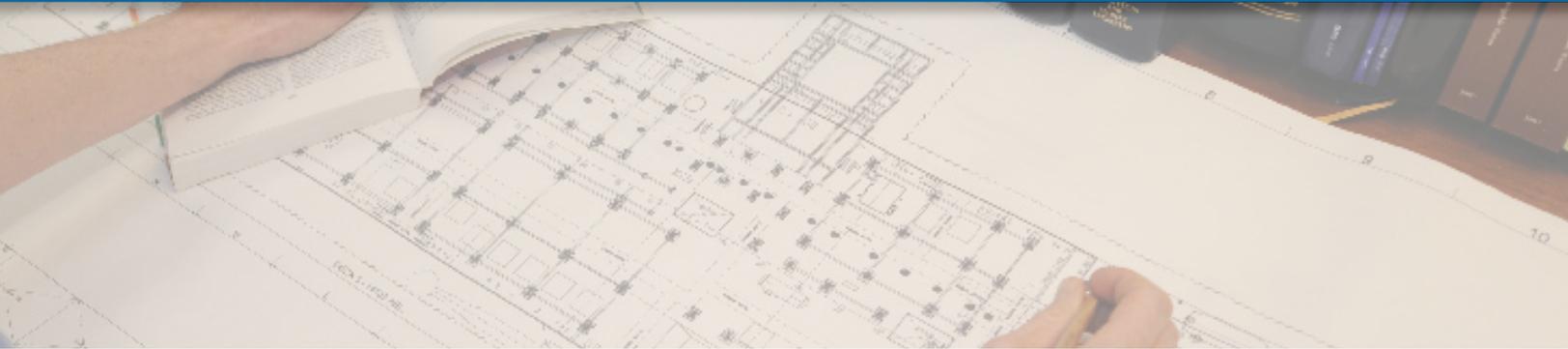


# Marine Safety Engineering



## A Note from the Director

Greetings and Welcome to the Spring 2011 edition of the Marine Safety Engineering Newsletter.

I believe you'll find this issue of the newsletter quite interesting, as it captures the efforts of Marine Safety Engineers responding to marine casualties. From dealing with complex offshore engineering issues, to participation in a Marine Board of Investigation and SERT team response actions, Marine Safety Engineers bring a wealth of knowledge, critical thinking and technical expertise to the Coast Guard. The articles in this issue provide a glimpse into some of the exceptional work Marine Safety Engineers are performing.

We also have an interesting article about the Coast Guard's involvement in the development of Industry Consensus standards. Marine Safety Engineers constantly utilize standards such as ASME, ASTM, ISO and many others. It is important to understand how and why these standards are developed.

From a regulatory standpoint, we continue to focus on, and are making great strides towards, the revision of regulations for the offshore industry. The offshore industry has gained a new level of visibility since the DEEPWATER HORIZON casualty, and we are doing our best to stay at the forefront of the technology in order to ensure safety on our waters.

Finally, I would like to congratulate the new Marine Safety Engineers who are graduating from our postgraduate programs this spring-Well done! We look forward to working with you here at Coast Guard Headquarters and the Marine Safety Center, and are eager to have you on board to contribute to many of the challenging technical projects currently underway or on the horizon. I would also like to say thank you to those of you who are tour complete and moving on to other assignments. It has been a pleasure to serve with you, and I wish you the best of luck in your future endeavors.

Thank you for your continued diligence and hard work. Each of you is proof that Marine Safety Engineering continues to be a premier community in the Coast Guard!

Regards,

Jeff Lantz,  
*Director of Commercial Regulations and Standards*



## Offshore Technology: Lessons from the Q4000

by CDR Josh Reynolds



CDR Josh Reynolds inspecting the failed generator head that caused the Q4000 to drift off-station

During the Deepwater Horizon incident, the Coast Guard naturally began to focus more on subsea oil spill prevention. While Congress and the media were primarily focused on BOEMRE and its role in blowout preventer oversight, the Coast Guard investigated how it oversees equally critical systems. Several related areas consistently came up: dynamic positioning (DP), automatic power management (APM) and emergency disconnect systems (EDS). The DP/APM system is critical to MODU station keeping while drilling in deep water because system failures may cause the MODU to drive or drift off station. Unless the EDS is properly deployed, this may damage the subsea risers and gear and result in a well spill.

In January, the HELIX Q4000, while attached to a well, had a generator failure that caused it to lose power, drift off station and deploy its EDS. While the EDS functioned properly and a subsea spill was averted, the DP/APM system had multiple problems. This system is designed so that a single component failure does not cause a MODU to lose power and position. Because the system did not function as designed, MSU Morgan City investigated the casualty with technical support from the Marine Safety Center's Dave O'Donnell and CG-521's CDR Josh Reynolds.

The investigation uncovered multiple areas for improvement for Coast Guard DP/APM system oversight. As it turned out, during required system testing in 2009, Q4000 identified this type of generator failure would cause the MODU to lose power and

position but did not correct the issue. Additionally, critical systems for communicating the EDS order did not function because they were either not hooked to back-up battery power or the batteries were dead.

In response to this and other critical system incidents, the Coast Guard is advancing policy and training for these critical systems as part of a coordinated effort that includes enhanced plan review, inspections and new regulatory standards. Because these systems are both highly complex and rapidly evolving, technical support by the Marine Safety Center and the Office of Design & Engineering Standards, including site visits and plan review, will be a key element to ensuring the safe operation of dynamic positioning systems.



Q4000 On Station in the Gulf of Mexico



EDS Communication Lights (not connected to emergency power)

## SERT Engineers On Scene: Davy Crockett

by LT Mark Neeland, Duty Officer, Salvage Engineering Response Team



Aerial view of the salvage operation

### CG-52 Receives U.S. Nomination for IMO Secretary General

The United States has nominated Mr. Jeffrey G. Lantz for the post of Secretary General of the International Maritime Organization (IMO) by means of a nomination letter dated February 10, 2011, from Secretary of State Hillary Clinton.

Currently the Director of Commercial Regulations and Standards, and a prior active-duty Marine Safety Engineer, Mr. Lantz brings to the job his long-standing experience that spans over 36 years as a military officer and as a government servant. He has spent more than a decade of service as the head of numerous United States delegations to IMO, including current IMO Council Chairman, giving him extensive experience in international relations.

Elections for the next Secretary-General of IMO will be held in June at the IMO Council meeting from 27 June to 1 July.

The Marine Safety Center's Salvage Engineering Response Team (SERT) is a group of highly trained naval architects who provide real time engineering support to Coast Guard field units during marine casualties. During fiscal year 2010, SERT assisted 31 different field units with 49 vessel casualties.

On January 27, 2011 the deck barge DAVY CROCKET, a converted Liberty ship, began leaking hydrocarbons into the Columbia River near Portland, OR. The owner had begun scrapping the barge by removing the deck and side shell near amidships. Coast Guard responders found the derelict vessel flooded, grounded, and buckled. The floating stern half of the vessel was only loosely connected with an unknown amount of effective structure holding it to the grounded bow section. When Sector Columbia River federalized the case, SERT took on the lead engineering role as a technical representative to the Incident Commander.

The immediate concern was to stabilize the stern section of the vessel to minimize pollution and impact on the waterway. SERT's detailed computer modeling indicated that the free surface in the ballasted compartments could potentially capsize the aft section if the midship structure were to completely fail. Such a failure would have endangered on scene personnel and threatened numerous bridges downstream. Based on SERT's recommendations, major changes were incorporated in the ballasting plan, mitigating risk. On February 3rd the stern section was successfully ballasted, significantly reducing the threat of catastrophic hull failure and pollution, while enabling salvage work to proceed in a safe manner. Sector Columbia River later received funding for the wreck removal and salvage operations continue.

In this case, in the absence of commercial salvage engineering services, SERT's naval architects took on a leadership role by conducting a sophisticated engineering analysis which led to a successful ballasting operation that stabilized the wreck. SERT's quick actions helped the Incident Command prevent a bad situation from getting much worse.

SERT has a naval architect on call 24 hours a day, 7 days a week. The duty officer can be reached at (202) 327-3985.



LT Mark Neeland observes ballast operations aboard the DAVY CROCKETT.

## ALASKA RANGER: Tragedy at Sea

by LT Al Giordano



CAPT John Nadeau presents the report of the Marine Board of Investigation



CDR Ben Hawkins and an NTSB investigator examine survival suits recovered from the ALASKA RANGER

On March 23, 2008, the 190 foot fishing trawler ALASKA RANGER sank off the coast of Dutch Harbor, Alaska, killing 5 crewmembers. A four-person Marine Board of Investigation (MBI) convened, including two senior Marine Safety Engineers. CAPT John Nadeau, current Chief of the Office of Design & Engineering Standards, and CDR Ben Hawkins, then Chief of the Human Element and Ship Design Division at Coast Guard Headquarters, were tasked to investigate the cause of this marine casualty.

CAPT Nadeau and CDR Hawkins have extensive marine technical backgrounds, including tours as naval architects at the Marine Safety Center (MSC) as well as the Office of Design & Engineering Standards. This experience was essential to the board's assessment of the ALASKA RANGER's complicated regulatory framework and long history of modifications. Their fundamental understanding of ship design and construction

allowed them to weave together witness reports with technical information about the vessel, and to reconstruct the chain of events leading to the casualty.

However, they were not the only engineers involved in this investigation. At the Board's request, the MSC's LT Brian Thomas conducted an independent analysis of the ALASKA RANGER's intact and damaged stability characteristics. This analysis uncovered problems with the vessel's stability test and evaluated multiple sinking scenarios. These scenarios assisted the Board, allowing them to validate witness testimony regarding the progression of flooding which ultimately sank the vessel.

The marine inspection, investigation, and Marine Safety Engineering experience these officers brought to the ALASKA RANGER investigation team provided the multi-disciplinary talent needed to identify the root cause and recommend actions to prevent similar events. The board's final report of investigation is available for download on [Homeport](#).

## BLG 15: Marine Safety Engineers At IMO

by LT Sean Peterson

The fifteenth session of the Bulk Liquids and Gases (BLG) Subcommittee met February 7 – 11, 2011, at IMO headquarters. CAPT John Nadeau, head of delegation, was accompanied by CDR Joshua Reynolds and LT Sean Peterson, all Marine Safety Engineers. Other members of the delegation included Mr. Tom Felleisen, Mr. Wayne Lundy, and Mr. Rich Everett, all civilian engineers at Coast Guard Headquarters.

BLG is the primary subcommittee for discussing international standards and issues related to the carriage of chemical cargoes, and representation by members from the Standards Directorate is crucial to retaining oversight of the ever-changing work in which IMO is involved. As the Head of Delegation, Captain Nadeau was ultimately responsible for ensuring all



## Post-Graduate Education Season for AY 2012

Do you know an Officer who would be a good candidate for the Marine Engineering, Fire Protection Engineering, Chemical Engineering, or Marine Engineering Technology Advanced Education Programs? Encourage them to apply and earn their post-graduate degree!

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

- Electrical Engineering
- Naval Architecture
- Marine Engineering
- Mechanical Engineering
- Ocean Engineering

Additionally, there will be one person selected for the Chemical Engineering program, as well as one person each for the Fire Protection Engineering and the Marine Engineering Technology programs.

Interested Officers may check the following links for more information

**[Marine Engineering, Fire Protection Engineering and Marine Engineering Technology](#)**

[ME, MET & FPE Program](#)  
Manager: LT Al Giordano

[Chemical Engineering Program](#)  
Manager: LT Beth Newton

**[OPM-1 Post Graduate Information](#)**

## BLG 15: Marine Safety Engineers at IMO (cont.)

U.S. objectives were met during the subcommittee meeting. He represented the U.S. during plenary by introducing all U.S. paper submittals, intervened on the behalf of the U.S. during discussions, and furthered U.S. goals through diplomacy.

Commander Reynolds, Chief of the Systems Engineering Division, represented the U.S. on the gas-fueled ship code drafting group, which was one of the higher visibility work items. The subcommittee worked on development of the gas-fueled ships code, review of the International Gas Carrier Code, and harmonization of these two codes. Lieutenant Peterson represented the U.S. on the Evaluation of Safety and Pollution hazards of Chemicals working group. Beyond the normal role of evaluating new chemicals, the group finalized the guidelines for the carriage of blends of petroleum oil and bio-fuels, and evaluated a number of tank cleaning additives. Lieutenant Peterson reviewed 109 cleaning additives for IMO approval as part of that sub-group.

## Engineer in the Spotlight: CDR Wayne Arguin

by LT Al Giordano

This edition's Engineer in the Spotlight is CDR Wayne Arguin, Chief of the Hull Division at the Marine Safety Center.

MSEN: Congratulations on your current assignment! Can you provide us with a snapshot of your career thus far and how it led to your current position?

WA: I graduated from CGA in 1992 with a degree in Naval Architecture, and my first tour was onboard HARRIET LANE as a student engineer. From there, I went to my first Marine Safety tour as an inspector trainee at Sector Hampton Roads, where I earned some of my major qualifications. My next stop was in Tampa, as a Port State inspector. Following that, I got the chance to go to Michigan for postgraduate school, and earned my graduate degree in Naval Architecture and Marine Engineering. Following grad school, I did my first tour at Headquarters in what is now CG-5211, working on topics like risk management and novel craft. After Headquarters, I did one year as the XO at MSO Memphis, and then became the Chief of Prevention at Sector Lower Mississippi River when that unit was created. Then I transferred to the DCO-A staff for two years, which was one of my most challenging assignments to date. Between then and now, I also spent time as the DEEPWATER HORIZON Staff Director at the NIC.



**CDR Wayne Arguin, Chief of Hull Division at the Marine Safety Center**

MSEN: Quite the colorful career. As a Marine Safety Engineer, can you explain how your degree helped shape your career path?

WA: I had always intended to pursue a postgraduate education. Long term, it seemed like a practical idea for continued professional growth. One of the biggest benefits to a postgraduate education is the fact that it teaches you how to think analytically about a problem, understand

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## Marine Safety Engineering Involvement In New Offshore Advisory Committee

Recently, two Marine Safety Engineers were asked to become involved with a new committee dedicated to improving the safety of the offshore industry. RADM Roy Nash and CAPT Patrick Little are currently serving on the Ocean Energy Safety Advisory Committee (OESAC).

This Committee consists of members of government, industry and academia, who will advise the Secretary of the Interior, through the Director of the Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE) on matters and actions relating to offshore energy safety, including drilling and workplace safety, blowout containment and spill response.

The Committee will initially focus its efforts on the assessment of current safety procedures and technologies as related to the issues mentioned above. One of the long-term goals of the Committee will be to help develop long-term recommendations for cooperation among major players, including government and industry, to help increase the safety of offshore engineering and prevent another catastrophe like DEEPWATER HORIZON.

## Engineer in the Spotlight (cont.)

constraints, identify a solution and then be able to explain why that solution works. This skill set helped me immensely throughout my career, especially during my DCO-A staff tour. My technical degree helped me to analyze tasks from a different perspective.

MSEN: Very interesting. As a student engineer, what drove you towards the Marine Engineering postgraduate program?

WA: As a student engineer, you are doing naval engineering work: Planned maintenance, what part goes where, mostly plug and chug type work. The Marine Engineering program offered more practical, technical engineering work which was what I was looking for. It gave me a chance to think critically about issues, and I enjoyed that immensely.

MSEN: A common perception among junior officers is that becoming a Marine Safety Engineer restricts you to a narrow career path. Do you agree?

WA: Not at all. There are many folks who have come through this program to go on and do amazing things and still maintain their technical skills. We've had people who have worked with the CG budget, go on to Senior Service schools, and continue to be promoted up the ranks. It's only narrow if you pigeonhole yourself. If you seek out challenges and perform well, you'll find multiple opportunities. There are no bad jobs, but you must do your job with passion to the best of your ability. The rest will work itself out.

MSEN: Agreed. What advice would you offer to junior officers currently entering the Marine Safety Engineering field?

WA: First, you have to work hard. You'll find more pure engineering in this line of work than you will anywhere else in the Coast Guard. You can't be a good engineer without a firm understanding of the underlying assumptions that govern the discipline. With this foundation, engineers can confidently consider designs outside the status quo...and at the MSC, we thrive on working problems on the fringes of our regulatory framework. Also, absolutely pursue professional certification, as it will establish your credibility and demonstrate your solid understanding of engineering.

MSEN: Fantastic advice. Any new and exciting projects on hand that you'd like to speak to?

WA: We're making fantastic headway in the latest marine technologies. Green shipping, LNG propulsion, new materials for Structural Fire Protection are all currently being worked on. These are topics that could revolutionize the industry, and we've got our hands in all of them. It's a very exciting time. Industry is "building the better mousetrap." We get the chance to see if that trap will actually work.

MSEN: Thank you so much for your time. Any last words of advice?

WA: Continue to learn and be open-minded. This is one of the best ways to continue professional development. Seek professional certification, as this lends instant credibility within the industry.

## Coast Guard Leads Development on PFD Standards

The Lifesaving and Fire Safety Division (CG-5214) is leading a joint industry/laboratory, Canadian and U.S. government effort to adopt the ISO 12402 series standards as a new “Consolidated North American Standard” for PFDs--to consist of the ISO standards, in combination with a harmonization document spelling out agreed National Differences. (Very recently, Mexican maritime authorities have expressed interest in the work as well.)

Currently, Headquarters staff are working within the relevant ISO subcommittee to promote refinements to the ISO standards with the goal of minimizing the National Differences needed to address remaining safety deltas between the ISO standards and current U.S. and Canadian requirements. The Consolidated North American Standard will potentially expand markets by allowing manufacturers to use one standard as the basis for both U.S. and Canadian approval without additional testing or follow-up inspections.

Further, adoption of the performance-based ISO standard has potential for fostering innovation and increasing wear rates by expanding the range of PFD types available, to include more flexible, comfortable, and lighter “Level 50” devices targeted to competent swimmers.



## Industry Consensus Standards: A Primer

by Mr. Duane Boniface

The U.S. Coast Guard uses a variety of methods to meet safety, security and stewardship objectives, including international regulations, domestic regulations, and industry consensus standards. This article focuses on this latter component, and highlights roles for Coast Guard Marine Safety Engineers in developing and implementing the standards.

The use of technical standards, in short, is defined as the “common and repeated use of rules, conditions, guidelines or characteristics for products or related processes and production methods, and related management systems practices.” These standards govern or at least touch much of modern day life, ranging from home construction to communications to computers and the maritime industry. Organizations such as ASTM International, the American Society of Mechanical Engineers and others bring together a virtual treasure trove of expertise in topics of direct interest to the Coast Guard, including pressure vessel design and construction, electrical installations, and offshore exploration and production. Accessing such broad and deep expertise would be a challenge for the Coast Guard to otherwise obtain, and so the insights provided by participating in the development are truly invaluable.

Marine Safety Engineers are routinely engaged in developing, reviewing and/or incorporating industry consensus standards. Currently, the Coast Guard incorporates by reference 641 industry consensus standards, with greater than 52% of the technical sections in 33 and 46 CFR incorporating at least 1 standard by reference. The use of such standards in federal regulations not only creates more effective rules, but also ones that are more efficient and that promote interoperability (and is required under the National Technology Transfer and Advancement Act of 1995).

Coast Guard involvement in these standards organizations runs the range from consumer to participant, and Coast Guard engineers have participated in the development of a wide variety of standards, including pressure vessel and boiler codes, and countless other instruments. Coast Guard personnel currently lead 12 different committees and/or subcommittees. These engagements allow the Coast Guard to leverage the resultant standard and provide invaluable access to best practices, emerging trends and other insights into the industry and technologies. This Coast Guard-industry relationship creates a win-win situation that achieves the right balance between Government, industry, and public needs, and Marine Safety Engineers will continue to serve as a valued asset to the development of these critical standards

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