or would like to contribute an article to an upcoming edition, please contact LT Amy Harman:

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(202) 372-1364



Example of a USCG-approved PFD.

## Managing the Ship Structure Committee (cont.)

Transport Canada, and the Society of Naval Architects and Marine Engineers. All Principal Member Agencies are represented by their respective senior executives and contribute to strategic planning, funding, technical information sharing and exchange, together with providing technical management, review and approval of the SSC's projects.

The Executive Director position was established to manage research projects and fiscal needs, while administering daily operations. The SSC's mission is similar to the Coast Guard Marine Safety Program's mission -- to enhance the safety of life at sea and protect the marine environment -- with an emphasis on promoting technological and educational advancements in marine transportation. Thus, it is fitting that the Executive Director position is filled by a Marine Safety Engineer who holds a strong understanding of the marine safety program. The Executive Director guides the member agencies' directors toward fulfillment of the SSC's vision to eliminate marine structural failures. The position offers a unique opportunity to influence the research focus of the committee while also directing the daily administrative and fiscal tasks. Working with the Co-Chairmen, a Coast Guard admiral and a Navy admiral, and 10 Senior Executive Service members who sit as Principal Members on the SSC, the Executive Director manages research priorities coordinating multinational efforts to ensure the timely and effective completion of highly technical ship structures reports and investigations. The position is one way in which Marine Safety Engineers are given the opportunity to improve their leadership capabilities and interact with senior leadership of a multinational organization.

## Consolidated North American Lifejacket Standard

By Brandi Baldwin, Life Saving & Firefighting Subject Matter Expert

In support of an initiative of the U.S./Canadian Regulatory Cooperation Council (RCC) established last year by President Obama and Prime Minister Harper of Canada, the Lifesaving and Fire Safety Division (CG-ENG-4) is working with Transport Canada, PFD manufacturers, and test labs to develop a new "North American" standard for lifejacket (PFD) approval.

The goal of the RCC is to reduce impediments to U.S./Canadian trade. Today, U.S. Coast Guard approved lifejackets may not be acceptable in Canada (and vice versa) without duplicative testing and approval processes. Adoption of a consolidated North American standard for lifejacket approvals will address this problem. Moreover, because this new standard uses the ISO 12402 series of lifejacket standards as a baseline, U.S./Canadian approvals will more closely align with Europe, potentially expanding the market further. Boaters will benefit from simpler labels that group related information, simplify language, and use figures/pictograms instead of words, where possible.

Another improvement is replacement of the current "type" system (Types I, II, III, etc.), which has not been well understood by the boating public, particularly with the introduction of "conditionally approved" Type V PFDs (this term can mean a variety of things). CG-ENG-4 is working closely with Coast Guard boating safety and public affairs staff to ensure boaters are informed of this change. In addition, CG-ENG-4 is working with state boating law administrators to ensure coordination of state and federal boating regulations.

The new standard represents a shift from prescriptive to more performance based requirements, which should foster the development of innovative devices more likely to be worn by boaters. Significant changes include a reduction in allowable minimum buoyancy, which can accommodate more comfortable and stylish devices now popular in Europe; and criteria for inflatable devices for use by youths aged 13 and over, closing an important safety gap.