

# Marine Safety Engineering

## Congratulations Class of 2009 Graduates!



**LT Al Giordano**  
Mechanical  
Engineering, Villanova



**LT Joe Morgans**  
Mechanical  
Engineering, Naval  
Postgraduate School



**LT Mark Neeland**  
Naval Architecture  
and Marine  
Engineering,  
University of Michigan



**LT Suzanne  
Hemann**  
Fire Protection  
Engineering,  
University of  
Maryland



**LT Sean Peterson**  
Chemical  
Engineering,  
University of  
Washington



**LT Steve Elliott**  
Industrial Technology,  
Lamar University

## A Note from the Director

Greetings, and welcome to the Spring 2009 edition!

Since our last issue, the request has been approved to establish Marine Safety Engineering as a sub-specialty (CG-OAP16) of the Operations Ashore - Prevention specialty area. This action reflects the vital importance of engineering capability to the successful execution and support of primary Coast Guard missions. To remain a world leader in Marine Safety, we need to thoroughly understand the complex structures, equipment and machinery that comprise today's technologically advanced vessels and offshore structures. Engineering competence is central to our ability to ensure these systems meet public expectations for safety. Establishment of the new sub-specialty is just one element of our broader long-term initiatives to enhance the way we recruit, train and retain a world class engineering workforce while providing challenging technical, managerial and leadership opportunities throughout their careers.

Once again this year, there's a long list of career Marine Safety Engineers who have been selected to serve in key leadership positions. These include RDML Jim Watson (LANTAREA, OC-3), RDML Kevin Cook (CG-54) and RDML Roy Nash (National Maritime Intelligence Center). In addition, many Captains who have developed their professional skills within the marine technical community have been selected to serve as Sector Commanders and senior District, Area, and Headquarters staff. At the Commander and Lieutenant Commander levels, other officers are receiving orders in AY09 to Command Marine Safety Units and to serve as Prevention Department Heads at major commands. Two others from our ranks will help familiarize rising engineers with career opportunities in Marine Safety by serving in newly established Marine Engineering and Mechanical Engineering instructor billets at the Coast Guard Academy. These men and women, and many others, who are following in their footsteps, serve as outstanding role models for cadets and junior officers considering pursuit of an advanced degree, and career service in the Marine Safety Engineering sub-specialty area.

Here in Washington, D.C., the Commercial Regulations and Standards Directorate (CG-52) has been busy providing the engineering support needed today, and preparing to meet the growing demand for our technical services tomorrow. The efficiency of our standards development machine has never been greater, resulting in publication of numerous key regulatory projects and policy documents in recent months. Looking ahead, we've published CG-52's Strategic Business Plan for 2009-2014 and have kicked off several workgroups to develop a human resource plan, customer service standards, and policy coordination protocols. Last month, as FY09 resources came on budget, our complement at CG-52 and the Marine Safety Center grew by the largest margin in decades, and we are filling these new positions rapidly to enhance Coast Guard engineering capacity. Together, these actions position us well to make significant contributions to the achievement of Marine Safety Performance Plan objectives.

Regards,

Jeff Lantz,  
*Director of Commercial Regulations and Standards*



## An Engineering Marvel: OASIS OF THE SEAS

LCDR Scott Calhoun and Mr. Thomas Woodford

At 220,000 gross tons, the OASIS OF THE SEAS is more than 40% larger than the next largest cruise ship. Exceeding \$1.1 billion in construction costs, it will have a carrying capacity of more than 5,400 passengers! A passenger ship of such massive size and ground-breaking design falls outside the bounds of

some prescriptive regulations. Therefore, complex engineering analyses were conducted to determine its compliance with performance-based standards. Fire protection engineers and naval architects at the Marine Safety Center (MSC), who routinely conduct initial control verification exams in Italy, Germany, France, and Finland, are extremely well-suited for performing and reviewing these challenging analyses.

The MSC worked closely with the builders and classification society while reviewing and completing independent analyses that identified unique hazards posed by the vessel's unprecedented design. One of the high risk areas to be addressed involved the large main vertical zones (MVZs), which were designed to contain fire and smoke within a series of "A" class division bulkheads.



Cruise ships have grown rapidly in both size and complexity over the past several decades. (Photo courtesy of RCCL)



The view from an interior balcony looking aft down the open-air centerline "Boardwalk". (Photo courtesy of RCCL)

The lengths of the MVZs on the OASIS OF THE SEAS exceed the maximum length allowed by prescriptive SOLAS regulations. These large MVZs increase the risk from intense fires propagating in very large spaces. As such, the performance-based approach outlined in SOLAS Chapter II-2, regulation 17, was needed to evaluate alternatives. Using that methodology, the designers completed an extensive fire safety analysis, which included a fire risk study that modeled numerous fire scenarios in atriums spanning multiple MVZs and decks. The results showed an acceptable level of risk from hazard mitigation strategies that employ very large retractable roller shutters and massive smoke extraction systems.

Their independent modeling and extensive review of the fire safety analysis of the OASIS OF THE SEAS showcased the technical expertise of MSC engineers. Their training and experience make them uniquely qualified to review complex engineering analyses of designs not envisioned by prescriptive safety regulations. Through close coordination with other technical experts, the MSC plays an integral role in ensuring the safety of the largest and most unique cruise ships throughout the world.



The U.S. delegation to Design and Equipment, (L to R): Mr. Charlie Dorchak, Mr. Kurt Heinz, Mr. Wayne Lundy, CDR Charlie Rawson, LT Rob Griffiths, CDR Dave McClellan, and Mr. Tom Thompson.



View of Thames River and Parliament House taken from the cafeteria at IMO.

For more information on the LNG Ship Rider Program, contact **Suzanne Chang** at (202) 372-1423, or [Suzanne.C.Chang@uscg.mil](mailto:Suzanne.C.Chang@uscg.mil)



A CG Port State Control Vessel Inspector conducts a safety inspection onboard an LNG tank vessel.

## Marine Safety Engineers and the International Maritime Organization

LCDR Jason Smith

The International Maritime Organization (IMO) is a specialized agency of the United Nations with the responsibility to develop and maintain a comprehensive regulatory framework for worldwide shipping. The result is a comprehensive body of international conventions, supported by hundreds of recommendations governing every facet of shipping including safety, environmental concerns, legal matters, technical co-operation, maritime security and the efficiency of shipping.

The IMO is based in London, England and is represented by 167 member states. Key treaties of the IMO include SOLAS, MARPOL, and STCW. The U.S. Coast Guard has been a key participant and the primary U.S. representative to the IMO for all policy development since the IMO Convention entered into force 50 years ago. Marine Safety Engineers typically serve as the U.S. Head of Delegation (HOD), where they lead advisors from Department of State, Department of Defense, and industry. Recently, CAPT Mike Blair served as HOD for the sub-committee on Bulk Liquids and Gases, CDR Charlie Rawson served as HOD for the sub-committee on Ship Design and Equipment, and Mr. Kurt Heinz served as HOD for the sub-committee on Fire Protection. Additionally, numerous staff engineers provide expertise on technical workgroups that advance IMO initiatives.



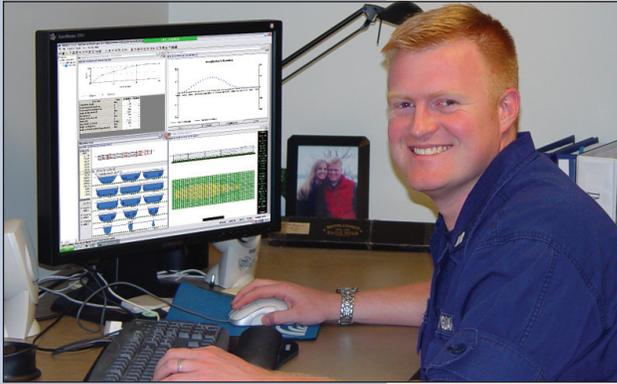
Kurt Heinz, Head of U.S. Delegation to Fire Protection.

## LNG Ship Rider Program

Suzanne Chang

The United States' liquefied natural gas (LNG) market has grown tremendously in the past several years. Consequently, the Coast Guard, both its Foreign Gas Carrier Examiners (FGCEs) and its chemical engineers, are becoming more involved in this industry. The FGCEs help ensure safe transport of LNG entering the U.S. by conducting safety exams at or near the entrance to a harbor. Unfortunately, this limited amount of time onboard prohibits a full examination of the shipboard controls and preventative systems, especially for those in training. The LNG Ship Rider Program lets FGCEs directly observe all aspects of LNG operations (loading, transit, and unloading) by sailing on a voyage from a loading facility to a receiving facility. This program is also open to those Coast Guard personnel assigned to the Marine Safety Center, Districts, and Headquarters who oversee LNG vessel plan review and policy such as the Coast Guard's chemical engineers who evaluate new design proposals for larger (LNG) vessels.

The LNG Ship Rider Program Manager is in the Coast Guard Headquarters Hazardous Materials Standards Division (CG-5223), which develops and maintains regulations and standards to promote the safety of life and protection of property and the environment during the marine transportation of hazardous materials. The chemical engineers in this division also provide expertise and technical support to Coast Guard units, industry, U.S. Government Agencies, other national governments, and the public.



LT Thomas analyzes the structural integrity and stability of a vessel during a salvage case.



After colliding with a railroad bridge, the asphalt barge MM-53 rolled, sank and buckled as it was pinned against the bridge by river current. LT Thomas oversaw operations as salvors prepared to right the barge.



The jack-up drill rig DOLPHIN 111 sank in March 2007. LT Thomas worked on-scene with the CG Sector and Titan Salvage to safely raise the rig and bring it into port for repairs.

## Engineer in the Spotlight

CDR Steve McGee

LT Brian Thomas is a naval architect at the Marine Safety Center in Washington DC. After graduating with High Honors from the Coast Guard Academy in 1999, Brian served in the Engineering Department aboard CGC TAMPA. From 2001 to 2003, he served at the Engineering Logistics Center, where he led a team of senior engineers evaluating the remaining service life of the Polar Class Icebreakers and developed conceptual designs for a comprehensive service life extension program. Brian then attended graduate school at MIT, graduating in 2005 with Master Degrees in both Naval Architecture and Mechanical Engineering.

Since his arrival at MSC in 2005, he's assessed hundreds of passenger vessels, barges, offshore supply vessels, tugs, research vessels, and floating offshore installations for compliance with domestic and international standards for strength and stability. Working directly with marine industry designers, owners, and builders he's resolved complex safety and regulatory compliance issues involving many novel vessel designs.

As a senior member of the elite Salvage Engineering Response Team (SERT), he has assisted field commanders on scene, providing a variety of marine technical services in the wake of hurricanes Katrina, Rita and Ike. In addition, he has performed in-depth stability and structural assessments for over 80 damaged, grounded, sunk, or capsized vessels to help mitigate emergent vessel casualty situations.

Because of his extensive knowledge of hydrostatics, seakeeping, maneuvering, ship structures, and salvage engineering, LT Thomas has frequently been selected to lead forensic engineering analyses to help marine investigating officers in their determinations of proximate cause. His most recent work aided the Marine Board of Investigation for the ALASKA RANGER casualty.

LT Thomas is a frequent guest lecturer at the Coast Guard Academy, where he provides instruction on vessel stability, engineering software applications, structural analysis, and salvage engineering to cadets majoring in Naval Architecture and Marine Engineering.

Brian continues to build on his consummate engineering skills. He recently became a registered Professional Engineer in the State of Virginia, and has had his technical papers on ship hydrodynamics theory published in the Journal of Engineering Mathematics, and in the Proceedings of the 26th Naval Hydrodynamics Conference in Rome, Italy.

While his professional engineering achievements are extensive, it's not all work and no play. You can frequently find Brian on the Chesapeake Bay competing in sailboat races.



LCDR Holly Najarian, senior  
Prevention Assignment  
Officer.

## Where are They Now? “Techie” LCDR Holly Najarian

Acquiring a graduate engineering degree provides opportunities to do more than showcase your skills in a payback tour. Marine Safety Engineers find that the experiences and analytical skills they hone in technical billets foster strong performance in other areas and leads to their selection for a number of prominent jobs. Recently the Marine Safety Engineering editorial team interviewed a techie in one of the most visible Prevention positions: LCDR Holly Najarian, the senior Prevention Assignment Officer.

**MSE:** Congratulations on your assignment as a detailer! That’s got to be a job you didn’t expect to be in while at grad school.

**HN:** Thanks, and you’re right. But the assignment process is very strategic and has many competing and often conflicting priorities. It helps when you are able to look at things methodically and strategically to see how all the pieces fit together and what the impact will be. So it’s really not that different from an engineering problem.

**MSE:** Why did you choose the graduate program of Fire Protection Engineering?

**HN:** I attended Worcester Polytechnic Institute for FPE. I owe my choice to pursue a technical program to several supervisors that urged me to look into a graduate program because of both the analytic skills it developed and the later opportunities it opened. FPE wasn’t something I knew a lot about, but it was different than the other programs as it is a science that is still developing, and that appealed to me.

**MSE:** So now that you are one, what does a Coast Guard FPE do?

**HN:** I went to the MSC after graduation. There, FPEs are assigned to either of two different areas. They are assigned to focus on structural fire protection or fire suppression systems. Regardless of what area the FPE ends up in, a lot of the job includes looking at novel designs and equating the new technology to what’s required in the existing regulations.

**MSE:** Is that rewarding?

**HN:** Oh, it can be. I won’t forget one project that covered a large part of my four years at MSC. The design was for a new class of government-owned ships that really challenged our regulations by including unconventional fire suppression systems, munitions stowage and other features that you wouldn’t ever see on a traditional cargo ship. To make any progress we had to collaborate with CG HQ, classification societies, government officials, Navy personnel and a multitude of other engineers. It was quite gratifying to work out the issues and arrive at consensus with so many competing interests. Was I glad to see those ships get finished and serve in the fleet!

**MSE:** Cool! Where else has your background as an engineer really made a difference?

**HN:** When I was in Boston as CID, the first offshore LNG facility in the region got approved, was constructed, and began operation. My command really relied upon my technical background to deal with the difficult issues that had to be overcome for the project to come to fruition. They requested me on numerous occasions to analyze problems and form workable solutions.

*continued on page 6*

---

I went to the MSC after graduation. There, FPEs are assigned to either of two different areas. They are assigned to focus on structural fire protection or fire suppression systems. Regardless of what area the FPE ends up in, a lot of the job includes looking at novel designs and equating the new technology to what’s required in the existing regulations.

---



## World Maritime Day

The Coast Guard has the honor of hosting the 2009 International Maritime Organization's (IMO) World Maritime Day Parallel Event. The celebration will be held on October 16th in New York City. The Parallel Event is an opportunity for the maritime community to come together with the public to celebrate the contributions of the industry. We expect representation from the IMO, international and national maritime communities, and public. The theme for this year's Parallel Event is "Climate Change" and how the maritime industry can lessen its impact on the environment.

The Parallel Event will include a panel discussion, evening reception, and VIP dinner for distinguished guests including the Commandant of the Coast Guard and Secretary General of the IMO. The remaining portions of the Parallel Event will be open to the public and will include a Green Ship Expo, Coast Guard and commercial vessel tours, a marine engineering & environment science fair and university design competition. The events open to the public will have a broader focus to showcase the environmentally friendly aspects of the maritime industry and may remain open throughout the weekend.

Anyone aware of individuals or organizations with an interest in promoting the environmentally friendly aspects of shipping should review the Parallel Event's website; [www.uscg.mil/worldmaritimeday](http://www.uscg.mil/worldmaritimeday).



**MSE:** That's seems like a common theme for a lot of techies in field positions.

**HN:** Yeah, especially now I see how technical graduates are highly desired by MSU and Sector Commanders due to their broadened personal capabilities and technical acumen. That stuff is so applicable to the multitude of issues and contingencies they face everyday.

**MSE:** So what is it you like best about your current job?

**HN:** Working with great people, getting the exposure to other specialties and talking to officers about their careers and long term goals. Hearing their experiences and their concerns reinforces what an amazing opportunity the graduate school program is.

**MSE:** Holly, thank you for your time for this interview. It's interesting to hear how your engineering background has helped you in a variety of areas.

**HN:** Thanks. And thank you for the opportunity to reach out to more junior officers about how important the graduate school program is to Prevention!

## AY 2010 Advanced Education Season

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 program? Encourage them to apply, as e-resumes are due to CGPC-OPM-1 on 10 June 2009.

In Summer 2009, the Marine Engineering advanced education program will select 11 officers. The program is unique in that selectees can earn a Master of Science degree in a wide variety of marine engineering disciplines including:

- Electrical Engineering,
- Naval Architecture,
- Marine Engineering,
- Mechanical Engineering, or
- Ocean Engineering.

Additionally, Chemical Engineering will select two officers, Fire Protection Engineering will select one officer, and Marine Engineering Technology will select one officer.

GRE scores are not required for the Marine Engineering or Fire Protection Engineering selection panels.

Helpful links:

ME, FPE and MET program manager: <http://cgcentralweb.uscg.mil/cLink/3108>

Chem E program manager: <http://www.uscg.mil/hq/cg5/cg522/cg5223/AdvED.asp>

CGPC-OPM-1: <http://www.uscg.mil/opm/Opm1/opm-1PG.asp>

Thanks for your support!



Naval Architecture and Marine Engineering graduate students in the University of Michigan Marine Design Laboratory. Pictured left to right: LT Mark Neeland (Class of 2009), LT Jesse Holston (Class of 2010), and LT Brent Yezefski (Class of 2010).