The Coast Guard Journal of Safety at Sea

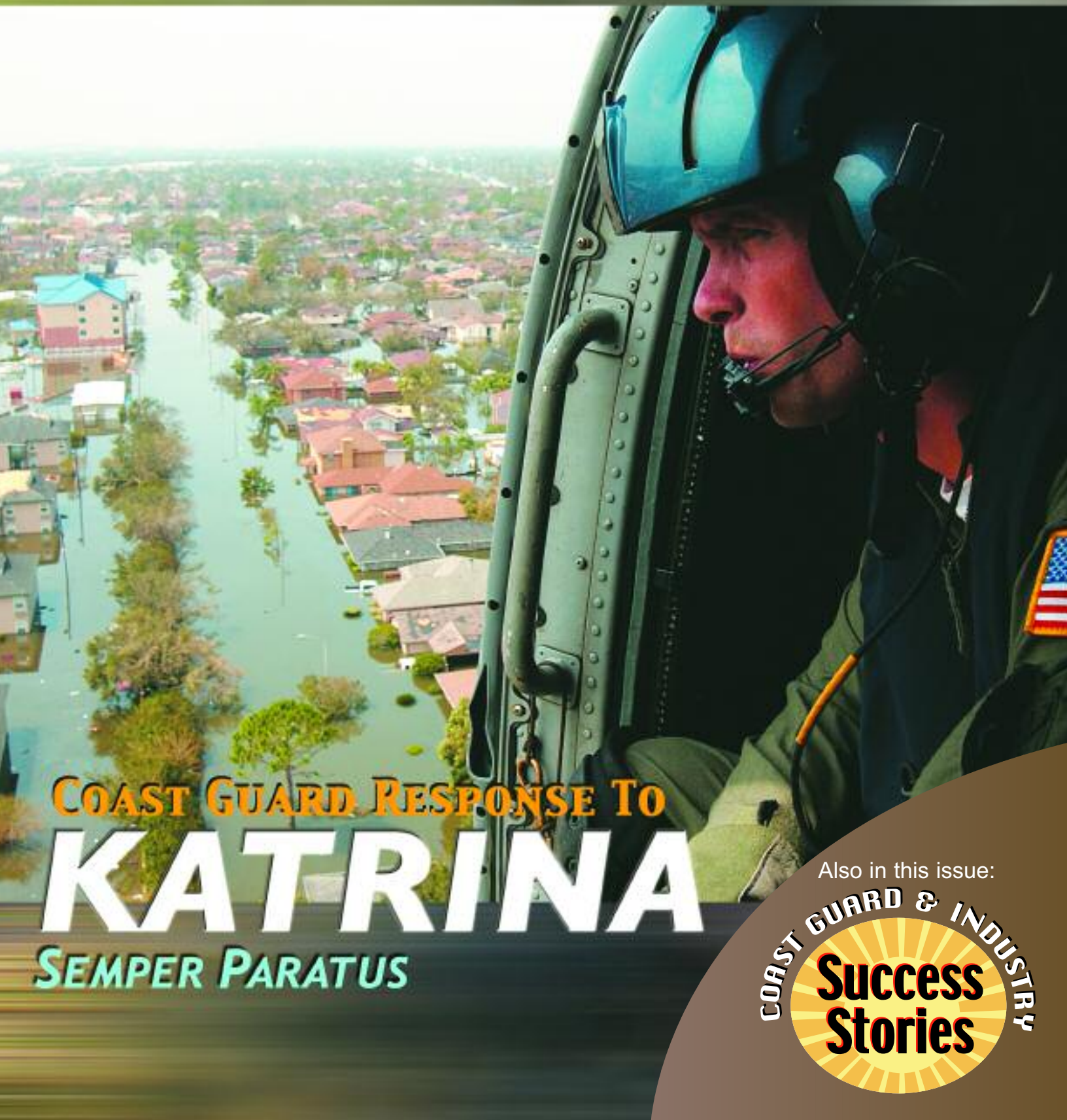
U.S. Department of Homeland Security

United States Coast Guard

PROCEEDINGS

Winter 2005-2006

of the Marine Safety & Security Council



COAST GUARD RESPONSE TO KATRINA

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COAST GUARD & INDUSTRY Success Stories

PROCEEDINGS

Winter 2005-2006

Vol. 62, Number 4

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Coast Guard Petty Officer 2nd Class Shawn Beaty of Long Island, N.Y., looks for survivors in the wake of Hurricane Katrina. Petty Officer Beaty is a member of an HH-60 Jayhawk helicopter rescue crew sent from Clearwater, Fla., to assist in search and rescue efforts.
U.S. Coast Guard photograph by Petty Officer 2nd Class NyxoLyno Cangemi.

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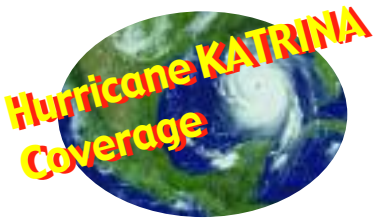

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Assistant Commandant's Perspective

by Rear Adm. T. H. Gilmour
Assistant Commandant for Prevention

The U.S. Coast Guard has a long tradition of service to our nation in peace and war. Our service is unique in that we provide national level capabilities with international reach to safeguard our country from safety, security, and environmental threats. At the same time, we operate in the communities we serve, interacting on a daily basis with those who conduct their business on our nation's waterways and along our coasts.

We put a lot of effort into preventing bad things from happening, but, unfortunately, they still happen. When they do, we must always be prepared to respond to them, whether these are man made or natural emergencies. The Coast Guard's response role was very evident recently in the immediate aftermath of Hurricanes Katrina and Rita, where images of Coast Guard rescues were shown on news media for several weeks. We are, of course, very proud of the Coast Guard men and women who performed so well during this crisis and who rescued or evacuated over 33,000 residents from hurricane-affected areas.

Like most major events, there is also another dimension to the story. Although it may not have received the attention accorded to the rescues, the restoration of our waterways and the critical marine infrastructure vital to our domestic and international trade is nevertheless of prime importance to our nation. Clearly, the Coast Guard played a major role in this effort. The majority of the Aids to Navigation on these waterways were destroyed or unreliable and needed to be quickly replaced. Our federal partners, in particular the Army Corps of Engineers, Navy Supervisor of Salvage, National Oceanic & Atmospheric Administration, and Environmental Protection Agency, were especially critical to clearing channels and restoring commerce. However, one aspect of the recovery that is little appreciated outside the maritime community is the essential role played by industry in this restoration and recovery effort.

Industry volunteers worked tirelessly alongside government officials in assessing waterways and identifying hazards. With over 2,000 vessels sunk or stranded by the storms, this was a monumental feat! Often, long portions of waterways were conditionally opened, based solely on industry surveys that were performed from vessels owned and operated by the private sector. With their unique understanding of complex maritime supply chains, industry partners provided advice that helped the Coast Guard Captains of the Port assign priorities for the use of government resources. If the response to Katrina and Rita is viewed as a success story for the Coast Guard, it is also a success story for our industry partners who worked so closely and effectively with us.

This brings us to the theme of this issue of *Proceedings:* industry success stories. Our positive working relationships with industry are clearly beneficial during dramatic responses, like those described above. But in a more consistent way, these relationships make a difference every day through formal and informal efforts to improve safety, security, and environmental protection. The Coast Guard and industry share many of the same goals. Preventing bad things from happening is a good use of government resources; it is also good business practice, with significant advantages to a company's bottom line. Experience has shown that the most consistent improvements in safety occur only where there is a commitment to do so by those who own and operate the ships, boats, and facilities. We are happy to take this opportunity to showcase a few examples where our industry partners have made, and continue to make, a major difference.

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Commandant
U.S. Coast Guard

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Champion's Point of View

by CAPT. BRIAN SALERNO
Deputy Director of Inspection & Compliance

Coast Guard missions include a broad portfolio of duties and responsibilities. These range from maritime safety and mobility to homeland security and national defense, from maritime law enforcement to environmental response. Success in many of these missions depends heavily upon approaching them jointly with other services, agencies, and private sector organizations.

This issue of *Proceedings* focuses on the Coast Guard's maritime safety mission. Specifically, we will explore a few of the many ways the Coast Guard works with the maritime industry to improve the safety of vessels, facilities, and maritime workers, while at the same time preserving the quality of the maritime environment.

These pages hold many industry success stories. Highlighted are examples that show how the safety of vessels and the people in them begins on the drafting table, where designers not only take account of safety requirements, but choose to stay ahead of the curve by exceeding minimum standards. We will take a look at crew training on novel and high-speed craft and how this improves the overall safety of the marine transportation system. These, together with other similar examples, will show how the best operators seek to embed safety as part of their corporate culture.

We will also delve into safety failures and discuss how such events are analyzed so as to yield valuable lessons learned and, if necessary, form the basis for new safety standards that will make future accidents less likely. We are pleased to include a special report based upon the Coast Guard's Office of Investigations and Analysis' most recent maritime casualty statistics.

What follows is not all-inclusive. There are examples too numerous to mention of how industry has made dramatic improvements in safety, security, and environmental protection. Many have appeared on these pages in earlier issues; others will appear in the future. Innovative solutions to safety problems and examples of good corporate citizenship in tackling shared concerns will continue to be well worth sharing.

Ferrying Success

How the Washington State Ferry System, the marine industry, and Coast Guard teamed up to deliver a new class of ferry.

by Captain Greg Sugden
New Vessel Construction Master, Washington State Ferry System

The Washington State Ferry (WSF) System is the largest ferry system in the United States, operating 29 vessels at 20 terminals serving Puget Sound (Figure 1). Its vessels range in size from 100-foot, passenger-only vessels to the 460-foot, Jumbo Mark II vessels, capable of transporting 220 cars and 2,500 passengers. In all there are nine different classes of vessels.

Washington State Ferry System crewmembers often rotate work among different classes of vessels. Each person working on a vessel is required to be familiar with the emergency equipment and emergency operations found on his or her vessel, so WSF has strived to standardize its emergency equipment and procedures on all vessels. In the event that any of its vessels need to be abandoned, for example, WSF has a fleet-standard emergency evacuation plan that is the same for all classes of vessels. All WSF vessels are also equipped with Dunlop-Beaufort marine evacuation slides (MES), and all WSF vessel employees receive ongoing training in the operation of these slides.

New Vessel Design, Same Emergency Features

In the spring of 2003, WSF embarked on an ambitious program to build four new 130-car/1,200-passenger ferry boats for use on routes upon Puget Sound. These new vessels would allow the Washington State Ferry System to retire some of its smaller, 75-year-old vessels. WSF worked with a steering committee consisting of naval architects, professional engineers, vessel operating engineers, and a vessel master to create the vessel specifications. Industry firms, including Glosten Associates, Elliot Bay Design Group, and Jensen Maritime Consultants, were represented on the steering committee, each firm taking responsibility for one area of the vessel design.

One priority was to design a new ferry that would still incorporate the standard emergency operations design of existing WSF vessels. Mr. Will Nickum, P.E., a senior naval architect at Elliott Bay Design, was directed to create a deck arrangement that would closely mirror other WSF car ferries.

Figure 1: Washington State Ferry System route map.

Design Clarification

During the very early stages of the design work, WSF contacted the local U.S. Coast Guard Marine Safety Office (MSO) for an informal review of the vessel arrangement drawings. At that meeting, the MSO representatives noted that the standard WSF vessel design would no longer meet regulations for new vessel construction and, in particular, would not meet the guidance found in Navigation and Vessel Inspection Circular (NVIC) 9-97, "Guide to Structural Fire Protection."

For WSF purposes, NVIC 9-97 provides definitions of open and enclosed vehicle decks and requirements for passenger egress to embarkation areas. By the definition found in NVIC 9-97, the

vehicle decks on WSF vessels are considered enclosed vehicle decks and, as such, areas of passenger egress or refuge must be structurally isolated from the vehicle spaces. The current WSF practice of moving passengers from the passenger cabin, down the stair towers, across traffic lanes, and into the marine evacuation slides would not be allowed in any new construction.

After this initial meeting WSF officials set up a meeting with the U.S. Coast Guard Marine Safety Center (MSC) in Washington, D.C., to receive further clarification regarding the regulations. I attended this meeting in my capacity as WSF new vessel construction master, along with Mr. Nickum and Mr. Olof Sander, WSF senior naval architect. It was our intention to convince MSC of the wisdom of our design and to receive approval to maintain our original arrangements. At the meeting we described how we had arrived at the current design of our new ferry. While the MSC group understood our desire to maintain fleet conformity, they ultimately informed us that our design could not be approved, based upon current regulations, which are in place for the safety of passengers and crew and, therefore, cannot be compromised.

An Impasse, Passed

The MSC staff did offer a possible solution. As noted in 46 Code of Federal Regulations (CFR) 70.15-1 Conditions Under Which Equivalents May be Used, WSF could propose an equivalent arrangement. However, due to the large scale of the design and the significance of the potential equivalency, WSF would need to perform a complete performance-based fire protection engineering analysis. In encouraging us to pursue this option, the MSC personnel also suggested something that we felt was extraordinary. They offered to participate with our design team to find an acceptable solution to our problem.

Representatives from the MSC Major Vessel Branch formed part of the design team and were our contact people throughout the process. Mr. Sander, Mr. Nickum, and I were the WSF team members. We decided early on that we would also need someone to guide us through the process, and we contracted Mr. Andy Grenier, P.E., a fire protection engineer working for Rolf Jensen and Associates. He would be responsible for conducting all of the engineering analyses and writing a final report of the findings, with suggestions for design improvements.

Design Back on Track

Since this was a new process, some guidelines had to be established. The Coast Guard made very clear to us from the beginning that this would not be a rubber stamp approval. We were expected to perform a fire safety analysis that would evaluate our proposed design for equivalency and then evaluate any mitigating design features that would be proposed.

The design team decided to use NVIC 3-01, "Guide to Establish Equivalency to Fire Safety Regulations for Small Passenger Vessels (46 CFR Subchapter K)," as a guide for this project. Even though WSF vessels are Subchapter H and not considered small passenger vessels, we agreed that the equivalency process outlined in NVIC 3-01 is applicable to a wide variety of projects.

The first question that needed to be answered was how would WSF evacuate passengers from the vehicle deck and into life rafts, if there were a fire on the deck? The vessel design must:

- protect passengers and crew from injury when evacuating the vessel during a fire;
- limit the spread of fire and smoke; and
- provide protection to crew responding to the fire.

To achieve these goals, we would need to provide an adequate safe refuge for all passengers for one hour. This refuge area must also have direct access to the embarkation deck.

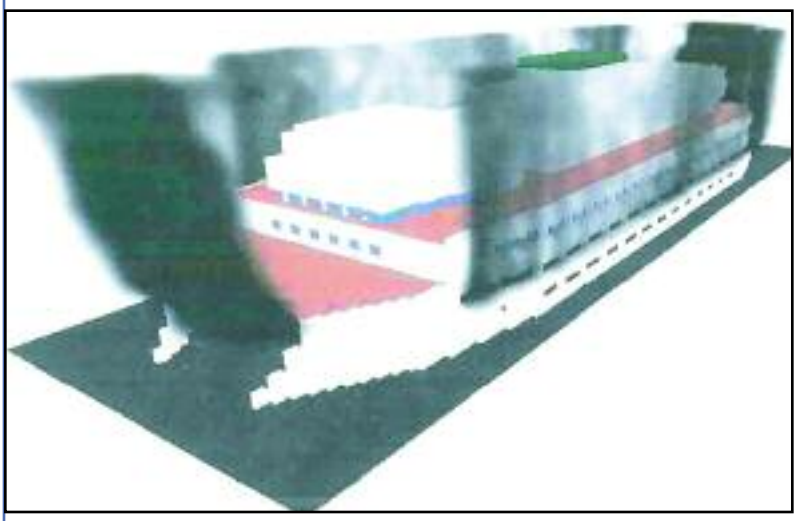

Figure 2: A fire model view of smoke spreading from the openings in the vessel side shell and ends, based on an 80-megawatt bus/truck fire located in the midship portion of the center vehicle tunnel. Courtesy WSF New 130-Auto Ferry Fire Analysis Report, Rolf Jensen and Associates.

The Process

Mr. Grenier developed a computer fire model for the proposed vessel design. This fire model simulated various fires, which allowed the team to analyze what areas

of the vessel would be affected by heat and smoke during various fire scenarios (Figure 2). After analyzing the heat and smoke spread of the design fires, the vessel design team made modifications to the original vessel design. The fire model was then re-tested to verify the results. The design team successfully incorporated some major new design features to address safety issues, while maintaining the current standard WSF deck layout, with MES located on the lower car deck.

These added safety features included roll down A-0 class doors that completely separate the four MES embarkation areas from the central vehicle tunnel, which is where the computer modeling showed the largest fires could be expected to occur. The design also incorporated an automatic early fire detection system for the car deck, as well as an enhanced fire suppression system for the car deck that exceeds all current regulatory requirements for vessels of this class.

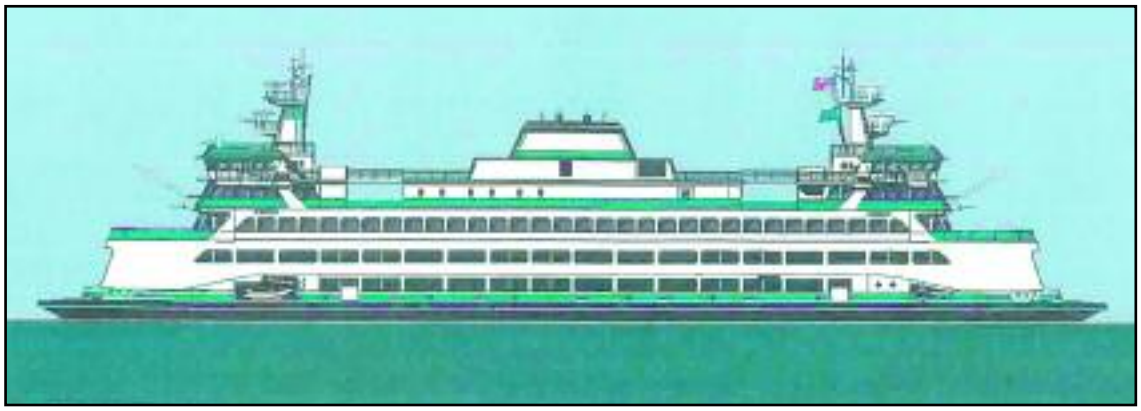

Figure 3: Drawing of the new WSF 130-auto, 1,200-passenger ferry. Drawing prepared by Gary Olsen, WSF Vessel Design.

Success

The entire process took several months to complete. There was continuous dialogue between MSC and WSF team members over what should be analyzed or how a certain result should be interpreted. The MSC team members offered useful suggestions based on their knowledge of the regulations, and we offered suggestions based on our operational experience. At times there were disagreements, which could usually be settled with meaningful dialogue. When a solution or compromise could not be found, it would fall to the MSC team members to remind us of the regulatory requirements and insist upon compliance. During these times we realized that, although we may be a "team" with MSC, all teams have a captain.

But there is no arguing with the outcome of this project. WSF was able to maintain its current design standard while designing a new vessel that actually exceeds all existing fire safety requirements (Figure 3). Instead of simply imposing its regulatory will upon us, the U.S. Coast Guard showed a willingness to work in a cooperative manner that allowed us to succeed.

The success of this project would not have been possible without some basic principles:

1. Start early. The WSF team was fortunate in that we decided to get Coast Guard comments very early in the design stage. Since we started early, there was no delay in the design process, even though we needed to complete the fire safety analysis.
2. Be flexible. We learned early on that we would not get everything that we wanted and would have to make modifications that affected the entire design.
3. Keep the dialogue flowing. There was never a phone call or e-mail that went unanswered.
4. Find the right teammates. WSF was very fortunate to work with Mr. Nickum and Mr. Grenier. Both men had the knowledge and professional expertise to find the right solutions to help guide us through the process. MSC representatives were fair and open-minded individuals who provided invaluable assistance to us in getting to a successful end product. The Coast Guard Office of Lifesaving and Fire Protection also provided valuable guidance and material review from the very start of the project.

Would we do this again? It depends. WSF certainly feels that more research is needed in the area of vessel fire safety. As it is, most of the studies and tests that are available are based on shore-based fires such as those in tunnels and garages. The concessions that we made to our design should not be precedent-setting for future ferry construction projects. But, if during future construction projects, WSF still feels the need to maintain the current design standard, WSF would most definitely like to continue the course set by this project and would not hesitate to team up with the U.S. Coast Guard.

About the author: *Captain Greg S. Sugden has worked for Washington State Ferries for 26 years. During that time he has been in both licensed and unlicensed positions on all WSF vessels and routes. He is currently the Construction Master representing the WSF Operations Department for New Vessel Construction.*

Cleaning Up Wastewater

The Coast Guard, state and federal regulators, and the cruise ship industry collaborate to improve wastewater quality.

by Lt. Dan Buchsbaum
Assistant Chief of Inspections, U.S. Coast Guard Marine Safety Office Juneau, Alaska

and Ms. Jennifer Kiefer
Technical Writer, SAGE Systems Technologies

We all know that the quality of drinking water is stringently regulated. But did you know that wastewater is also regulated? In fact, some of the wastewater discharged by cruise ships traveling in Alaska's waters is actually clean enough to drink! Perhaps drinkable wastewater does not sound too exciting, but the partnership and technology that has created it definitely is.

Regulating Wastewater…as a Team

Alaska is renowned for its spectacular scenery, and cruise ships are a highly visible part of that scene. Each year, the ships transport more than one million people around the beautiful coastlines, bringing with them great revenue—and leaving behind a considerable amount of wastewater. Concerned by this growing environmental pollution, Alaska has spent the last decade focused on implementing cleaner wastewater standards. The result has been crystal clear success.

In 1999 the Alaska Department of Environmental Conservation (ADEC) organized the Alaska Cruise Ship Initiative (ACSI) to review the cruise ship industry's waste management and disposal practices within Alaskan waters. There were many groups involved, including the U.S. Coast Guard, Environmental Protection Agency (EPA), cruise industry representatives, various Alaskan tribes, environmental groups, and concerned Alaskans. It quickly became apparent that the concern first voiced by Alaskans was shared by many.

In a great display of solidarity, the regulatory agencies

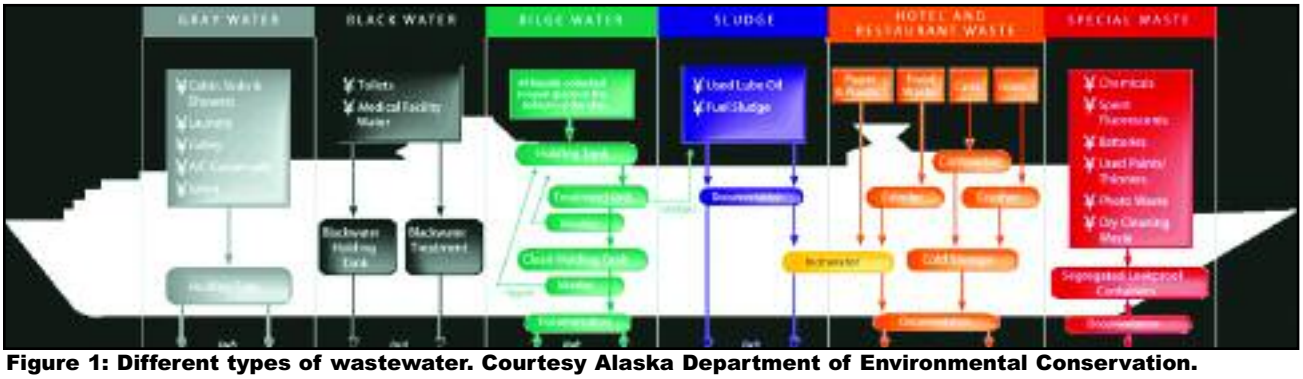

Figure 1: Different types of wastewater. Courtesy Alaska Department of Environmental Conservation.

and the cruise ship industry approached the problem from the same side. All parties seemed willing to contribute as much assistance and information as possible. Mr. David Eley, a consultant at that time for ADEC, noted that "cruise ships are very competitive in marketing, but, when it comes to such matters as environmental standards and security, they all work very closely together. They know that one accident or dirty discharge affects the health of the entire industry, not just one line. One definitely gets the impression that the cruise industry feels that collaboration is not only the right thing to do, it is good business practice."

While federal standards already defined concentration limits of certain pollutants, many unknowns remained. How much wastewater the cruise ships were actually discharging was not really known. The ACSI set out to establish baseline information regarding the wastewater discharges, enlisting most of the cruise ships to conduct voluntary wastewater sampling during the summer of 2000. The sampling included treated blackwater (such as sewage) and graywater (such as wastewater from showers, the galley, and laundry).

There were no standards for graywater at that time. However, the Coast Guard required that blackwater waste from cruise ships contain no more than 200 fecal coliforms per 100 ml. Fecal coliform is a bacteria found in the intestines of mammals and is used as an indicator that other disease-causing organisms may be present. ACSI's sampling revealed that the blackwater contained as many as 16 million fecal coliform per 100 ml and that the graywater contained as many as 32 million fecal coliform per 100 ml. Needless to say, the surprising results demanded immediate improvement.

The Alaska legislative community sprang into action, and the first set of regulatory improvements was passed by Congress in December 2000, with Title XIV-Certain Alaska Cruise Ship Operations. These regulations set wastewater discharge standards for large cruise ships in Alaskan waters. Tasked with implementing and enforcing Title XIV, the Coast Guard soon after published Title 33 of the U.S. Code of Federal Regulations, Part 159, Subpart E, which prescribed the regulations governing the discharges. Alaska Statute 46.03.460 – 46.03.490 joined the federal law in July 2001, placing its own set of strict guidelines on wastewater discharge. This statute also established ADEC's Commercial Passenger Vessel Environmental Compliance (CPVEC) program to ensure cruise ship compliance with the established discharge standards. Regulation 18 AAC 69, which became effective in November 2002, presented the requirements necessary to join the CPVEC program.

Throughout the two years that these various regulations were being formed, the cruise ship industry continued to play a valuable role in their development. Recognizing that lots of money and time would need to be invested to improve the wastewater discharges, the industry was understandably eager to have the standards established. Set standards allowed the industry to contract for new, advanced wastewater treatment technologies.

The Regulations Take Effect

A major concern since the beginning of the Alaska Cruise Ship Initiative was not just the lack of informa-

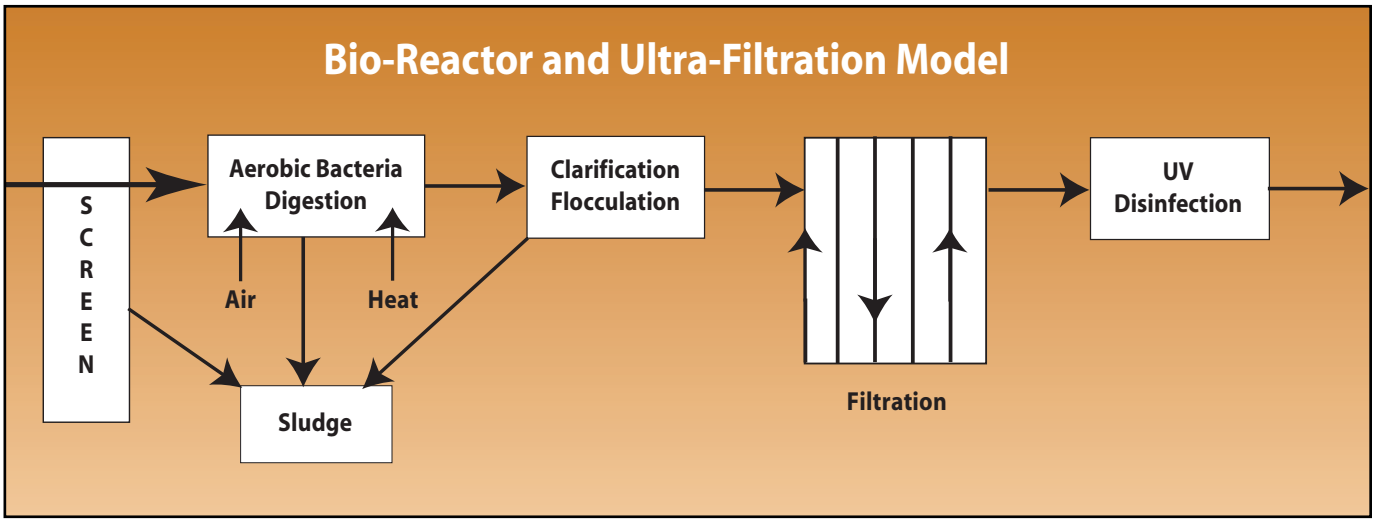

Figure 2: Wastewater treatment systems. Courtesy Mr. David Eley and Ms. Carolyn Morehouse, Cape Decision International Services, Inc.

tion regarding the type of wastewater being discharged (Figure 1), but also the location and quantity of the discharges. With the passing of the various regulations, this information is now effectively captured and monitored. Specifically, the state's CPVEC program requires that each ship maintain comprehensive records of its wastewater discharges. Included in these records are the amount and types of pollutants being discharged.

Figure 3: Scanship advanced wastewater treatment system on a Norwegian Cruise Line vessel. Pictured are two shipboard marine engineers charged with running the system. Courtesy Norwegian Cruise Lines.

Understandably, there is some overlap between the federal and state requirements, so ADEC (specifically, its CPVEC program staff) and the Coast Guard work together closely. For example, if a ship plans to discharge in Alaskan waters, it must provide both ADEC and the Coast Guard with a vessel specific sampling plan (VSSP). The VSSP contains the intended sampling techniques and analytical testing methods of the ship's discharge; it must demonstrate that samples will be representative of the wastewater discharged from that specific ship.

According to Ms. Moana Leirer, an environmental program specialist with ADEC, large cruise ships—which are defined by Alaskan law as 250+ passengers and federal law as 500+ passengers—have one of three options for wastewater discharge that must first be approved by the CPVEC program. These ships can:

1. hold their wastewater, discharging it outside of Alaskan waters (wastewater is therefore not sampled);
2. discharge their wastewater once they are at least one nautical mile from shore and traveling at least six knots (wastewater samples are required and must meet certain effluent standards); or
3. operate advanced wastewater treatment systems that are certified by the Coast Guard for continuous discharge.

A continuous discharge of wastewater, allowed by option three, initially sounds contradictory to the environmental concerns that provided the impetus for the many wastewater discharge regulations. However, the advanced wastewater treatment systems employed with this option are discharging some of the cleanest wastewater ever seen.

Advanced Wastewater Treatment Systems

In addition to the great partnership forged between the regulatory agencies and industry for this massive environmental cleanup, the second part of this success story is the technology that has been developed to improve the wastewater itself. While the regulations were first being formed, many of the cruise ship companies were already evaluating several advanced wastewater treatment systems. These included chemical treatment and mechanical decanting, activated oxidation and oxidant disinfection, reverse osmosis filtration, and bio-reactor/filtration.

Today, while some employ a reverse osmosis filtration system, the majority of cruise ships are using various combinations of enhanced bio-reactor/filtration systems. There are currently four basic designs from dif-

ferent manufacturers—Hamworthy, Rochem, Scanship, and Zenon being the most popular—but all function relatively the same (Figure 2). Hamworthy, Scanship (Figure 3) and Zenon are each biological reactor and ultrafiltration systems, while Rochem is a reverse osmosis ultrafiltration system.

The bio-reactor/filtration systems use an integrated system of enhanced aerobic digestion and low-pressure membrane filtration to treat the wastewater. Tank collection and sorting of waste that contains oils is critical to the process, since most of the systems cannot handle the introduction of oils. Soapy materials and biological agents are the primary targets for treatment. Ultraviolet radiation, which prevents reproduction of live bacteria like fecal coliform, is typically applied to the wastewater before it is sent to a holding tank or discharged overboard. Filtration is essential to all systems in sorting out solids, which are then handled by incineration or other solid waste disposal methods. One of the drawbacks of these bio-reactor/filtration systems, which also occurs with the reverse osmosis system, is that solid sludge is produced and must, therefore, be properly handled and disposed.

Maintaining Quality Assurance

As mentioned earlier, any cruise ship operating an advanced wastewater treatment system that wishes to have continuous discharge allowances must be certified by the Coast Guard for this purpose. First, though, each ship must submit the required VSSP to ADEC for approval. Once approved, the VSSP is submitted to the Coast Guard Captain of the Port, along with certification that the ship's treated wastewater already meets the minimum regulatory standards. The ship must present satisfactory sampling results from five separate days over a 30-day period.

Also crucial to receiving the continuous discharge permit is the development of a quality assurance/quality control plan (QA/QCP), which formalizes and standardizes the manner in which discharge sampling tests are collected and analyzed. To best ensure accurate samples, the QA/QCP also requires duplicate sampling, sampling audits, and a lab technical systems audit. It also lists all the pollutants to be tested and the EPA analytical methods to be used.

The QA/QCP must be approved by all affected parties, including the Coast Guard, ADEC, each participating laboratory project manager since multiple labs can be used to test samples, and the overall project quality assurance officer who oversees all the labs. This multiple approval requirement helps standardize the lab work and provides some oversight to ensure that the labs provide consistent data.

Once certified for continuous discharge, the Coast Guard requires the ship to submit two samples per month. The ship is also tested randomly twice per season by a third-party sampling team—once for conventional pollutants and once for conventional and priority pollutants. All testing is paid for by the cruise ships. These samples are closely monitored by the Coast Guard and ADEC, most notably through the QA/QCP.

To remain eligible for the continuous discharge permit, each ship's QA/QCP must be updated yearly to include the following information:

- sampling techniques and equipment;
- sampling preservation methods and holding times;
- transportation protocols, including chain of custody;
- lab analytical information including methods used, calibration, detection limits, and the lab's internal QA/QC procedures;
- quality assurance audits to determine the effectiveness of the QA program; and
- procedures and deliverables for data validation, to assess data precision and accuracy, the representative nature of the samples drawn, comparability, and completeness of measure parameters.[1]

While each ship is allowed to maintain its own QA/QCP, the majority of the 47 large cruise ships transiting Alaskan waters during the 2005 season have been represented by the North West Cruise Ship Association (NWCA) and use its specific QA/QCP (Figure 4).

Sampling

The number of samples in each sampling event is based upon the ship's configuration, its wastewater management practices, and the wastewater quantities discharged during the sample team's visit. Blind sample duplicates are also collected, which assess overall method variability and can assess bias or analytical errors not otherwise detected by the lab.

Mr. David Wetzel, president of Admiralty Environmental and lab project manager for NWCA's QA/QCP sampling project, helped develop the initial

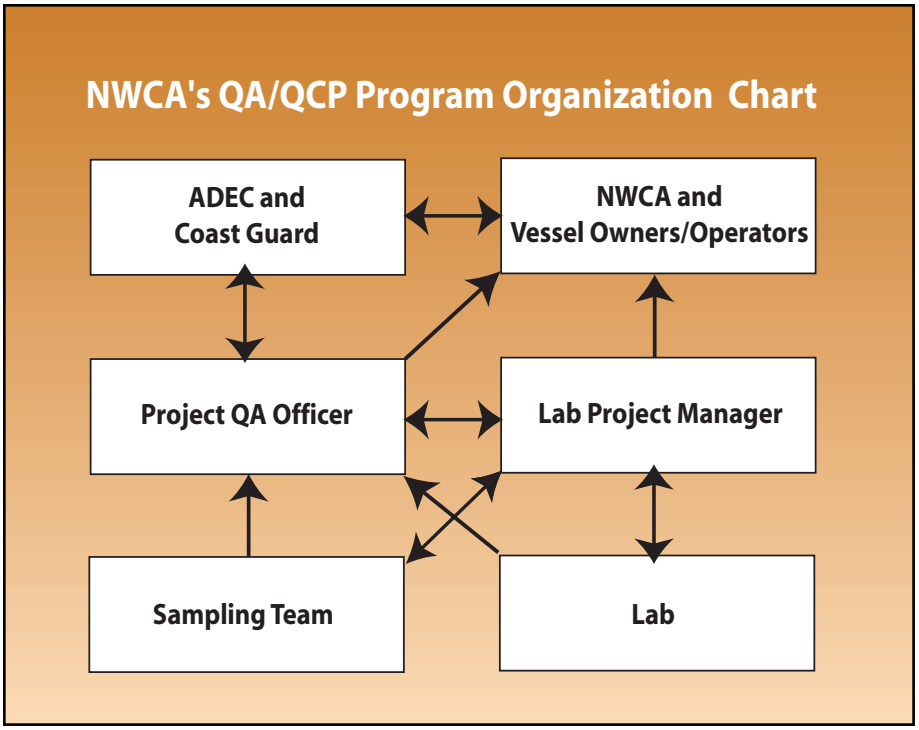

Figure 4: North West Cruise Ship Association's QA/QCP organization chart. Courtesy North West Cruise Ship Association.

set of sampling standards and lab analysis. According to Mr. Wetzel, reliable and representative samples are crucial to achieving valid readings. Therefore, specific sample collection procedures are detailed in each QA/QCP and each ship's VSSP is also submitted to the sampling team. With all groups working from the same documents, there is a stronger certainty that consistent sampling methods are followed and that samples are collected from appropriate and representative locations.

The Coast Guard also verifies installation of the sampling ports on the ships and reviews operations of the advanced wastewater treatment systems during their annual vessel examinations. Additional verification occurs during sampling events because exactness is vital to obtaining a true reading. For example, if a sample port is located too close to certain equipment, then the wastewater has not had a chance to mix before discharging and can produce a tainted sample.

While a third-party sampler takes all the required wastewater samples, it is the responsibility of the ship owner or operator to submit a report on the analytical results of sampling. The sampling analytical report must include the following:

1. date, time, and onboard location where each sample was collected;
2. sampling technique and analytical testing method used for each sample;
3. quality assurance and quality control analysis of the sampling, analytical testing, and analytical data;
4. analytical results;
5. any deviation from the approved plans submitted under 18 AAC 69;
6. type of wastewater sampled; and
7. if necessary, a notification that re-sampling is occurring. [2]

All sample analysis results are submitted by the independent labs directly to the Coast Guard and are reviewed to ensure that each ship is actually meeting all the requirements. The information is later released by ADEC. While samples do occasionally fall out of range, a compliance scheme allows the Coast Guard to average samples to ensure a ship meets compliance on a monthly basis versus an individual sampling event. Since the QA/QCP's inception in 2002, there has been an average of only one bad sample every two months, but these bad samples are usually later shown to have been tainted.

While it may sound confusing, the primary goal of a QA/QCP is to keep wastewater discharge as clean and pollutant-free as possible. In fact, NWCA's QA/QCP tests for 250 different pollutants, substantially more than the 16 pollutant tests required by the Coast Guard.

Other States Implement Alaska's Standards

Alaska's success story has traveled far, including to such distant states as Maine, Washington, and Hawaii. In a great example of knowing when not to reinvent the wheel, the state of Maine essentially adopted the Coast Guard's existing regulations for Alaska (33CFR159, Subpart E) with only two noticeable changes: substituting "Maine" for "Alaska" and "State of Maine Department of Conservation" for "Coast Guard Captain of the Port." Regulations in Washington have also adopted many of Alaska's regulations but require additional record keeping requirements. Officials in Hawaii are currently working on

similar regulations and have a memorandum of understanding signed, but there are some area-specific concerns. Because freshwater has a negative reaction on coral, Hawaii is understandably—but ironically—worried about too much clean water being discharged with the advanced wastewater treatment systems.

For other states or areas wanting to implement advanced wastewater treatment systems and the requirements that come with them, Mr. Wetzel points out that the focus should first be an agreement among all affected parties of the end goal, such as what types of discharges will be allowed or the quantity of the overall discharge. Mr. Wetzel observed that both the regulatory agencies and industry in Alaska recognized early on that completely eliminating discharges in Alaskan waters was not realistic, but that creating certain discharge standards was a more appropriate goal. Because this mutual agreement and goal recognition were realized early on, Mr. Wetzel notes, the positive changes were implemented so quickly.

EPA is also looking closely at Alaska's success. Authorized to create additional standards at its discretion, EPA is currently in the process of evaluating the cruise ship wastewater discharge requirements in Alaska. It recently distributed a review, "Survey Questionnaire to Determine the Effectiveness, Costs, and Impacts of Sewage and Graywater Treatment Devices for Large Cruise Ships Operating in Alaska," to all cruise ships authorized to carry 500 or more passengers for hire that traveled to Alaska in 2004. EPA also sampled wastewater from cruise ships to evaluate the onboard performance of various advanced wastewater treatment systems. Under Title XIV, EPA plans to develop standards for discharges of blackwater and graywater from cruise ships into Alaskan waters. Proposed changes to existing regulations are expected in mid-2006.

Proving the Technology Valuable

According to Mr. Wetzel, the greatest benefit of advanced wastewater treatment systems is the vast improvement of Alaska's water quality. He notes that these systems have reduced the discharge to being superior to even a municipal discharge on land. Mr. Wetzel attributes these improvements, in large part, to the collaboration between regulatory agencies and industry.

Mr. Eley wholeheartedly agrees. As one of the first participants in the ACSI, Mr. Eley remains involved today as a member of the QA/QCP review team. He remarks that the process from its very beginnings evolved quickly but that everyone was working toward the same goal: "I've never seen new technology and new engineering move so fast. And now all the groups are taking the technology and different practices and moving it forward; doing what's best for the environment."

These systems are not without obstacles, however, notes Mr. Richard Pruitt, director of environmental and public health programs for Royal Caribbean International (RCI). Since RCI installed its first advanced wastewater treatment system in 2001, RCI has endured many learning curves. First, installation of the systems themselves has proven tricky. According to Mr. Pruitt, each system takes up a tremendous amount of space—a precious commodity on ships. Lots of technical resourcefulness is required in figuring out how to fit a system into an already compact area. This task is made especially more difficult since ships—even those in the same class—are often designed differently, thereby presenting each installation with its own set of placement dilemmas.

Financially, there is a huge initial cost in capital, and the continual costs of personnel time and operations, including electricity consumption, are substantial. Mr. Pruitt also observes that the systems themselves are still relatively new and continually being modified to meet the demands of each ship, so there are added costs involved with working out those specific issues. However, despite any drawbacks or concerns, both RCI and Norwegian Cruise Lines have already agreed to install these systems fleet-wide.

In 2003 the cruise ships operating advanced wastewater treatment systems were sampled for 16 conventional pollutants and 160 priority pollutants. The vast majority of these pollutants were not detected, showing a dramatic improvement in the quality of the wastewater. Success is undeniable.

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Chemical Transportation Advisory Committee

Marine industry members are working with the U.S. Coast Guard to ensure safe transport of potentially hazardous material.

by Lt. Matt Barker
Chemical Engineer, Hazardous Materials Standards Division
U.S. Coast Guard Office of Operating and Environmental Standards

by Lt. Jenn Stockwell
Chemical Engineer, Hazardous Materials Standards Division
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by Mr. Paul Book
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Chemical Transportation Advisory Committee Chairman

by Mr. James Prazak
Logistics Specialist, Dow Chemical Company
Chemical Transportation Advisory Committee Vice Chairman

The Chemical Transportation Advisory Committee (CTAC) is a federal advisory committee that provides advice and consultation to the U.S. Coast Guard's Marine Safety, Security and Environmental Protection Directorate with respect to the water transportation of hazardous materials in bulk. CTAC members are respected experts and managers in the field of chemical transportation, with a broad range of experience and knowledge relating to vessel operation and design, chemical characteristics and hazards, and port facility operations. The members represent the diverse maritime industry, including vessel operators, chemical shippers, environmental response sector representatives, environmental safety and health officials, non-profit classification societies, federal and state governmental agencies, and educational institutions.

History

The U.S. Treasury Department established CTAC (then known as the Chemical Transportation Advisory Panel) on May 4, 1949. Its purpose was to provide advice and consultation to the Coast Guard regarding the marine transportation of hazardous material. The scope of CTAC's work has remained fairly consistent throughout the years,

Chemical Transportation Advisory Committee Members

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Mr. John R. Temperilli
Garner Environmental Services, Inc.

Mr. Edward G. Trotter
Shell Chemical LP

Ms. Ann Hayward Walker
Scientific and Environmental Associates, Inc.

though recently CTAC's reach includes a focus on the security issues related to the marine transportation of chemicals.

Issues and concerns relating to the marine transportation of hazardous materials in bulk are unique to the Coast Guard. While the Occupational Safety and Health Administration protects the workforce in other U.S. industries, licensed marine workers are protected solely by Coast Guard regulations. CTAC is in a unique position to provide technical advice and expertise not available from other sources, directly assisting the Coast Guard in the development of international standards, federal regulations, and non-regulatory tools to ensure the safe waterborne transportation of hazardous materials.

The relationship between CTAC and the Coast Guard has resulted in many positive advances in the safety of the maritime transportation industry. Recent advances include the development and implementation of the Maritime Transportation Security Act (MTSA) regulations, the development of the Marine Operations Risk Guide with the Prevention Through People campaign, and development of marine-specific competencies for the National Fire Protection Association (NFPA) 472 standard.

MTSA Regulations

One of the most important issues that CTAC has addressed in the past few years has been the issue of maritime security. After terrorists utilized areas of vulnerability in air security in the September 11, 2001, attacks, the Coast Guard began working to address potential vulnerabilities in the maritime industry. In late 2002, Congress passed the Maritime Transportation Security Act, requiring that the Coast Guard promulgate regulations related to maritime vessel and facility security. Even though the act allowed the Coast Guard to circumvent many of the normal rulemaking processes, the Coast Guard felt that input and involvement from maritime stakeholders would lead to better regulations. Coast Guard officials contacted CTAC, and this led to the formation of the CTAC Hazardous Cargoes Transportation Security Subcommittee. Ms. Alice Johnson of PPG Industries chairs the subcommittee, which held its first meeting in December 2002 and continues to meet today.

Changes related to maritime security were coming quickly, due to the need to close security vulnerabilities within the industry. While the members of CTAC represent a broad cross section of the maritime community, the group fully recognized that there were areas where it could not adequately provide representation. To deal with these issues, subcommittee members identified representatives from other parts of the maritime industry who could get involved and provide the insight needed to ensure that the issues being addressed were both applicable and appropriate. Outside speakers were brought in to provide input and insight into issues with which the subcommittee was dealing. In some cases, outside groups that were working on projects related to security were asked to attend to share their plans and solicit input from the subcommittee members. And, with many of the members of CTAC and its subcommittees also actively involved back in their local port areas, these members were able to enhance communication between the local and national levels and leverage opportunities for increased security throughout the United States.

Ground rules were essential to the success of the subcommittee efforts. The standing rule was "nothing left the room," which helped encourage frank, open discussions regarding best practices, problems, and vulnerabilities. The Coast Guard was able to develop and issue regulations that were both effective and achievable in a very short time, due to such active industry cooperation.

While focused on security, the topics covered by the CTAC Security Subcommittee varied greatly. Some of the topics included tracking vessels and shipments, classification of materials based on their hazards, operations at fleeting areas, communications within the industry, and concerns about procedures used during inspections. Much of the information gathered by the Coast Guard went directly into the development of Navigation and Vessel Inspection Circulars (NVICs), security regulations, and policy decisions. In addition, the members of the subcommittee were able to take what they were learning back to their own companies and local port areas to use in improving safety and security there.

The focus for CTAC and its subcommittees has always been related to the enhancement of safety within the industry, and that remains the primary focus of the group. However, the events of 9/11 brought security to the forefront, and protecting our homeland now tops the agenda for both industry and the Coast Guard. Ultimately, security and safety go hand in hand, and the best way to improve either is through open dialogue between industry and the agencies responsible for oversight. The CTAC Security Subcommittee has served as a conduit for this purpose and will continue to do so for the foreseeable future.

Prevention Through People

The human element is key in the safe shipping and transportation of hazardous materials in the marine industry. The human element can also be a contributor to events causing unacceptable incidents in the marine environment. CTAC developed a Prevention Through People subcommittee to review the processes involving handling hazardous materials and to recommend tools that would assist the mariner in maintaining a safer marine transportation system.

One such tool is the Marine Operations Risk Guide. A team of carriers and shippers was formed to develop a risk assessment guide that a vessel/facility operator could use as an aid to:

- hazard identification;
- probability or likelihood of a hazard;
- consequence/impact assignment;
- risk countermeasures; and
- cost/benefit analysis.

The goal of the guide is to serve as a tool to identify potential risks and the means to effectively control them.

The assessment guide is a simple 10-step process an operator uses to:

- identify risks;
- determine persons needed to identify solutions;
- identify countermeasures to the risks; and
- develop a cost/benefit ratio for the countermeasures.

The CTAC Vessel Over-pressurization Subcommittee tested the guide during its work efforts and found it to be effective and practical.

Another project was the redesign of the Certificate of Inspection (COI). Again, a subcommittee of Coast Guard and industry experts was formed to review the existing COI and identify a design that would provide persons in charge (PIC) of cargo transfer with better information on vessel designs and authorizations. The subcommittee found that the existing certificate lacked consistency in the placement of essential information the PIC would use to assess risks of the operation prior to conducting cargo transfers to or from a vessel.

The subcommittee recommended a certificate design change that provides for the consistent placement of all required information. The new design was tested with a local marine safety office and a tank barge operator. The testers approved the suggested changes, and the revised COI was instituted throughout the inland waterways marine system.

NFPA 472 Standard

As another part of the ongoing effort to improve maritime safety, security, and environmental quality, in 2000 the Chemical Transportation Advisory Committee formed the Subcommittee on Hazardous Substances Response Standards. This subcommittee

CTAC members represent the diverse maritime industry, including vessel operators, chemical shippers, environmental response sector representatives, environmental safety and health officials, non-profit classification societies, federal and state governmental agencies, and educational institutions.

identified, reviewed, and made recommendations on current industry standards that represented the best practices for ensuring safe and effective emergency response operations for marine transportation-related chemical spills. The subcommittee's work was published in 2002 in the Assessment Guidelines for Hazardous Substance Response Team Capabilities. As this document represents guidelines and is not a standard, the subcommittee recommended that marine-specific competencies for emergency responder guidelines be forwarded to a standards organization.

Most of the first responders for hazardous materials incidents are trained on land to respond to land-based incidents. Unfortunately, the work of the Hazardous Substance Response Standards Subcommittee revealed that the marine environment provides unique challenges for these response teams. It was decided that there is a need to specify in a standard the special skills, training, and team requirements necessary for emergency responders in the marine environment.

Issues and concerns relating to the marine transportation of hazardous materials in bulk are unique to the Coast Guard. While the Occupational Safety and Health Administration protects the workforce in other U.S. industries, licensed marine workers are protected solely by Coast Guard regulations.

Based on a review of existing industry standards and guidelines, CTAC decided that marine-specific requirements would best fit in the National Fire Protection Association (NFPA) 472 Standard, Professional Competence of Responders to Hazardous Materials Incidents. This decision led to the formation of the CTAC NFPA 472 Subcommittee in 2004. Ms. Parminder Sandhu of Marathon Petroleum Co., LLC chairs the subcommittee, which held its first meeting in June 2004.

Working with the National Fire Protection Association Technical Committee, which is responsible for maintaining and updating the NFPA 472 Standard, the CTAC subcommittee drafted the marine-specific emergency responder chapter. The final draft of the chapter, "Competencies for the Technician with a Marine Tank Vessel Specialty," was unanimously approved by CTAC in April 2005. The chapter was then submitted to the NFPA Technical Committee in May 2005, before the public proposal closing date for the 2007 revision cycle of NFPA 472. The marine-specific competencies chapter was approved by the technical committee in July 2005 and will be incorporated in NFPA 472, when the 2007 revised edition is published.

The accomplishments of the CTAC NFPA 472 Subcommittee are very important to both the Coast Guard and industry. Competencies for responders to hazardous materials incidents in the marine environment will now be spelled out in a nationally recognized standard, NFPA 472. These competencies include the special skills, training, and team requirements necessary for emergency responders in the marine environment. This will greatly enhance response efforts and will help to reduce the potential impact to U.S. ports and waterways. The work of the CTAC NFPA 472 Subcommittee will continue to ensure that the marine-specific competencies are updated during future revision cycles of the NFPA 472 Standard.

As these examples show, working together, the Coast Guard and the marine industry continue to improve the safety, security, and environmental quality of our maritime system. While membership to CTAC is limited to those persons appointed by the Secretary of the Department of Homeland Security, the public is encouraged to attend all meetings. Subcommittee activities are open to members of the public, and CTAC has three active subcommittees: Hazardous Cargo Transportation Security Subcommittee, NFPA 472 Subcommittee and the Outreach Subcommittee. For more information on CTAC, visit its Web site at: http://www.uscg.mil/hq/g-m/mso/hms.htm or contact 202-267-1217.

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Alaska's Extreme Ferries

How the high-speed ferry M/V Fairweather *is making history in southeast Alaska.*

by Lt. Cmdr. William T. Jeffries
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There is a tender, if not sentimental, tone that many Alaskans use in matters concerning the ferryboats in the Gulf of Alaska. The ferry system's waterways, characterized by a maze of inlets and archipelagos from the outstretched Aleutian Islands in the west to Prince William Sound in central Alaska and Ketchikan in the southeast, have been traversed time and again by a dozen or so mainline vessels since 1963. All of these ferries, some more than 40 years old and capable of holding 750 passengers and 130 vehicles, have essentially served as the transportation lifeline and principal means for moving people, goods, and cars throughout the state's coastal communities.

Water, Water Everywhere

To those of us in the "lower 48," understanding a transportation system that offers no other basic public transit option but rugged water journeys might be difficult. Should Alaskan commuters from the southeastern city of Sitka, for example, wish to see a doctor, have a shopping excursion, or, in many cases, simply go to work, it is a multi-hour ferry ride anywhere from 100 to 400 miles that will get them there—not a bus, not their own cars, and certainly not the subway.

But for the U.S. Coast Guard and Alaska Marine Highway System (AMHS), which governs the state's water transportation services, these unique conditions allowed for maritime history to be written. Last year saw the arrival of the *M/V Fairweather*, a remarkable new member of the state's fleet of passenger-vehicle ferries.

The 235-foot, catamaran-style *M/V Fairweather* is the first high-speed passenger-vehicle ferry in the country. Not only is it a boon to Alaska's distinguished fleet of mainline ferries, it is, at $35 million, one of the most sophisticated vessels of its kind—a milestone for the Coast Guard and U.S. shipbuilders and the foundation for the rest of the U.S. fast ferry industry.

Where a typical, monohull displacement ferry moves at an average of 18 to 20 knots, the *M/V Fairweather*, at total capacity of 250 passengers and 35 vehicles on board, can achieve service speeds of 35 knots. In its first outing between Juneau and Haines last year, *M/V Fairweather* made the 78-mile run in two hours, half the time of any other vessel in the AMHS fleet.

To reflect on its progress one year after arrival, and after its first full season on feeder routes between Alaska's busy southeastern ports of Skagway, Haines,

Juneau, and Sitka, the *M/V Fairweather* already has a storied, albeit short, life. From its construction—a process entirely overseen by, among others, Coast Guard engineers—to its present operations schedule, the *Fairweather* is painstakingly monitored and maintained by crews, AHMS engineers, and Juneau-based Coast Guard staff, all of whom provide complementary efforts to ensure its success in the name of future fast ferry programs for other coastal cities within the United States.

The *Fairweather* dates back to the late 1990s, when it was the pet project of then-Governor Tony Knowles' administration, whose efforts led to a successful Capitol Hill campaign that raised about $70 million in initial funding for Alaska's fast ferry program. Upon completion, *Fairweather*'s celebrated service launch in spring 2004 was followed by serious labor issues, an engine failure, and some mishaps at sea, illustrating a certain degree of resilience and, if nothing else, cementing its place at home in Alaskan waters, where enduring a challenge with dignity and ingenuity seems to be the norm.

Revolutionizing the System

AMHS press materials described the *M/V Fairweather* as a new ferry "virtually revolutionizing the 40-year-old Alaska Marine Highway System." A key part of broad plans to expand Alaska's transportation services, *M/V Fairweather* was the first of two fast ferries to be delivered to the state and was followed in spring 2005 by a sister vessel, the *M/V Chenega*. With the *Fairweather* operating as a shuttle ferry in southeastern Alaska, the *Chenega* has been scheduled to serve as a shuttle during the summer months in the Prince William Sound area of south central Alaska, connecting the ports of Cordova, Valdez, and Whittier.

Plans are to utilize both ships as a couplet during the winter months in the busier southeastern region, where the ferries will essentially play tag between Juneau, Petersburg, and Ketchikan. All of this, according to Captain John Falvey, general manager of AMHS, is to see how successful these shuttles operate, so that the state can exercise its option for two more fast ferries by spring 2006.

"We have the option to continue on the trail we are on with this class of vessel," said Captain Falvey. "One of the reasons we're bringing Chenega out of Prince William Sound to run it in the southeast is to try to give us a feel as to how this is going to work, because Ketchikan is, in essence, where the third boat would run."

The incorporation of ferries like the *Fairweather*, its sister ship, and, perhaps, two more will allow long-term plans for more roads in Alaska to come to fruition, according to Captain Falvey. "The state of Alaska is attempting to build roads. We don't have a lot of roads, especially in the southeast," he continued. "Our transportation plan is calling for shuttle ferries to connect road heads."

The new fast ferries change the composition of the state's ferry fleet, said Captain Falvey, which historically has been comprised of large, long-haul mainline vessels. The massive mainline ferries, with lengths up to 408 feet, transport much-needed container vans, perishable food, and freight. They also connect residents, tourists, and commercial goods en masse to Alaska's gateway city of Ketchikan from the lower 48 by way of Bellingham, Washington and Prince Rupert, British Columbia.

"We will always have a certain degree of mainline ferries… there are just some places where the shuttle ferry-to-road head plan won't work because of the topography here," said Captain Falvey. "What we will end up with is a combination of roads, shuttle ferries, and some mainline ferries. The idea behind the fast ferries is to connect road heads. We are slowly getting away from all mainline ferries in the system.

"People are very dependent on the ferry system, especially in the southeast," he continued. "Ketchikan is on an island, and you cannot drive in or out of this town of 14,000 people. You either take one of our boats in or you fly in with Alaska Airlines."

He explained further the idea for stringing ferry shuttle service between Ketchikan all the way up to Haines. Even though cities like Ketchikan and Sitka will always be roadless, AMHS intends to provide faster travel from one point of the state to a road head farther north that leads into the interior with fast ferry service.

"Bottom line is travelers will literally be able to go from Ketchikan to Juneau all in one day," said Captain Falvey of the new fast ferry routes, which promise to cut travel time between those cites in half, eliminating overnight trips on some of these journeys.

Opposite: The *M/V Fairweather* underway at Auke Bay, northwest of Juneau. The glacier in the background is the Mendenhall Glacier, approximately 15 miles from downtown Juneau. Courtesy Alaska Marine Highway System.

Class Society

The *M/V Fairweather* is a high-speed catamaran made of aluminum alloy. A consortium of maritime experts was on hand between 2002 and 2004 to aid in the production and delivery of *Fairweather*, because it was to be the United States' first high-speed passenger-vehicle ferry, built to exacting international standards.

The *M/V Fairweather* was classed by the international classification society Det Norske Veritas (DNV) as "DNV Maltese Cross 1A1 HSLC, R3 Passenger Car Ferry A EO" and with full Coast Guard compliance to SOLAS/HSC Code Category. Formidable as it sounds, the *Fairweather*'s classification is "partly regulatory, but mostly an insurance function for shipping," said Lt. Daniel Buchsbaum, assistant chief of inspections in Coast Guard's Marine Safety Office in Juneau.

The Coast Guard played an instrumental role at nearly every stage of *M/V Fairweather*'s development—from her production and maiden voyage from the vessel's builders at Derecktor Shipyards in Bridgehampton, Conn., to the high-speed certification and training required to ultimately get the vessel into service.

As a classification society, the DNV has detailed rules for construction and operational maintenance that must be met. The Coast Guard is charged with interpreting the various guidelines dictated by the DNV classification, and it issues international regulatory certificates, specifically the high-speed craft code certificate. For a large vessel like *Fairweather* to remain insured, said Lt. Buchsbaum, it must maintain its classification society certification.

Integral to high-speed craft code protocol was rigorous classroom and on-board training for the crews of the *M/V Fairweather*. The Coast Guard's Marine Safety Office had the role of evaluating the training course that the Alaska Marine Highway developed.

The *M/V Fairweather* is classified as a route-specific vessel, which means that a route manual is created for each vessel, said Lt. Buchsbaum. Under the high-speed craft code, there must be route-specific training for all crewmembers, whereby they have to drive the vessel over the route they will be operating. As part of the training, Coast Guard personnel like Lt. Buchsbaum observed the crew aboard the vessel during route training.

"Not only do you have to be licensed to operate that particular vessel, you also have to be licensed on the route that you travel on, like a pilot would be licensed to travel on specific waters," said Lt. Buchsbaum. "Everybody who has a license to operate on the vessel, whether it be an engineer or the navigation officers, they have to have a license specific for the route they are traveling. It's a separate endorsement on their license to go to Skagway, a separate endorsement to go to Haines, and a separate endorsement to go to Sitka."

Cooperation

Awarded the project to build the *M/V Fairweather* and the *M/V Chenega* in February 2002 was Connecticut-based Derecktor Shipyards. Derecktor Shipyards teamed up with the naval architecture firm of Nigel Gee & Associates (NGA) of Southampton, England, and the builders used one of NGA's original designs, developed expressly for Alaska's fast ferry project. The Coast Guard, along with the AMHS and the classification society DNV, formed something of a client trifecta throughout the design and construction process, as contractors Derecktor Shipyards and NGA designed and built the *M/V Fairweather*.

"There were three entities involved, and they reviewed all the plans; then, the Coast Guard, along with the DNV, were both on board to survey the construction," said Mr. Gavin Higgins, general manager of Derecktor Shipyards. According to Mr. Higgins, the Coast Guard and DNV monitored construction every step of the way to make sure *Fairweather* was built to international high-speed code specifications.

"Everybody worked very well on this vessel," said Mr. Higgins. "We worked hard in the beginning to get good, clean channels of communication, so everybody would know what to expect and when they had to get their answers back."

Star Trek at Sea

According to the high-speed craft code, the bridge on a boat like the *M/V Fairweather* is called an operating compartment. In describing the operating compartment, Lt. Buchsbaum likes to say that a key qualification for someone to operate the giant catamaran is that "the person should be very good at video games," which is to say *Fairweather* is teeming with sophisticated technology and computerized controls.

"There are more than 3,000 points that are monitored on the vessel," said Mr. Higgins. "You have a number of different aids to navigation that are electronic, and they are all there to improve the safety. The charts are all electronic, and the radar is integrated with the charts, so you are getting radar overlays on the charts.

There is also night vision on board."

One notable piece of equipment essential for operating the vessel is the integrated machinery alarm and control (IMACS), also described as an advanced human machine interface. IMACS enables the ship's operator to stop not only the main engines but also all equipment on the vessel.

"If you picture a video game where you actually sit in and drive something, it's comparable to that," said Lt. Buchsbaum of the unique setup for manning the vessel, which requires two individuals to sit side by side with a console in between and the vast display of IMACS data before them. The operating station also includes standard navigation information and controls, including gyrocompass, GPS, AIS, radar, external microphone, ECDIS chart display, and low-light cameras for night vision. Because the two seated crewmembers are on watch all the time, said Lt. Buchsbaum, they are relieved at 20-minute intervals.

"The fatigue factor sets in because there is a lot of data to keep track of," he continued. "[Information] is just flying at you, and you are constantly adjusting things and looking at things to sort out where you are going and what is coming at you in terms of targets. It is very exhausting."

Design and Speed

The *M/V Fairweather* represents many firsts in the maritime industry. It is the first high-speed passenger-vehicle ferry in the country— most are displacement or monohull ferries, and some, built more recently, are catamaran-style but not designed for speed. *Fairweather* is the first aluminum passenger-vehicle ferry, the first vessel of its kind built to international standards, and the first high-speed ferry run by a major state organization.

Fairweather also cost more than a regular displacement ferry. Derecktor's Mr. Higgins said the vessel construction for *M/V Fairweather* and *M/V Chenega* was the company's largest commercial project in its 50-year history. A world-class manufacturer of high-speed crafts, yachts, and commercial vessels, Derecktor won the contract largely due to its experience and skill level in the field of highly stressed aluminum construction, machinery installations, and a weight-conscious approach to vessel construction.

The boat was designed to be a safe, high-speed, roll-on/roll-off passenger ferry that interfaced with existing AMHS docks and pier side facilities. It will travel up to 36 knots, or 41 miles per hour, and remain comfortable through sea conditions of up to 10-foot waves, or Sea State 6.

With its lightweight aluminum twin-hull design, the fast ferry is powered by four medium-speed diesel engines, which are bigger engines with more horsepower. The propulsion system calls for four MTU 16V595 diesel engines that drive four Kamewa 90SII water jets. With four powerful engines and two long, thin hulls, this kind of ferry planes across the water. Mr. Higgins credits the designer, NGA, for doing extensive research in hull forms.

"The reason we use catamarans for high-speed ferries is basically, as the ferry goes faster, you start to create an enormous wave and the ferry goes into a semi-planing and then full planing mode," said Mr. Higgins.

The catamaran's two giant hulls allowed the builders to put a bigger deck area between them, he said. To try to make one long, slender hull stand up on its own, the deck area would be too wide and too weighty. "With the catamaran, you have long slender hulls, which are low weight, and, consequently, the resistance to push the boat through the water is lower," he added.

While catamaran ferries are nothing new, according to Lt. Buchsbaum, naval architects like the firm of Nigel Gee have been re-engineering the catamaran hull form to get more out of the vessels, such as greater speed and better riding vessels in heavy seas.

"The other catamaran ferries do not conform to the properties found in the *Fairweather* to provide increased speed," said Lt. Buchsbaum. "Part of that success for speed has come because of the high-speed craft code that allows naval architects to take advantage of lightweight materials like aluminum to significantly decrease the weight of the vessel."

Mr. Higgins was quick to point out that the fast passenger-vehicle ferry is not for everyone. Through a fair amount of voyage analysis, he discussed some important variables in terms of optimizing high-speed ferries.

"The application of a high-speed ferry is dubious," said Mr. Higgins. "Unless it is a reasonable amount of time spent at high speed, the difference of the cost of [a regular displacement ferry] with a fast ferry doesn't make it worthwhile to go high speed." Fast ferries

like *M/V Fairweather* are best suited, according to Mr. Higgins, to particular geographic areas with large distances that need to be covered. Such conditions are more conducive to high-speed ferries than other regions with smaller stretches of waterways.

"You need to assess the advantages of traveling at high speed," said Mr. Higgins. "The time that you take to cycle from one end of your journey to the other end of your journey is very important to what you do during that journey. In terms of the time you spend loading and pulling away from a pier, voyag-

The high-speed ferry *M/V Fairweather* operates from Alaska Marine Highway System terminal at Auke Bay. Courtesy Alaska Marine Highway System.

ing from one point to another, slowing down, docking and discharging, and getting ready to receive new freight on board, that whole time period is important, and you need to analyze how much of that time was spent operating at high speed. There is a break-even point."

Mr. Higgins emphasized the use of passenger-vehicle ferries versus only passenger ferries. In New York Harbor, for example, he said it all boils down to cost. "There aren't many runs in New York that would make it worthwhile for actually running a real high-speed passenger-vehicle ferry," said Mr. Higgins. "Around New York Harbor, there are a lot of runs where it makes sense to run high-speed passenger ferries, but a real high-speed passenger-vehicle ferry is a pretty expensive animal these days, and you've got to have a run probably somewhere in excess of 15 miles to really make it pay off."

Of the *M/V Fairweather*, Mr. Higgins said: "In Alaska, you have the unique situation where you basically have a lot of communities that are separated by water or by roads. The *M/V Fairweather* runs daily between Juneau to Haines to Skagway—60 miles straight north before she goes to Sitka, which is another 120 miles. So, *Fairweather* goes to Haines twice a day and Skagway once a day, and this winter, down to Petersburg. Those are all excellent runs. These are big distances. We are chopping up big distances and bringing them down to manageable time slots. It is a great application of high-speed ferries."

While *Fairweather* carries up to 35 vehicles, other ferries in the AMHS fleet can carry up to 130 vehicles, including vans and trucks that move much-needed supplies from island to island. Overall, AMHS ferries move about 85,000 cars per year in southeast and southwest Alaska.

Mr. Higgins likened the *M/V Fairweather* to a high-speed ferry Derecktor completed in 1998 for Buquebus of Argentina, the *Patricia Olivia II*. Designed also by Nigel Gee & Associates, the *Patricia Olivia II* makes runs up to 100 miles from Buenos Aires to Montevideo, Paraguay, at operating speeds of about 53 knots. Also used to carry cars and passengers, the Argentinean vessel reached trial speeds of 57.5 knots.

Growing Pains

The efficiency and speed of the *M/V Fairweather* ushered in a brief but significant firestorm of labor problems for AMHS almost immediately after the ferry arrived in Alaska. Because *Fairweather*'s journeys were markedly faster than those of mainline vessels, there was no need for more than one crew a day, as compared to the older long line vessels that historically carried larger crews who rotated shifts and berthed on the boats. The high-speed *Fairweather* had, in essence, created a hub system, allowing its operational crew of 10 to operate during the day and go home at night. Moreover, *Fairweather*'s service schedule fluctuated from more operations in summer and fewer voyages in winter, thus, further reducing the staffing needs.

Involved in the complicated negotiations on behalf of ferry operators were three maritime unions that represented them: the Inland Boatmen's' Union; the Marine Engineers Beneficial Association; and the Masters, Mates & Pilots. Bargaining continued for nearly one year and required, at one point in January 2005, that the *Fairweather*'s service altogether cease operations until an agreement could be made between the three unions and Alaska's Department of Transportation.

In March 2005 the state and the unions reached an agreement outlining the number of crews and work schedules for winter and summer seasons. By the end of March 2005, the *M/V Fairweather* was back in service. "It took some time, but we resolved that issue," said Captain Falvey. "It is important to understand that for 40 years we've run mainline vessels where these crews work one to two weeks at a time. They live on the ship, and it is a 24-7 operation."

The new contracts are "a 180-out" from the old contracts, said Captain Falvey. It was very difficult negotiating those agreements, he added, because they were "very, very different from a mainline contract."

Murphy's Law

The *M/V Fairweather* was not without a few mishaps in its inaugural year in 2004. After a one-month delay, due to a longer-than-planned route training schedule, the long-awaited ferry officially started service at 7:00 a.m. on June 7. In her first spring-summer season—the warmer months in Alaska mean more ferry rides and calmer weather conditions—the vessel carried passengers between Haines, Juneau, Skagway, and Sitka without incident until early September, when one of the ferry's four engines failed.

While the vessel continued to run on three engines, AMHS announced that service to Sitka—which was at least 150 miles from the other three ports—would

be dependent on tides and winds. Still under warranty, the Fairweather's German-made engine was replaced at no cost during the vessel's scheduled lay-up period in October of that year. "The boat stayed online through its season. We didn't lose any time because of the engine failure, which is a big testament to everyone," said Mr. Higgins, who was on hand for the engine replacement last fall.

On a few occasions, the *Fairweather*'s lightweight aluminum frame and the elements of nature have also refused to cooperate. While departing Skagway early in the morning on September 21, 2004, the ferry allided with three of five stern lines of the Zaandam, a moored Holland America cruise ship. The ferry cut the lines in two and was pushed into a mooring dolphin. With 52 passengers, 10 crew, and 17 vehicles onboard, the *Fairweather* suffered minor damages, and the incident did not cause any injuries on either ship. An investigation shortly after revealed that a strong wind pushed the vessel off course.

Fairweather endured another incident on a stormy December afternoon in 2004, during a regularly scheduled Haines to Juneau trip, when the vessel was hit hard by large waves in Lynn Canal. With no injuries to passengers, the *Fairweather* was able to proceed to its berth, where it was taken out of service for repairs. The cowling, a non-structural, protective component designed to deflect water from the front of the boat between the two hulls, was bent inward by the force of the wave that hit the vessel.

According to Lt. Buchsbaum, the rated speed per wave height was not correct. The Coast Guard recalculated the speed per wave height and required a reduced speed with increased waves. With minimal wave heights, *Fairweather* may operate at a top speed of 42 knots. When conditions are calm in Lynn Canal, the vessel has reached 42 knots, said Lt. Buchsbaum. However, when currents are stronger and wave heights are higher, the vessel is required to slow down.

Those familiar with the vessel acknowledged that it might have been traveling too fast for current conditions when the damage was sustained. "The vessel can operate in those conditions," said Mr. Higgins of the severe weather that day, "but it just has to operate slower. It was seeing very high pressure under the wet deck."

Alaska's Main Attraction

Alaska's ferries service 32 communities in the state and carry about 300,000 passengers every year. The ferry system is billed, more often than not, as one of Alaska's top attractions. As described in one prominent tourism publication, an Alaskan ferry offers waterway scenery and the flexibility to experience Alaska's best-kept secrets.

The Alaskan perspective is somewhat different, according to Lt. Buchsbaum, for the ferries, from the grand old monohulls to the sleek, new *Fairweather*, are simply essential. They are the only way a resident can get around, and the only form of transportation that is cost effective. Still, there is no denying that they are as pleasurable as they are utilitarian, offering incredible scenery and almost always the promise of seeing a whale.

Describing a southeast inlet called Peril Straight, traversed regularly by the *Fairweather*, Lt. Buchsbaum said: "If you are out on the water in places where there are smaller inlet passages, the glaciers have essentially cut their way through the passes here. So your mountains are very tall and they are right next to the water…deep water right next to the shore. On either side as you transit, you are very close to the shoreline. It's extremely close, and just beautiful."

A ferry ride is an intoxicating journey to most, routine to the average Alaskan citizen. Nonetheless, in a resident's letter to the *Juneau Empire*, the *Fairweather*'s arrival, while making nautical history around the world, "gave cause for much celebration," but, most likely, for an entirely different set of reasons. For the U.S. Coast Guard, as one of its many marine safety initiatives in the state of Alaska, the integration of the *M/V Fairweather* and the high-speed program into the state's valued ferryboat system has been nothing if not a promising, fascinating process, and one that will serve future programs well.

About the authors: *Lt. Cmdr. William T. Jeffries has been with the Coast Guard for 20 years and recently assumed the post of Chief of Port Operations at the Anchorage Marine Safety Office (MSO). He served four years previously as Chief of Inspections in Juneau's MSO, where he inspected the* M/V Fairweather *upon her arrival in 2004.*

Ms. Daisy Khalifa is a freelance writer and media consultant and has worked in the communications field for 17 years. She has written feature and business articles for a variety of publications covering law, technology, telecommunications, real estate, and history. A native of California, Ms. Khalifa lives in Arlington, Va.

An Interagency Success Story

Coast Guard partnerships with Minerals Management Service and Federal Energy Regulatory Commission.

by Cmdr. John Cushing
Chief, U.S. Coast Guard Vessel & Facility Operating Standards Division

and Mr. James Magill
Offshore Engineer, U.S. Coast Guard Vessel & Facility Operating Standards Division

As a federal agency with wide-ranging and evolving maritime safety and security missions, the U.S. Coast Guard employs a motto, *Semper Paratus* (Always Ready), that is sometimes jokingly referred to as *Semper Gumby*, which roughly translates to "Always Flexible." The Coast Guard's Marine Safety and Security program is no exception, with expanding responsibilities to address traditional and newly emerging maritime safety and security risks within U.S. ports and coastal waters. In this capacity, the Coast Guard has regulatory responsibilities over commercial shipping and the offshore oil and gas industry and has overlapping responsibilities with other federal agencies that also regulate these industries.

To reduce redundancy and confusion, use federal resources more efficiently and effectively, and reduce the regulatory burden on industry, the Coast Guard has forged very successful partnerships with several federal agencies that have overlapping responsibility. Two excellent examples are the Coast Guard's partnership with the Minerals Management Service (MMS), a bureau of the U.S. Department of Interior, which shares regulatory responsibilities over the offshore oil and gas industry, and the Federal Energy Regulatory Commission (FERC), which shares regulatory responsibilities with regard to importation of liquefied natural gas (LNG) into our nation's ports.

The Coast Guard and Minerals Management Service share the statutory responsibility, under the Outer Continental Shelf Lands Act, for the safety and inspection of all Outer Continental Shelf oil and gas facilities. The Coast Guard and Federal Energy Regulatory Commission share statutory responsibility for the safe and secure importation of liquefied natural gas into our nation's ports.

Fixed Platform Inspection Program

The Coast Guard and Minerals Management Service share the statutory responsibility, under the Outer Continental Shelf Lands Act (OCSLA), for the safety and inspection of all Outer Continental Shelf (OCS) oil and gas facilities. On fixed OCS production facilities, of which there are more than 4,000 in the Gulf of Mexico, MMS regulates the structural integrity of the facility in addition to enforcing all regulations pertaining to production and activities such as drilling and workover operations. The Coast Guard regulates marine systems, including lifesaving and firefighting equipment, and workplace safety and health.

Prior to 1988, the Coast Guard conducted inspections on all fixed production facilities to determine if they complied with Coast Guard regulations. The Coast Guard amended its regulations, effective June 27, 1988, to implement a self-inspection program, which requires the owner or operator of a facility to conduct the annual inspection; with the Coast Guard only performing spot-check inspections on random facilities. However, the Coast Guard was only able to conduct annual spot-checks on less than 10 percent (less than 100) of the manned fixed OCS production facilities, due to the limited number of inspectors available who were tasked with other, higher priority marine safety missions.

On the other hand, MMS has continued to inspect all of the fixed OCS production facilities to inspect for violations in its area of responsibility, targeting the drilling and production equipment and activities. In 1998, the Coast Guard and MMS collaborated to review the regulations of both agencies to ensure consistency and to eliminate duplication. As part of this review, the Coast Guard and MMS decided that, because MMS was already inspecting all of the fixed OCS facilities at least once a year, it would benefit both agencies if the MMS was authorized, on behalf of the Coast Guard, to inspect and enforce the Coast Guard's regulations for fixed OCS production facilities. Such an authorization is provided for under the OCSLA, which allows the Coast Guard to use the services and personnel of other federal agencies for the enforcement of its OCS regulations.

The Coast Guard's Marine Safety and Security program has regulatory responsibilities over commercial shipping and the offshore oil and gas industry and has overlapping responsibilities with other federal agencies that also regulate these industries.

As a result, a joint MMS/Coast Guard rulemaking was initiated in 2001, culminating with a final rule that went into effect on June 7, 2002. The regulation authorizes MMS to conduct inspections on behalf of the Coast Guard on fixed OCS facilities and enforce Coast Guard regulations applicable to those facilities. The Coast Guard inspectors provided classroom and on-the-job training to Minerals Management Service inspectors on how to conduct a fixed Outer Continental Shelf facility inspection for those items regulated by the Coast Guard. The Coast Guard and MMS inspectors have worked closely together to develop this program and have continued to collaborate to ensure it is working successfully.

MOUs/MOAs

The Coast Guard and MMS have a Memorandum of Understanding (MOU) to clarify each agency's areas of responsibility on the OCS, which dates back to the inception of the OCSLA. This MOU has been revised a number of times, with the most recent revision signed on September 30, 2004. The MOU details how the two agencies will work together to regulate the oil and gas activities on the Outer Continental Shelf to keep pace with an industry facing rapidly evolving technologies and engineering designs for drilling and production in deepwater regions, with water depths reaching record levels approaching 10,000 feet. The MOU helps minimize duplication of effort, aids the Minerals Management Service and the Coast Guard in the successful completion of their assigned missions and responsibilities, and clarifies the roles and responsibilities of each agency for the regulated industry.

Increasing interest in building deepwater ports on the Outer Continental Shelf, including LNG import facilities, and additional security requirements created under the Maritime Transportation Security Act of 2002 are among the factors that prompted a significant overhaul of the MOU. At one of the quarterly meetings between senior Coast Guard and MMS management, MMS proposed revising the MOU that was signed in 1998 to encompass a new format.

This new format includes an MOU that serves as an umbrella document and outlines the basic framework of the two agencies' relationship, including legislative and regulatory authorities; areas of technical expertise; data sharing, research and interagency communi-

Minerals Management Service / U.S. Coast Guard Memorandum of Understanding signing ceremony. Standing, from left: Mr. Frank Esposito, U.S. Coast Guard Office of Environmental Law; Lt. Cmdr. Eric Walters, U.S. Coast Guard Office of Compliance; Mr. David M. Moore, Minerals Management Service; Lt. Cmdr. Kelly Post, U.S. Coast Guard Office of Investigations and Analysis; Mr. Jim Magill, U.S. Coast Guard Office of Operating and Environmental Standards; Capt. Dave Scott, U.S. Coast Guard Office of Operating and Environmental Standards; Mr. Brad Laubach, Minerals Management Service. Seated from left: Adm. Thomas Collins, Commandant of U.S. Coast Guard; Ms. Johnnie Burton, Director of Minerals Management Service; Rear Adm. T. H. Gilmour, U.S. Coast Guard Assistant Commandant for Prevention; and Mr. Bud Danenberger, Acting Associate Director of Offshore Minerals Management.

cations; regulatory synchronization; and other typical interagency concerns. The new format will facilitate the development of a number of subject matter-specific Memorandum of Agreements (MOAs) to address such topics as deepwater ports; offshore facility security; accident investigations and incident reporting; civil penalties; and oil spill planning, preparedness, and response. The advantage of this new format is that it allows the promulgation of new policy on specific areas of overlapping jurisdiction as separate MOAs, which will be subordinate documents to the MOU and can be developed and approved in a more expedient manner.

The latest version of the memorandum of understanding and the first MOA (MOA "OCS-01") were signed on September 30, 2004. Under the MOU, the two agencies will continue to foster communication and cooperation; optimize the use of government resources; develop common, compatible regulations and policies; encourage adoption of similar codes and standards; and assist the offshore industry in understanding applicable regulations. The new MOU and MOAs will enhance further cooperation and consistency between the Minerals Management Service and the Coast Guard, ensuring they continue to work successfully together toward the same offshore safety goals.

USCG and FERC Interagency Agreement

The Coast Guard and Federal Energy Regulatory Commission share statutory responsibility for the safe and secure importation of liquefied natural gas into U.S. ports. Under authority of the Magnuson Act and the Ports and Waterways Safety Act, the Coast Guard is responsible for assessing the suitability of a waterway for LNG marine traffic associated with the application for a new facility that will handle liquefied hazardous gas (LHG) or LNG. Once the waterway has been assessed, the cognizant Coast Guard Captain of the Port will issue a Letter of Recommendation (LOR) to the applicant as to the suitability of the waterway. Under authority of the Natural Gas Act and as delegated by the Department of Energy, FERC is responsible for authorizing the siting, construction, and operation of onshore LNG terminals and offshore terminals located within state waters. Once FERC receives an application to build a new LNG terminal, or reactivate or modify an existing one, in accordance with the National Environmental Policy Act (NEPA), it is required to complete an environmental review, which is usually documented in the form of an Environmental Impact Statement (EIS).

In February 2004 the Coast Guard, FERC, and the U.S. Department of Transportation, which regulates pipeline safety, entered into an Interagency Agreement.

This agreement commits each agency to work together to ensure that both land and marine safety and security issues for a proposed shore-side LNG terminal are addressed in a coordinated and comprehensive manner. This agreement also identifies FERC as the lead federal agency for preparing the environmental impact statement, and the Coast Guard acts as a cooperating agency to FERC for the EIS, serving as the subject matter expert for maritime safety and security. The agencies have agreed that maritime safety and security-related information will be addressed by FERC in the EIS process required under NEPA and disclosed to the public to the extent permitted by law.

These partnerships have been very beneficial to the Coast Guard, allowing us to streamline our policy and procedures and focus our limited resources where they are needed the most.

Navigation and Vessel Inspection Circular (NVIC) 05-05
The Coast Guard's regulations for the LOR process date from 1988 and clearly did not contemplate the maritime security challenges the United States faces today. While the current LOR regulations contain specific requirements addressing navigational safety and waterway management risk factors, it is clear in the post-September 11, 2001, world that security considerations must also be evaluated to make an adequate assessment of the suitability of a waterway for LNG marine traffic. This information must also be considered by FERC during the facility siting approval process.

A review of security considerations is also necessary to fulfill both agencies' NEPA compliance responsibilities in the environmental impact statement process, since this process allows for consideration of activities that are connected to the principal matter under environmental review, which is the siting of the proposed LNG terminal. In the case of shore-side LNG terminals, relevant connected activities include the LNG vessel transits to and from the LNG terminal and the potential impact of the LNG marine traffic on the safety and security of the port environment.

To address the lack of clear guidance on how to include security considerations when assessing the suitability of a waterway for LNG marine traffic, the Coast Guard collaborated extensively with FERC to develop NVIC 05-05, *Guidance on Assessing the Suitability of a Waterway for Liquefied Natural Gas (LNG) Marine Traffic.* This NVIC provides valuable guidance to the regulated industry on how to conduct a Waterway Suitability Assessment (WSA), taking into account both navigational safety as well as port security risk factors for the proposed LNG marine traffic. It also provides valuable guidance to the Coast Guard on how to review and validate the WSA, report critical information to FERC and collaborate with them on the development of the EIS, and issue the LOR. The NVIC would not be possible without very close cooperation between the Coast Guard and FERC to synchronize the timing of the evaluation and review process between the agencies and develop a framework to communicate critical information between agencies to meet all the necessary regulatory and statutory requirements.

Conclusion
These partnerships have been very beneficial to the Coast Guard, allowing us to streamline our policies and procedures and focus our limited resources where they are needed the most. These partnerships have also been very beneficial to the other federal agencies involved, the regulated industries, and the general public by ensuring more efficient use of taxpayer's money to more effectively enhance maritime safety and security. Furthermore, the success stories mentioned above are just a few examples of the ongoing efforts being made to improve cooperation between the agencies. They have opened the door to interagency communication from the field office level to the highest levels of management within each agency. These partnerships are clearly in the best interest for getting the most "bang for the buck" out of our federal government.

About the authors:
Cmdr. John Cushing was project manager and principal author for NVIC 05-05. He is a 1984 graduate of the U. S. Coast Guard Academy and has two master's degrees from MIT. He has 17 years of marine safety experience with tours at MSO Portland, Ore.; the Marine Safety Center in Washington, D.C.; the Eighth CG District in New Orleans, La.; and is currently assigned to CG Headquarters.

Mr. James Magill is a Naval Architect and Offshore Activities Specialist at U.S. Coast Guard Headquarters, Washington D.C. He has been with the Coast Guard 18 years, involved in writing and revising Coast Guard rules and formulating policy for offshore activities. Prior to that, Mr. Magill worked in the offshore industry in the design and construction of various drilling units. Mr. Magill is a naval architecture graduate of Belfast College of Technology, Northern Ireland. He is a member of the Royal Institution of Naval Architects, the Society of Naval Architects and Marine Engineers, and is a U.K. Professional Engineer. He has written a number of papers and articles on various offshore subjects and has represented the Coast Guard on many industry workshop panels and symposiums.

Reflagging the *WestPac Express*

Partnerships at work.

by Mr. Greg Brown
Vice President of Marine Operations, Hornblower Marine Services

On charter to the U.S. Navy Military Sealift Command, the 101-meter, high-speed catamaran Theatre Support Vessel *WestPac Express* has successfully undergone reflagging into the U.S. fleet. The conversion of this foreign-built and flagged high-speed vessel challenged everyone involved to find partnerships that work. The *WestPac Express* stands as an example of what the marine industry and the U.S. Coast Guard can accomplish, working together.

Designed and built by Austal Ships of Western Australia (Figure 1), and originally designed and constructed to international commercial standards, the vessel is now operated by Hornblower Marine Services of Indiana. It has been deployed to provide logistical transport for the Third Expeditionary Force (IIIMEF) of the U.S. Marine Corps, based in Okinawa, Japan

The *WestPac Express* was designed and constructed in accordance with the International Code of Safety for High-Speed Craft (HSC Code) in force at the time of keel lay in August 2000. It was registered in the Republic of Panama on completion in July 2001 (Table 1).

Figure 1: The 101-meter, high-speed catamaran Theatre Support Vessel *WestPac Express*.

Military Deployment
Although originally designed and constructed with an expectation that the vessel would ultimately be employed in commercial ferry service in Europe, the *WestPac Express* was chartered by the U.S. Navy Military Sealift Command as the first Theatre Support Vessel to transport U.S. Marine Corps and their equipment to exercises in the Western Pacific (Figure 2).

The vessel is based in Naha, on the Japanese island of Okinawa. It was initially chartered for a seven-month proof of concept charter to establish the viability of moving troops and equipment by high-speed craft. Previously, the Marines relied upon airlifts to move battalions from one island to another—a process that could take up to two weeks.

Figure 2: The *WestPac Express* transports U.S. Marine Corps and their equipment to exercises in the Western Pacific.

There are many U.S. military bases on Okinawa, including those of IIIMEF. Thus, although approximately 17,000 Marines are stationed on the island, almost all regular training exercises are conducted off-island, at regular training locations on mainland Japan, Korea, Guam, the Philippines, and Thailand.

Training is a vital element in retaining battle readiness. For the Third Expeditionary Force, this has been characterized by high costs of over $20 million per year, to engage the U.S. Air Mobility Command strategic lift aircraft to mobilize Marines and their equipment. These deployments typically require 14 to 16 days to fully deploy one battalion, via aircraft, as each aircraft can only carry a limited number of troops. This extended deployment period also meant that time was wasted, while troops waited to get to, or return from, exercises. The ship-based approach means that the Marines are able to travel with their equipment, instead of flying separately and having to meet up with their equipment on site.

Birth of the Theatre Support Vessel
Unlike normal commercial ferry services, where crewmembers are rostered on and go ashore each night; operation in a military role requires that the vessel and its crew undertake extended voyages of up to 36 hours. In other words, the vessel needs to be manned and operated in a similar way to most ocean-going vessels, requiring the addition of accommodations onboard for the crew. This involved a redesign, adding sleeping cabins in a modified area forward, with additional cabins located amidships, where the duty free shop had previously existed, and a number of rest cabins aft.

Most high-speed ferries operate on regular routes to designated ports and terminals, where link-spans or ramps are provided to avoid the need to fit the vessel with more than a watertight door. However, in the case of the *WestPac Express*, there was a need for the vessel to have the flexibility to operate to very basic facilities in locations far from established ports and infrastructure. A large folding ramp was designed and fitted to the stern, to enable loading and discharge of vehicles and cargo (Figure 3).

The Challenge: Reflagging to the United States
As a condition of the three-year charter, Austal was required to reflag the vessel from Panama to the United States. Because this vessel is chartered to the Military Sealift Command, it is a merchant vessel that falls within the jurisdiction of the U.S. Coast Guard and is manned by a civilian crew.

The Vessel Conversion Process

Following an initial review of the Coast Guard regulatory structure and likely requirements, Austal held a meeting with the Marine Safety Center in Washington, D.C., to introduce the project and the vessel and to identify the magnitude of the tasks involved in reflagging. About 24 persons attended the meeting, including representatives of the Marine Safety Center, Coast Guard Headquarters, and the Coast Guard National Maritime Center. In addition, there were two representatives from Austal USA, two from Germanischer Lloyd, and two observers from the charterer, Military Sealift Command.

Principal Dimensions	
Length Overall	101.00 meters
Length (Immersed hull)	88.70 meters
Beam (Moulded)	26.65 meters
Depth (Moulded)	9.40 meters
Hull Draft (Approx.)	4.20 meters
Vehicle Deck Clear heights	
Center Lanes	4.60 meters
Side Lanes	2.70 meters
Mezzanine Lanes	2.00 meters
Payload & Capacities	
Passengers	970
Vehicles	[1]152 HMMWVs or12 AAPs and 20 LAVs
Maximum Deadweight	750 tons
Maximum Axle Loads	
center lanes (dual wheels)	15.0 tons
(single wheels)	12.0 tons
side lanes	3.0 tons
mezzanine lanes	1.2 tons
Fuel	160,000 liters
Long Range Tanks	240,000 liters
Propulsion	
Main Engines	4 x Caterpillar 3618 4 x 7,200 kW @ 1,050 rpm
Gearboxes	4 x Reintjes VLJ 6831
Waterjets	4 x KaMeWa 125 SII
Performance (with Ride Control Fitted)	
Speed (500t DWT, 90% MCR)	36 knots
Fuel Consumption (approx.) @ 90% MCR	5.3 tons/hr

Table 1: Principal particulars of *WestPac Express*.

[1] HMMWV (High Mobility Multipurpose Wheeled Vehicle); AAVP (Amphibious Armoured Vehicle – Personnel); LAV (Light Armoured Vehicle).

One aspect that concerned the Coast Guard was the ability of the vessel to perform its military role, while still operating within the constraints of the HSC Code. Austal and the Military Sealift Command presented a plan that would clearly define the role of the vessel and types of cargo carried.

The Review Process

Coast Guard regulations require that all materials and equipment installed on U.S. flag ships must be Coast Guard approved or comply with U.S. standards. A literal interpretation of this requirement would have meant the extensive replacement of materials, fittings, and equipment already onboard—a very expensive and time-consuming process.

Austal gathered comprehensive supporting documentation with regard to the design standards of the *WestPac Express*, since the vessel was designed and built with operation in a European region in mind. So although Austal's records and documentation for the ship were extensive, they were largely based on Australian and European standards such as BS and DIN. This created a significant hurdle, namely trying to identify U.S. standards that were equivalent to the Australian and European standards. In many cases, Austal contacted the original suppliers and manufacturers to assist in identifying equivalencies. Where this was not possible, extensive documentation and extracts from standards and manufacturers' technical data were submitted with the drawings.

Similarly, most of the materials and equipment installed on the vessel carried certification from various classification societies or under the EU Wheelmark approval regime and, in some cases, Australian or European test authorities. In the majority of cases, the Coast Guard did not automatically accept these approvals. However, given the unique circumstances involving an existing vessel that was fully classed, acceptance was in some cases granted on a for-this-ship-only basis.

FEACT

The U.S. Coast Guard Far East Activities (FEACT), located on Yokota Air Base near Tokyo, Japan, performed the role of the Officers in Charge, Marine Inspection (OCMI) for this project, a role it undertakes with most Coast Guard matters within the Far East and Australasian region.

The OCMI's principal role in this case was to undertake inspections of the vessel to verify conformance with the plans that had been reviewed by the Marine Safety Center. Coast Guard inspectors took a particular interest in the *WestPac Express*, because it was a high-speed ferry, operating according to the requirements of the HSC Code, and because of its role transporting U.S. Marines.

This was reflected in the requirement that the operator, Hornblower Marine Services, had to develop a joint operating agreement (JOA) to be accepted by all parties involved in the operation of this vessel.

Joint Operating Agreement
The intent of this JOA was to join together all of the principal parties involved in the operation of the *WestPac Express*—AAA Shipping No 1 LLC (the ship owner), Austal Ships (the bareboat charterer from the owner), Hornblower Marine Services (operator and owner's representative), the Coast Guard, Military Sealift Command, Military Sealift Command Far East, and III Marine Expeditionary Force.

While each party is expert in its own field, each did not necessarily understand the limitations and constraints associated with the operation of a high-speed craft under the HSC Code. Hence, the OCMI insisted that there be an agreement, signed by all parties, that clarified their shared responsibilities for the operation of the *WestPac Express*.

Although the JOA is in place, it is intended as a living document that can change, as the operation requires, subject to the mutual agreement of all parties. However, matters related to the regulatory requirements, safety, and security of the vessel may not be changed.

The JOA totals 18 pages and covers a number of operational topics, including

- chain of command;
- master's authority;
- voyage planning;
- vessel operating parameters;
- design characteristics and limitations;
- route restrictions;
- refuge;
- emergency evacuation procedures;
- work and rest periods;
- emergency support procedures;
- cargo operations and other operating parameters; and
- review by the Military Sealift Command and the Coast Guard, together with a communications matrix that lists the relevant representatives of each party.

Operations
Since the reflagging of the vessel to the United States, Indiana-based Hornblower Marine Services, Inc. has assumed the role of crewing, logistics, technical management, and day-to-day management of the vessel.

Manning
One of the first challenges in manning this vessel was the subject of high-speed craft type rating. Typically, in foreign flag fleets, this becomes a function of the attending class society. However, as a U.S. flagged vessel, those high-speed craft endorsements would be a function of the U.S. Coast Guard Merchant Marine licensing system.

Based on the guidance found in National Maritime Center (NMC) Policy Letter 06-01, "Qualifications for issuance of type rating endorsements authorizing service on high-speed craft," the first hurdle was going to be the lack of a commercially available NMC-approved high-speed craft training program. Compounding this challenge, the existing guidance had not taken into account a nontraditional role for a high-speed vessel. The guidance was created to accommodate traditional ferry operations with established routes, not open ocean deployment.

The operators at HMS had to develop, and the staff at the NMC needed to approve, a prototype program. This significant project was going to set the standard for high-speed vessels to follow.

The next step was for Hornblower Marine Services to submit the program, along with its trainers and evaluators, to NMC for approval. The first draft of a high-speed craft training course, based on HSC 18.3, NVIC 5-95 and NVIC 6-97 was offered to NMC in March 2003. On May 20, 2003, the first open waters High-Speed Craft Training Program was approved by the Coast Guard. The speed at which this program was approved was largely due the work of the evaluators at NMC. They were willing to collaborate with HMS in the revision process, and they gave clear, concise, and consistent comments through the evaluation and editing process.

The vessel now operates with a U.S. crew complement, holding Coast Guard licensing, Standards of Training, Certification, and Watchkeeping (STCW) endorsements, and High-Speed Craft Type Rating Certificates, appropriate for an unlimited tonnage and unlimited horsepower ocean-going vessel.

The complement of 13 persons, stated on the Certificate of Inspection, is comprised of:

- one Master;
- one Chief Officer;
- three Deck Officers;
- one Chief Engineer;
- one 2nd Engineer;
- one Engineering Officer;
- three Able Bodied Seamen; and
- three Qualified Members, Engine Department.

Figure 3: As part of a redesign, a large folding ramp was fitted to the stern of the *WestPac Express*, to enable loading and discharge of vehicles and cargo.

The vessel's machinery plant is fully monitored and controlled from the engineer's console on the bridge as an unmanned engine room installation. Route lengths for the deployments vary from 500 to 3,000 nautical miles and are within the bounds stated on the ship's Permit to Operate, including the HSC Code requirement that the vessel should not operate more than four hours from a safe haven. Because of the prolonged operations required, the crew maintains a four-hour on, eight-hour off watchkeeping regime, to ensure continuity of safe operations.

This manning level is typical for similar ferries operating in commercial services and ensures adequate onboard resources to respond to any emergency scenario and to perform all mooring and berthing activities. Typically, these vessels have large supernumerary staffs that provide customer service functions. In times of emergencies, they augment the hard navigation crew in the areas of crowd control and evacuation. To duplicate this on the *WestPac Express* would have required an additional eight full-time crewmembers, which would have created a large burden on the owners and operators. In this area, the Coast Guard and the operator were able to find acceptable safe alternatives in operating the survival craft.

The vessel is equipped with four marine evacuation stations (MES), each outfitted with three inflatable life rafts. If the vessel is carrying a full load of passengers, it is necessary to be able to deploy all four stations, each requiring four persons to coordinate the evacuation.

To achieve this requirement, two selected passengers (Marines) are co-opted into a ship's platoon, to assist the ship's crew at each station. These Marines receive basic safety training, including familiarization with all details of the MES equipment, plus details of emergency routes and procedures for passenger assistance. During times of emergency, they are identified with a green safety vest and are assigned to a specific MES station.

A Successful Conclusion

From the start of the reflagging process in July 2002, until the American Flag was raised aboard the *WestPac Express* on September 15, 2003, there had been a constant and intense effort to achieve the reflagging. More than 3,000 letters, emails, and faxes were exchanged in this process. A very large number of Coast Guard personnel at MSC, HQ, NMC, National Vessel Documentation Center (NVDC) and FEACT involved in the project provided the willing cooperation and assistance.

This effort was also assisted by the design and build quality of the vessel and the very extensive documentation that was available from Austal. As the end user of the vessel, IIIMEF was very understanding and tolerant in scheduling work and inspections. Finally, the U.S. crew and the ship manager, HMS, were essential ingredients in the successful re-flagging of the vessel. They worked to maintain Coast Guard requirements and responded quickly to Coast Guard requests during marine inspections. All in all, this process was a great team effort!

About the author: *Mr. Greg Brown is the vice president of marine operations at Hornblower Marine Services.*

Partnership in Action

Crew endurance management.

by Ms. Amy Hewett
Director-Government Affairs, The American Waterways Operators

Nearly 31,000 tugboats and barges transport some 800 million tons of cargo annually in the United States.

Alertness, sleep, fatigue, diet, exercise, noise, heat, cold, light exposure, watch schedules. All are factors affecting the mariners who operate the 4,000 tugboats and towboats and 27,000 barges that move more than 800 million tons of cargo annually on U.S. inland and intracoastal waterways; the Great Lakes; and the Atlantic, Pacific, and Gulf Coasts. Operating year-round, 24 hours a day, barges and towing vessels move more than 60 percent of U.S. export grain; energy sources such as coal and petroleum, including most of New England's home heating oil and gasoline; and other bulk commodities that are the building blocks of the U.S. economy.

The American Waterways Operators (AWO), the national trade association representing the tugboat, towboat, and barge industry, and the U.S. Coast Guard have teamed up to address endurance factors facing the 24/7 world of towing industry operations. Recognizing that the public has zero tolerance for fatigue-related accidents, the Coast Guard and AWO have leveraged their long-standing safety partnership to work cooperatively on crew endurance issues affecting towing vessel crewmembers. For the last several years, the Coast Guard and AWO have focused their efforts on promoting the Crew Endurance Management System (CEMS), a holistic approach to addressing job-related environmental, operational, physiological, and psychological factors that may impact crew endurance. Both the Coast Guard and AWO are committed to developing practical, effective, non-regulatory approaches to enhance crew endurance throughout the towing industry.

Roots of the Coast Guard-AWO Safety Partnership

The Coast Guard-AWO Safety Partnership was established more than a decade ago, under the leadership of

then-Rear Adm. James Card, Assistant Commandant for Marine Safety and Environmental Protection, and AWO President and CEO Mr. Thomas Allegretti. A quality action team of Coast Guard and industry leaders, tasked with developing a non-regulatory process for communication and problem-solving and fostering the use of that process to advance common goals, drew up the framework for the partnership. In 1995 the Coast Guard and AWO signed a memorandum of understanding, officially establishing the Coast Guard-AWO Safety Partnership.

Over the last 10 years, more than 30 cooperative Coast Guard-industry initiatives have been launched under the auspices of the safety partnership, to address high-priority safety and environmental challenges facing the tugboat, towboat, and barge industry. Since 1999 the partnership has devoted significant resources to addressing crew endurance and alertness issues—a priority of both the Coast Guard and AWO. The crew alertness dialogue group, comprised of AWO members and alertness/endurance experts from the Coast Guard, was formed in 1999 to recommend ways to manage risk and ensure personnel safety in a 24-hour work environment. In December 2000 the safety partnership unveiled the *Stay Alert for Safety!* brochure for tugboat and towboat crewmembers. More than 35,000 brochures were distributed to mariners throughout the industry, to raise their awareness of alertness issues.

In 2002 a quality action team, established in the aftermath of a bridge allision in Seattle, Wash.—in which operator fatigue was a primary cause—recommended that AWO partner with the Coast Guard to promote the Crew Endurance Management System implementation in the barge and towing industry. That recommendation led to the formation of a Coast Guard-AWO crew endurance management working group, tasked with developing a plan to facilitate widespread implementation of CEMS throughout the barge and towing industry. Over the last two years, the group has had significant success in expanding access to CEMS training from private-sector sources, greatly increasing the opportunities for towing vessel crewmembers and industry managers to learn about CEMS. The working group has also developed a series of educational and outreach materials on CEMS.

Over the years, it has become increasingly obvious that endurance, fatigue, and alertness issues have a large role to play in any 24-hour industry. The National Transportation Safety Board, the government's chief transportation accident investigator, has repeatedly encouraged all modes of transportation to take more active steps to address the endurance challenge. The Coast Guard and the congressionally established Towing Safety Advisory Committee have endorsed CEMS as the preferred method of enhancing crew endurance in the tugboat, towboat, and barge industry. AWO and the Coast Guard have made it a priority to develop crew endurance management principles and techniques that can be implemented broadly throughout the barge and towing industry.

Where Did CEMS Come From?

By the late 1980s much was known about the science of crew endurance and the roles of the human biological clock, stress, and diet. What was missing was an effective way to take the science from the labs and books and apply it in the real world. Dr. Carlos Comperatore, a former researcher with the U.S. Army Tank Command, Special Operational Forces, developed the concept that has come to be known as crew endurance management. Dr. Comperatore was hired by the Coast Guard Research and Development Center in Groton, Conn., to apply his promising work on CEMS to both Coast Guard and commercial maritime operations.

Collaboration between the Coast Guard and AWO on endurance issues began at the research level under Dr. Comperatore's guidance. AWO members American Commercial Barge Line LLC, Kirby Corporation, and Ingram Barge Company welcomed Coast Guard researchers into their operations to study how endurance risk factors degrade crew performance. Researchers studied the working environments, including watch schedules, of towing vessel crews and assessed their impact on crewmembers' ability to perform their jobs. The researchers used light and sound meters and other tools to learn more about the environment onboard towing vessels.

As a result of this research with AWO members and his previous experience working with the military, Dr. Comperatore refined the CEMS process and worked with the Coast Guard's Human Element and Ship Design Division to publish the Crew Endurance Guide for Maritime Operations. The guide is the key document outlining the science and the practice of CEMS.

CEMS Is a System, Not Predetermined Outcomes

The term "crew endurance" refers to a crew's ability to maintain performance within safety limits, while enduring job-related physiological, psychological, and environmental challenges. CEMS is a system for managing the risk factors that can lead to human error and performance degradation in maritime work environments. CEMS is gaining momentum as a process that improves crew endurance by helping crews deal with endurance-related risk factors. To be effective, CEMS

requires a comprehensive, step-by-step approach to addressing such issues as awareness and education; lifestyle issues like diet and exercise; the physical environment onboard vessels, including light exposure management; company policies and procedures; and watch schedules. CEMS is a cycle of continuous improvement in which companies and vessel crews analyze risks, establish a plan to deal with those risks, implement the plan, evaluate the results, and modify the plan as necessary.

Over the last 10 years, more than 30 cooperative Coast Guard-industry initiatives have been launched under the auspices of the safety partnership, to address high-priority safety and environmental challenges facing the tugboat, towboat, and barge industry.

CEMS can be tailored to meet the unique needs of any vessel and any towing company, whether it operates line-haul boats on the Mississippi River; fleet boats in St. Louis Harbor; ocean-going tugs on the Atlantic or Pacific coasts; or harbor tugs in Baltimore, New Orleans, or San Francisco.

Demonstration Projects and Metrics

Seven AWO member companies—American Commercial Barge Line LLC; Blessey Marine Services, Inc.; Kirby Corporation; Marathon Petroleum; MEMCO Barge Line; Moran Towing Corporation; and Penn Maritime, Inc.—are participating in CEMS implementation demonstration projects. These projects will allow the Coast Guard and AWO to learn more about what it takes to implement CEMS successfully in different operating environments. Since the initial research on CEMS was conducted aboard inland towing vessels, the demonstration projects have grown to include companies in the inland, coastal, and harbor services sectors.

The demonstration projects are important, because as part of the Coast Guard and Maritime Transportation Act of 2004, Congress gave the Coast Guard discretionary authority to establish hours of service requirements for personnel on towing vessels. The legislation requires the Coast Guard to conduct CEMS demonstration projects on towing vessels and make a report to Congress before considering changes to the work hour requirements.

The AWO member companies involved in the demonstration projects are working closely with the Coast Guard to measure changes in risk factors over the course of CEMS implementation. Baseline measurements of endurance risk factors were taken as the companies began their CEMS programs. The baseline data were obtained through surveys and have been compared against more recent evaluations of endurance risk factors. The results will be presented in the Coast Guard's report to Congress, which was expected to be completed in late 2005.

Preliminary analysis of the data from the demonstration projects reveals that CEMS implementation has resulted in measurable reduction in endurance risk factors onboard towing vessels. Efforts to provide CEMS training for both CEMS coaches and other towing vessel crewmembers have produced marked increases in the number of trained personnel participating in the demonstration projects. Data have also been collected on the effects of physical improvements made to vessels, to make sleeping quarters darker and reduce noise levels and vibration; changes in food served onboard the vessels and crew diets; vessel policies concerning meal and shower times, courtesy, napping, and vessel maneuvering; and changes in watch schedules.

What's Next?

Through the safety partnership, AWO and the Coast Guard remain committed to working with tugboat, towboat, and barge companies to provide the necessary support for successful CEMS implementation.

With the distribution of the new *Crew Endurance Management: Getting Started, Making It Work* manual

complete, and work on the demonstration project report to Congress nearing completion, the Coast Guard-AWO working group is preparing to embark on its next challenge: assisting the Coast Guard in developing a Navigation and Vessel Inspection Circular (NVIC) on CEMS implementation. The working group will strive to ensure that the information in the NVIC is consistent with previously published CEMS resources.

Working cooperatively with the Coast Guard to help tugboat, towboat, and barge companies improve crew endurance and meet the challenges inherent in 24/7 operations is one of AWO's top safety priorities. AWO

Crew Endurance Management: Systems can be tailored to meet the unique needs of any vessel and any towing company.

will continue to work with the Coast Guard and member companies to promote CEMS as a flexible approach to crew endurance management that represents a more effective and practical alternative to prescriptive regulatory requirements.

About the author: *Ms. Amy Hewett serves as Director-Government Affairs for The American Waterways Operators, the national trade association representing the inland and coastal tugboat, towboat, and barge industry. Since joining AWO in 2000, Ms. Hewett has worked with federal agencies, including the Coast Guard, on regulatory issues affecting the barge and towing industry.*

Coast Guard-AWO CEMS Products and Resources

These resources are available to the public. More information about them can be found on the Crew Endurance Management (CEM) Web site at http://www.uscg.mil/hq/g-m/cems/index.htm. This Web site was launched in 2003 to provide one-stop-shopping for CEMS information.

Crew Endurance Management: Getting Started, Making It Work **is a user-friendly implementation guide for company safety professionals, focused on the practical application of CEMS in a towing company. Published in September 2005, this document was developed with significant input from the demonstration project participants and includes CEMS Q&A, CEMS tips, trip hazards to avoid, and testimonials from companies and mariners who work on boats that have implemented CEMS. The implementation guide is available through AWO or electronically on the CEM Web site.**

CEMS: The System **is a tri-fold brochure that provides a brief overview of the CEMS process—how to set up a crew endurance working group, analyze the current situation, develop a plan for addressing endurance risk factors, implement the plan, and evaluate the results to establish a cycle of continuous improvement. The brochure also presents some frequently asked questions about CEMS that clarify the flexibility of the CEMS program. The brochure can be viewed and printed from the CEM Web site.**

Coast Guard-AWO Executive Level Presentation and Script **is a PowerPoint presentation that presents CEMS as a real-world solution to endurance risk factors in the barge and towing industry. This presentation was developed by CEMS experts from AWO and the Coast Guard. It explains the science behind CEMS as well as the benefits of improved operations that result from CEMS implementation. It is intended to provide an overview of CEMS for company executives.**

Crew endurance coaches training information is available on the Coast Guard Web site and as a special feature in every edition of the *AWO Letter* (AWO's biweekly newsletter available at www.americanwaterways.com). CEMS coaches are critical to providing consistent, onboard support for CEMS implementation. To disseminate information on the availability of CEMS coaches training throughout the country, the Coast Guard and AWO provide information on upcoming coaches training classes, including date, location, and training provider contact information. As a result of these efforts, more than 500 CEMS coaches have been trained, mostly by private-sector sources using a Coast Guard-accepted curriculum.

Recovering the *Pacific Gayle*

Logistics and teamwork.

by Ms. Diane Shipway
Salvage Coordinator, Parker Diving Service

On November 26, 2004, the *Pacific Gayle*, a 58-foot steel crabbing vessel, went aground approximately two miles north of Usal Beach on the coast of California. After U.S. Coast Guard Station Noyo River Mobile Unit had rescued the captain and crew, Parker Diving Service was called to manage all environmental issues and to see if the *Pacific Gayle* could be safely removed from this remote shoreline.

***Gayle* Aground**

On November 27, 2004, a team, including representatives from Parker Diving Service and the National Response Corp.; Coast Guard Chief Warrant Officer John LaFlamme; California Department of Fish and Game Warden Joaquin Mariante; California State Parks and Recreation Supervising Ranger Kelly Roach; and *Pacific Gayle*'s owner Tim Estes and his insurance surveyor, Kevin Moore, put their heads together to devise a method to remove any hazardous material. Columbia Helicopters, Portland, Ore., was contracted to fly in all necessary equipment and remove any hazardous materials and items including crab pots, lines, and buoys that could entrap marine wildlife.

Figure 1: The *Pacific Gayle* aground.

The contracted helicopter was unable to land at the vessel wreck site, so all personnel had to hike the two miles to the *Pacific Gayle*. Work, nonetheless, commenced quickly, and by November 28, 2004, all hazardous material had been safely removed.

When it came time to address moving the vessel, team members determined that refloating the vessel and pulling it to sea would greatly increase the risk to the environment, equipment, and personnel as opposed to dismantling the vessel in place and air-lifting the pieces out. After much discussion, it was agreed that, due to limited daylight hours, impending winter storms, extreme high tides, and the rough terrain, the salvage efforts would be put off until spring. In the meantime, the *Pacific Gayle* would be nature's guest (Figure 1).

Removal Requires Teamwork, Planning

During the winter, Parker Diving Service checked on the *Pacific Gayle* several times, and each time the ocean had changed the vessel's position. After checking tides in April, the company formulated a safe wreck removal plan. Working with all agencies, every aspect of the job was discussed. It was determined that the safest way to dismantle the vessel was to use explosives. Randy and Patty Messer, from Western Blasting Technologies, Marysville, Calif., were contracted do the explosive work. Airlift Helicopters, Reno, Nev., was contracted to provide a Hughes 500 helicopter to transport equipment and personnel.

Figure 2: The vessel was dismantled using explosives.

Figure 3: The *Pacific Gayle*, in pieces.

Representatives from Parker Diving Service, Western Blasting Technologies, Air Lift Helicopters, the Coast Guard, the California Department of Fish and Game, and California State Parks and Recreation met with the insurance underwriters and the owner to formulate a plan for the *Gayle*'s removal. The first safety meeting lasted over two hours.

Safety, of course, was the first priority. The California Department of Fish and Game was responsible for the safety of all persons, including the public, the contractors, and crew. California State Parks had the daunting task of closing down 100 miles of popular, remote parkland and keeping the general public out of the danger zone. The Coast Guard was tasked with ensuring that the explosives were properly stored, handled, and detonated. In addition the Coast Guard secured the blast zone: a radius of one mile offshore of the wreck site. Parker Diving Service guards were placed strategically in four areas surrounding the immediate danger zone.

Success

Between April 25 and April 29, 2005, the team dismantled the vessel. After four blasts (Figure 2) and many man-hours, the *Pacific Gayle* was now a pile of steel rubble (Figure 3).

On May 10, 2005, Parker Diving Service returned to Usal Beach with a Columbia Helicopters 234 Chinook and, in less than four hours, removed 100,000 pounds of steel from the shoreline to a landing zone on the Campbell Timberland property. The company's crew cut the rubble into pieces small enough to fit in trucks, and the remains of the *Pacific Gayle* were loaded and trucked to Sims Metal Recycling Center, Richmond, Calif.

About the author: *Ms. Diane Shipway is salvage coordinator for Parker Diving Service. Her work involves coordinating with all agencies involved in an incident, preparing safety plans, and coordinating subcontractors and equipment. Prior to joining Parker Diving Service, Ms. Shipway was owner/operator of Vessel Assist, a towing and salvage company.*

The New Style of Crab Fishery

U.S. Coast Guard and industry work together to make fisheries safer.

by Petty Officer Sara Francis
U.S. Coast Guard 17th District, Office of Public Affairs

"Hook it!" A crewman leans over the side of the vessel, straining to hook the buoy rope that marks the prize. The crab pots have been soaking for 13 hours. He brings the rope onboard and slings it into the power winch. It begins to rise to the surface. Have they found the crabs? Metal breaks the surface as the first pot of the string appears. Red king crabs teem inside. As the pot swings over the deck and opens, the crabs spill out onto the processing table. Each crab is like a $20 bill, with legs.

Crab fishing is labeled as one of the most dangerous professions in the world. The U.S. Coast Guard, in cooperation with the Alaska Department of Fish and Game (ADF&G), the North Pacific Fisheries Management Council, and the National Marine Fisheries Service, is working to make the fisheries safer (Figure 1). Hands-on safety training, teamed with safety compliance inspections, has greatly reduced the number of accidents and deaths over the last decade. Since 1999, there has been a 65 to 70 percent decline in fatalities, due to vessel loss in the crab fisheries. In line with those efforts, federal, state, and local agencies and groups adopted the Crab Rationalization Plan for the 2005–2006 winter season. The plan dictates that the crab fisheries in the Bering Sea and the Aleutian Islands will no longer be derby-style fisheries.

Figure 1: Chief Petty Officer Dave Simmerman and Petty Officer Third Class Sarah Vega from Marine Safety Detachment Kodiak visually inspect a life ring and emergency marker light on the fishing vessel *Provider* during a dockside exam. The exam is intended to help the *Provider* prepare for an upcoming red king crab fishery. Petty Officer Kip Wadlow, USCG.

A Sea Change

"The Crab Rationalization Plan is the most complex fisheries management tool we've used yet," said Chief Petty Officer Zane Reser, a Coast Guard investigator and fishing vessel examiner from Marine Safety Office Anchorage. The derby-style fishery forced fishermen to a heightened level of competition, by hosting an overall quota of crabs to be caught as fast as possible. The fishery would last a week to 10 days, until the quota was met. The desire to catch as many crabs as possible, equaling as much money as possible, drove crews beyond their limits and caused them to make poor judgment calls where safety was concerned to maximize their haul.

The rationalization plan eliminated the overall quota and dealt out individual fishing quotas to boats, based on participation and catch history. Vessel operating costs have made the fishery uneconomical for some vessels. They will spend more money going fishing than the catch will bring in. Most of these vessels have chosen to join co-ops and allow the crews of larger vessels that can carry and use more pots to fish their quota for a percentage of the profit. Pot limits are established by ADF&G and have nothing to do with stability.

There are limits on the number of pots to be fished. For instance, last year the limit was 200 pots, so, if a vessel could carry 300, it could still only fish 200. If a vessel could only carry 120 pots and wanted to fish 200, it had to make an extra trip and use wet storage areas. This year, the pot limit has been set at 450 pots per vessel.

Vessel Stability is Vital

Every vessel has a stability letter and stability book, dictating the number of pots and supplies it can carry at any one time (Figure 2). The letter is also based on the size and weight of the pots. Many of the stability letters Coast Guard officials have seen in recent years dictate a vessel can carry a certain number of pots, but the letter lists those pots at 600 pounds rather than the 800 to 1,000 pound pots officials find onboard. Changing the weight of the pots radically changes the physics and stability of the vessel. It is vital that the crews of crab vessels abide by their stability letter, and, if pot weight or height has changed, they should obtain a new letter that takes the new dimensions into account.

The loss of the fishing vessel *Big Valley* during the 2005 Bering Sea opilio crab season vividly demonstrated the importance of vessel stability. While the official investigation to the incident is not complete, it is clear, based upon the information collected by Coast Guard investigators following the sinking, that the *Big Valley* was not only overloaded, but the average pot weight as listed in the vessel's stability letter did not match the weight of the pots that were loaded on the vessel. Specifically, while the pot weight as recorded in the *Big Valley*'s stability letter was 600 pounds (including line and buoys), the average weight of the pots onboard was determined to be 780 pounds. This 30 percent difference is dramatic and, alone, could have significant effects upon vessel stability.

Figure 2: The crew of the 103-foot fishing vessel *Determined* has stacked crab pots onboard in preparation for the 2005 Bristol Bay king crab opener. Petty Officer Chris McLaughlin, USCG.

Crab vessels that will be participating in the 2005

Bristol Bay red king crab fishery (Figure 3)—at press time, scheduled to open at 12:00 noon on October 15, 2005, and remain open through January 15, 2006—must have properly loaded pots and stability letters with accurate pot weights. Coast Guard officials will be examining crab vessels prior to their departure from Unalaska, Akutan, King Cove, and Kodiak. The Coast Guard has advised vessel owners and operators to ensure that their vessels' stability letters are current and accurately reflect current loading practices. Vessel operators should confirm that pot weights, amount of bait allowed, tank management (fuel burning practices), and number of tiers are accurate and strictly adhered to. Vessel captains are also expected to notify the Coast Guard of their departure intentions 24 hours prior to leaving port to fish. Coast Guard personnel conducted safety training (Figure 4), fishing vessel safety exams, and safety compliance inspections in Dutch Harbor, Akutan, King Cove and Kodiak during October and November 2005 to aid vessel crews in their preparations.

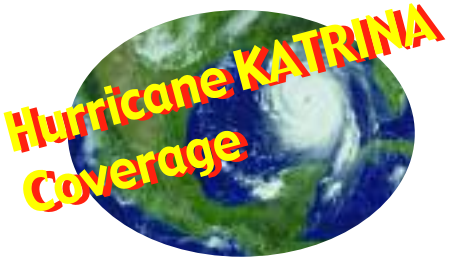
Figure 3: Fishermen repair and rig crab pots for loading at the *Western Pioneer* dock in Kodiak. Petty Officer Chris McLaughlin, USCG.

Figure 4: Max Mutch peers out of a life raft during a survival training evolution at the Kodiak Coast Guard base pool. He attended the training with his father; both are local fishermen. The training, hosted by the Coast Guard and the Alaska Marine Safety Education Association, included stability models, donning a survival suit, survival practices in the water, and use of a life raft and a Coast Guard hoist basket. Petty Officer Sara Francis, USCG.

About the author:

Sara Francis enlisted with the Coast Guard in 2000 after high school. She is now a first class petty officer and works in Public Affairs. Prior to Public Affairs she was a small boat engineer in Northern Michigan. Four of her five years have been served in Alaska. She currently lives in Anchorage with her husband and daughter.

Hurricane Katrina



The U.S. Coast Guard responds.

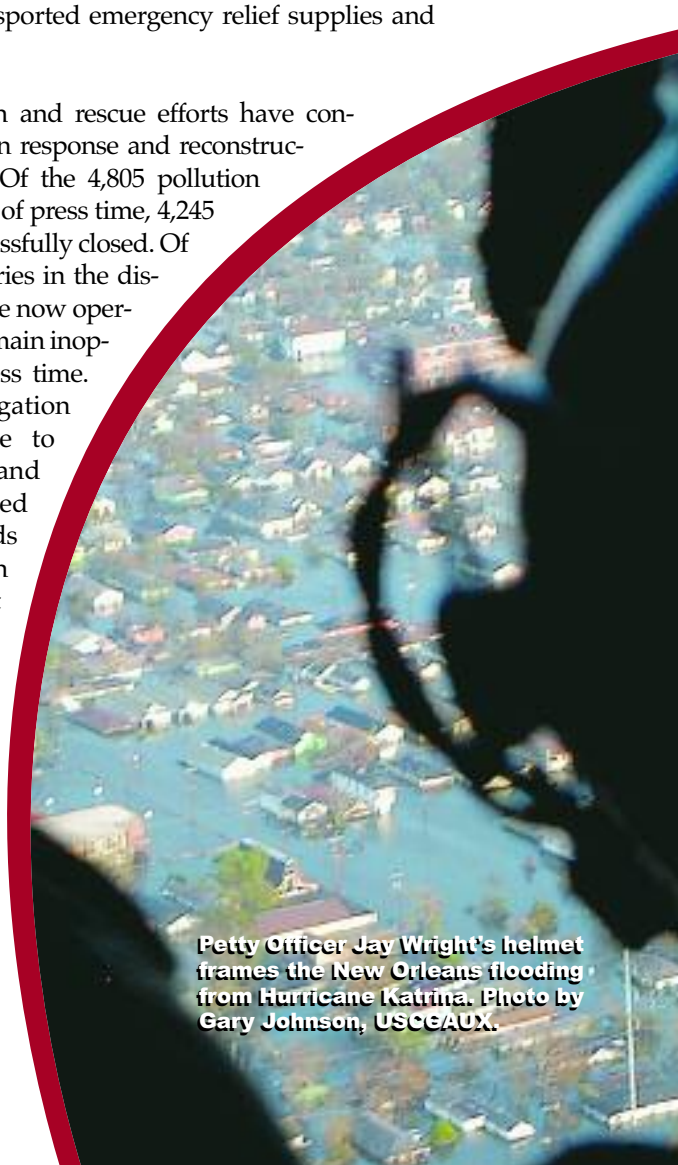
Hurricane Katrina struck the Gulf Coast August 29, 2005. The destruction from the storm stretched from Grand Isle, La., to Mobile, Ala. The power of the hurricane created a 90,000 square-mile area of destruction and impacted 6,400 miles of shoreline. It was one of the worst natural disasters in American history.

Coast Guard air crews that were pre-staged in Texas, Florida, and North Carolina began rescuing victims and surveying the damage as soon as weather conditions allowed. Thousands of Coast Guard personnel and assets from Coast Guard units around the country were sent to assist. More than 5,000 Coast Guard personnel conducted search, rescue, response, waterway reconstitution, environmental assessment operations, facilities damage assessments, and emergency repairs and established temporary operational and support facilities throughout the disaster area following Hurricane Katrina. The Coast Guard Reserve and Auxiliary played major sustaining roles in these events. Vice Adm. Thad Allen was appointed as the Department of Homeland Security Principal Federal Official (PFO) for the federal response to Hurricane Katrina. Also, Rear Adm. Larry Hereth was appointed PFO for Hurricane Rita, which made landfall on September 24, 2005, just east of Sabine, Texas. Although Rita did not result in as many rescues as Katrina, it nevertheless was very damaging and severely affected the U.S. energy sector.

The response to Hurricane Katrina remains one of the largest search and rescue operations in U.S. history. The Coast Guard used air and boat crews to rescue more than 24,273 people and assisted with the joint-agency evacuation of an additional 9,462 patients and medical personnel from hospitals in the damaged regions.

Eighteen HH-60J and 25 HH-65 helicopters participated in rescuing 12,661 people from peril, including three HH-65C aircraft. Coast Guard Cutter *Decisive* was the first major cutter on scene, and *Spencer* arrived in downtown New Orleans on September 1, 2005. Cutter *Gallatin* also supported recovery operations in New Orleans, and C-130 planes from air stations on both U.S. coasts transported emergency relief supplies and aircrews.

Although search and rescue efforts have concluded, pollution response and reconstruction continues. Of the 4,805 pollution cases opened as of press time, 4,245 have been successfully closed. Of the 56 oil refineries in the disaster areas, 48 are now operational; eight remain inoperable as of press time. Aids to Navigation Teams continue to assess, repair and replace damaged and missing aids to navigation (last count at press time was 2,015) along hundreds of miles, and the Coast Guard is coordinating the salvage of more than 2,900 vessels.



Petty Officer Jay Wright's helmet frames the New Orleans flooding from Hurricane Katrina. Photo by Gary Johnson, USCGAUX.

Petty Officer 2nd Class Scott D. Rady gives the signal to hoist a woman from her apartment.

Ensign Dan Donovan delivers food to a young hurricane victim near Gulfport, Miss.

A Coast Guard helicopter flies over a neighborhood devastated by Katrina.

Katrina's aftermath.

Chief Petty Officer Carey Bollinger loads cases of meals, ready-to-eat, into a helicopter.

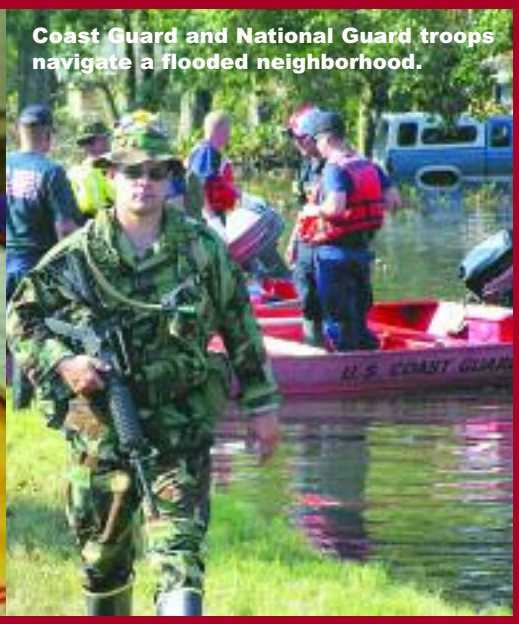
Members of U.S. Coast Guard Port Security Unit 309 help clean out a Gulfport, Miss., home.

Lt. j.g. Shay Williams, of Coast Guard Air Station New Orleans, carries a small child from the Superdome in New Orleans into a rescue helicopter.

USCG photos by Petty Officer NyxoLyno Cangemi; Chief Petty Officer Jeff Hall; Petty Officer Kyle Niemi; Petty Officer Danielle Demarino; Petty Officer L.F. Chambers; Petty Officer Luke Pinneo; Petty Officer Bobby Nash.

A Coast Guard search and rescue crew drags their skiff to look for people in distress.

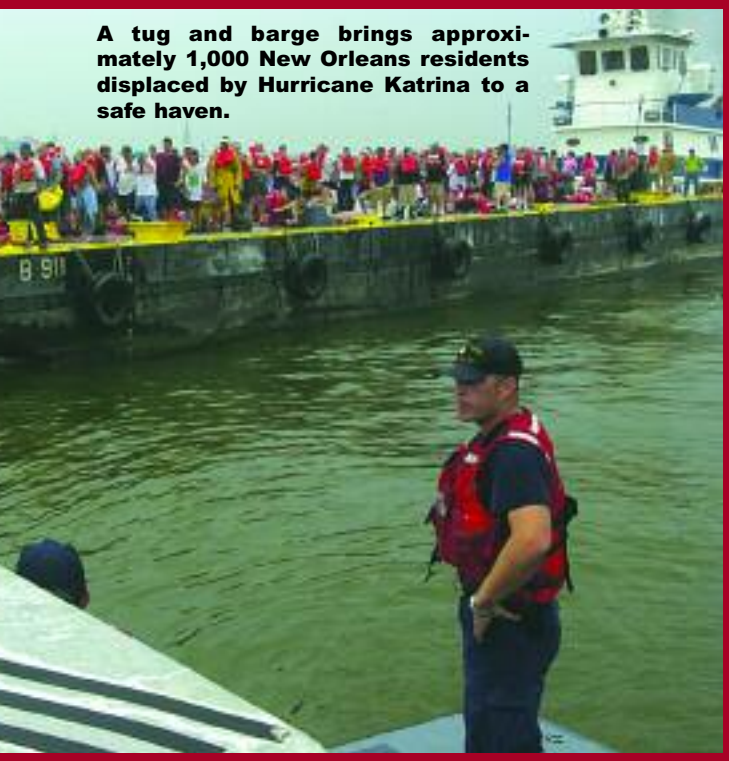
Coast Guard Petty Officer 1st Class Craig A. Miller signs an axe that will be displayed at the Coast Guard Aviation Training Center in Mobile, Ala., representing the unorthodox methods aviation crew members used to rescue Hurricane Katrina victims.



Coast Guard and National Guard troops navigate a flooded neighborhood.

Tugs work to free the bulk carrier *Polyhronis*, following the passage of Hurricane Katrina.

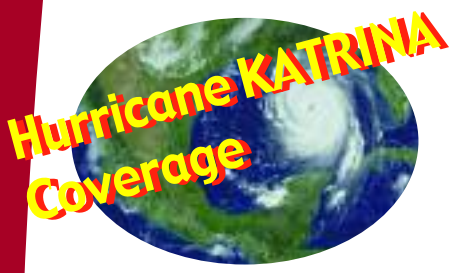
Capt. Frank Paskewich, commander of Coast Guard Sector New Orleans, looks out over the ravaged Superdome.



A tug and barge brings approximately 1,000 New Orleans residents displaced by Hurricane Katrina to a safe haven.

From left, Federal Emergency Management Agency Acting Director David Paulison, Department of Homeland Security Secretary Michael Chertoff, and U.S. Coast Guard Vice Adm. Thad Allen discuss ongoing Hurricane Katrina response efforts. DHS photo by Barry Bahler.

USCG photos by Gary Johnson, USCG Auxiliary; Petty Officer 2nd Class NyxoLyno Cangemi; Chief Petty Officer Jeff Hall; Petty Officer Robert Reed; Petty Officer 2nd Class Kyle Niemi; Petty Officer L.F. Chambers; Petty Officer Luke Pinneo; Petty Officer Bobby Nash; LT Dan Cost, Marine Safety Center (SERT)



Pack your patience. Leave your ego at home.

One man's story of Hurricane Katrina recovery duty.

by Mr. Albert G. Kirchner, Jr.
Chief, Budget, Administration & Planning Division
U.S. Coast Guard National Maritime Center

The morning after Hurricane Isabel struck my hometown of Annapolis, Md., on September 19, 2003, my wife and I ventured downtown to look at the damage done by a storm surge that was estimated to be between eight and 14 feet. The water had gone about 300 feet up the gentle slope of Main Street. Down by the City Dock, the water was up to the door handle on Stevens Hardware. People were casually rowing their dinghies as if on an afternoon stroll, and we counted eight Labrador retrievers splashing around, chasing after tennis balls at the circle by the Market Space. Despite the calm acceptance, it was still an incredible sight. Or, so I thought.

Just a few weeks shy of two years later, I volunteered through the Coast Guard to assist the Federal Emergency Management Agency (FEMA) with Hurricane Katrina's relief and recovery efforts along the Gulf Coast. I had been a charter employee of FEMA when it was created by President Carter in 1979, and, years later, after being the Chief of Marine Corps Fire and Rescue Services for nine years, I returned to FEMA as a senior executive political appointee, serving as Superintendent of the National Fire Academy. I expected that my 27 years of fire service experience and my FEMA background would be valuable assets to the operations in Louisiana. Even though this was true, there were still many surprises ahead for me.

The first leg of my journey was to my old home, the National Fire Academy, in Emmitsburg, Md., to in-process and be given an orientation brief. We were given one day to shop for specialized gear such as safety shoes, ponchos, flashlights, sunscreen, filter masks, latex gloves, and bug repellant and, then, given 24 hours to get to the FEMA Long Range Recovery Center (LRRC) in Orlando, Fla., for screening, just-in-time training, and deployment.

Still miles from the disaster, LRRC was a sight to behold. It was a large building that was a combination of offices and warehouse areas. The place was buzzing with all sorts of recovery workers like me who were busy going to briefings, getting shots for hepatitis and tetanus, and meeting our teams. As expected, there was some "hurry up and wait" and the types of assignments ranged from handing out fliers to the public to highly specialized, technical positions. Patience was essential here, and, as I would learn, critical to success throughout the duration of the mission.

The FEMA Joint Field Office in Baton Rouge, La., buzzes with activity.

The FEMA Long Range Recovery Center was a logistics miracle. Thousands of desks, phones, and computers were all set up and operating within days after the storm. Likewise, the LRRC training and office staff came across like old pros who had rehearsed their lines long before we arrived.

Off to Mission Impossible

When the screening people saw that I had an engineering degree, I was pulled out of class and deployed to the Joint Field Office (JFO) in Baton Rouge, La., because they desperately needed engineers in the logistics operation. That was okay, since I had some logistics experience from my days in the Army Reserve. When I reached JFO, where state and federal officials work side by side, I was in awe. The Joint Field Office was in a vacant department store that I was told was once one of the largest department stores in America. There were about 1,500 people working at folding tables, with wire strung everywhere, and phones ringing nonstop. Originally, I was assigned to operate a warehouse in the New Orleans area, but the section chief took a look at my qualifications and recognized that I could be better utilized elsewhere. He made a few calls, and I ended up working in the FEMA Public Assistance Program to restore public buildings, roads, and other public infrastructure.

I was assigned to a team comprised of two other engineers and deployed to Louis Armstrong New Orleans International Airport in Kenner, La., to help get the airport reopened. My first job was to assess damage to the Aircraft Rescue and Fire Fighting (ARFF) Station and make recommendations for alternative ARFF coverage, if necessary. The ARFF facility had to be operational for the airport to reopen.

Louis Armstrong New Orleans International Airport

Enroute to the airport on the morning of September 14, I read FEMA manuals to understand the process and the paperwork needed to get the New Orleans Airport Authority the funds they needed to repair and reopen the airport. We arrived at the airport to the eerie sight of a double line of ambulances parked the entire length of the departures level. I would later learn that the airport had been the triage and treatment area for thousands of people evacuated from the flood waters. In addition, there had been approximately 20,000 passengers and refugees living in the concourses for nearly a week, without clean water, adequate ventilation, or plumbing.

In the baggage claim area, as you walked from one end of the terminal to the other, the utilization of the carousels went from sleep facilities to triage and ambulatory care, then to non-ambulatory care to finally, the last carousel, which had served as a morgue. All that was left when I arrived were the Air Force security folks sleeping on carousels 6 through 8. Meanwhile, 7,200 Army troops from the 82nd Airborne Division were bivouacked at the long-term parking area and in every other nook and cranny out among the airport buildings. Numerous law enforcement personnel; a few dozen Forest Service personnel; and perhaps a dozen airport and Transportation Security Administration (TSA) folks, made homeless by the disaster, rounded out the population at Louis Armstrong.

On the tarmac between Concourses A and B, the Forest Service was running all of the support for the thousands of folks now on duty at the airport. A huge (300 ft. by 100 ft.) tent nicknamed the Grand Ballroom served as the dining facility. Food service trailers opened for breakfast at 5 a.m. and served the last hot dinner at 9 p.m. In addition, the tarmac was home to dozens of support personnel who prepared food, maintained the site, and did the laundry.

Fortunately, the ARFF facility was not damaged to the extent originally reported and was operational. To my delight, I would be working with an old colleague from my Marine Corps fire protection days, Chief Richard Blanchard, who had been a Navy installation fire chief before retiring and coming to the airport as Fire Chief.

A line of ambulances parked the entire length of the departures level at Louis Armstrong New Orleans International Airport.

The baggage claim carousels at Louis Armstrong New Orleans International Airport were used in the immediate aftermath of Hurricane Katrina as a triage and medical care area.

We quickly got the paperwork done to repair the roof and replace six apparatus bay overhead doors. I spent the next several weeks working with the team at the airport, doing damage assessments with contractors and working with the airport executive staff, almost all of whom had been made homeless by this storm, and had been living in their offices (one with her two dogs and one cat) since August 27. They were a remarkable team, always pleasant and always professional and a delight to work with. Who would guess they were also dealing with such serious personal losses?

Into the Eye of the Storm

Around September 27, I was asked to be the liaison to the New Orleans Fire Department for the FEMA City of New Orleans Strike Team. This would be my first entry into the city. We started at the Hyatt hotel downtown, where the city had established its Emergency Operations Center. The building had been badly battered on the outside. Inside there were National Guard troops maintaining security. In the Emergency Operations Center were approximately 20 major organizational or functional groups, with clusters of tables. FEMA; Red Cross; Corps of Engineers; Infrastructure; Finance; Logistics; National Guard; Public Safety (Police, Fire, and EMS); Public Utilities; and Command Group were some of the major players. I worked at the fire tables of the Public Safety cluster, along with personnel from the New Orleans Fire Department (NOFD); the Knoxville, Tenn., Fire Department; and the U.S. Forest Service. It was wonderful to see the National Incident Command System fully operational and how well it seemed to interface with the National Response Plan.

The Hyatt Hotel, downtown New Orleans, was badly battered by the storm.

The city did an excellent job running the Emergency Operations Center. Each morning began with a status report by all major agencies and functional areas involved with the rescue, relief, and recovery operations. Information such as daily mission objectives, weather forecasts, and status of critical infrastructure and services was disbursed. After the status report, city department heads met with state and federal officials for a detailed infrastructure recovery review.

I was to work with the fire department to document damage to their fire apparatus, their buildings, and their equipment. The Forest Service guys were handling the operational resource requests through E-TEAM, an electronic resource request system, or EMAC, an electronic mutual aid compact between the state emergency management agencies. These two mechanisms could locate and tap into huge resources in a matter of hours. It was impressive.

Early in my assignment with the fire department, I went out to Unified Katrina Command for fire operations at Holy Cross College, a small women's college in the West Bank section of the city. It was humbling to see fire fighters and fire apparatus from Illinois and New York City (FDNY) working together, 24-7, to help NOFD protect the citizens of New Orleans. The FDNY guys made me really proud. For the most part, their Incident Management Team

Air Force security personnel are housed in the baggage claim area of Louis Armstrong New Orleans International Airport.

organized and ran the operation. The planning and coordination was impeccable—what one would expect of a Marine Expeditionary Force. I took copies of their daily Incident Action Plan home for my local fire department to use.

Interesting Moments and Events

After about 33 days away from home, FEMA asked the Coast Guard if I could stay for another two months, and my superiors agreed to 45 days away from my full-time duties. I appreciated the opportunity to continue my work with the fire department, the people of New Orleans, and the outstanding cadre of FEMA people in the Public Assistance Program.

Just like my experience at the airport earlier, most of the local fire department folks were homeless, living on one of the Carnival Cruise Lines ships or with relatives. They worked the same long hours the FEMA people worked, and the work was difficult. The dimensions of the problems and their costs were enormous. For the fire department, most of their firehouses had been flooded, many requiring gutting and rehabilitation, some requiring total demolition. Most of their fire apparatus fleet was also damaged in some way, due to flooding.

As the city began to repopulate, traffic also became a problem. The majority of the intersections had no traffic signals, and we all had to stop, alternate which lanes got the 'go-ahead' and then look both ways again, when our turn came. Talk about delays!

Flat tires were a major concern. Storm debris was everywhere; after the storm, debris continued to fall off any of the thousands of trucks hauling it out of the city.

Early on, the political bickering and finger pointing had all of us concerned. We were conscious about not wearing our FEMA shirts or FEMA identification badges after hours in public places like grocery stores. All of that has changed. Local officials are running into the same problems that FEMA had at the earliest stages of the recovery and are telling their citizens the same things FEMA said then: "Please be patient. This is bigger than anything we've ever dealt with and we're doing the best we can."

There have been some funny moments and simply odd things that have happened while I was here. We were at a briefing when one FEMA person mentioned that he was having trouble getting to his hotel after work before the curfew went into effect at 8 p.m. The city official said that the New Orleans Police would honor our FEMA identification. The person said, "It's not the New Orleans Police that's the problem; the Minneapolis Police won't let me into the city."

On another night, I was waiting at a traffic light when a fire department pickup truck pulled up beside me. I was looking at the four grime-covered guys riding in the bed and then saw the lettering on the door of the truck: Menlo Park, Calif. Fire Department. A little far from home, aren't we? There were other odd sights, like 13 California Highway Patrol (CHiPs) cars, 30 Michigan State Police cars, a dozen or more New Jersey State Police cars, and enough cars from other police departments around the country to cover a football field. I saw several massive shopping center parking lots converted into campground/staging areas for hundreds of utility workers, along with their bucket trucks and huge stocks of supplies including telephone poles, transformers, and wire spools.

Road signs meant nothing during our travels; they were either missing or left twisted by the wind to give you the wrong route. One night I called a colleague

The tarmac at the airport was home to dozens of support personnel who prepared food, maintained the site, and did the laundry.

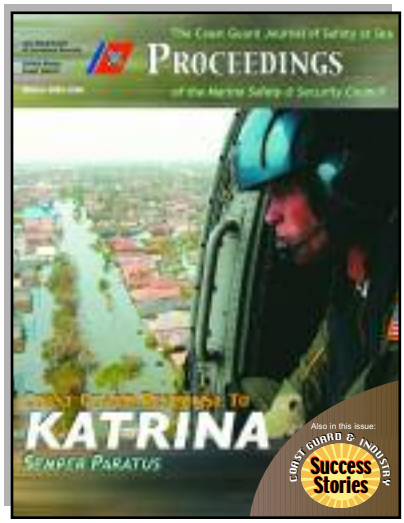
and asked him, "Rex, where are you?" There was a long pause as I guess he looked around for a street sign. Finally, he said, "From the best I can tell, I'm at the corner of Walk and Don't Walk."

On a personal level, the people of New Orleans have been a source of strength and encouragement for many of the relief and recovery workers here. Their courage is inspiring, their love and commitment to their city is unbelievable, and their focus on the future is steadfast. I have learned and grown immensely from this difficult and often heartbreaking experience. I am grateful to the Coast Guard for giving me the opportunity to do the good that I did and have this experience. I am thankful to the many wonderful people I had the chance to work with. They will be a source of strength and inspiration for years to come. Finally, I am more proud to be an American than ever before in my life. The outpouring of people and resources for disaster relief defies description. It was America at its best.

Finally, we cannot forget our global neighbors. I saw Canadian volunteers as well as several groups from Europe. I'm sure there were many nations from around the world who sent people or resources, perhaps both. We need to remember how much they care about us and that we owe these people our thanks as well.

About the author: *Mr. Albert G. Kirchner, Jr. is the Chief of the U.S. Coast Guard National Maritime Center Budget, Administration & Planning Division. During his 27-year career in the fire service, he served as Chief of Marine Corps Fire & Rescue Services with worldwide responsibilities for the Marine Corps, and served as the Superintendent of the National Fire Academy in the first Bush administration. Mr. Kirchner earned a Bachelor of Science degree in aerospace engineering from the University of Notre Dame and recently earned his second Master of Science degree, this one for Quality Systems Management from the National Graduate School. Mr. Kirchner is a retired field grade Infantry officer in the United States Army Reserve.*

The author documents damage to a New Orleans firehouse where 60-inch floodwaters destroyed two fire trucks and did nearly $500,000 damage to the building.



We'd Like Your Input

PROCEEDINGS Magazine, Winter 2005-06

READER'S SURVEY

As an effort to assist authors and the *Proceedings* magazine staff, this short questionnaire was developed. Please take a few moments to complete it.

Please return this questionnaire by email to ARL-DG-NMCFeedback@ballston.uscg.mil. Simply type the question number and your response in your email with a subject line of "Winter Proceedings." You may also return the survey by fax at 202-493-1065 by circling the number of your choice below.

1. Was the content in this issue of *Proceedings* useful to your pursuits in the maritime industry?

   Strongly Agree 5……4……3……2……1 Strongly Disagree

2. Was the design and layout of this issue of *Proceedings* pleasing to the eye and conducive to readability?

   Strongly Agree 5……4……3……2……1 Strongly Disagree

3. Do you have any suggestions for improvements to *Proceedings*?

   YES / NO.
   If you answered "yes," what would you like to see included?

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Special Supplement

2004 Maritime Casualty Statistics

Deaths and injuries.

by Ms. Chrystal Smith
U.S. Coast Guard Office of Investigations and Analysis

and Ms. Jennifer Kiefer
Technical Writer, SAGE Systems Technologies, LLC

This article focuses on the maritime fatalities and injuries reported to the Coast Guard that occurred in calendar year 2004. During that time, there were 84 fatalities and 573 injuries aboard U.S. flagged commercial vessels.

Commercial vessel owners and operators may be able to reduce injuries, and even deaths, by focusing safety efforts on slip and fall prevention.

Reports of Marine Casualties

As the saying goes, "accidents happen." And when they happen on the water, the Coast Guard is tasked with figuring out what went wrong. Under Title 46 of the U.S. Code of Federal Regulations, Part 4, the Coast Guard requires the owner, agent, master, operator, or person in charge of a commercial vessel to notify the Coast Guard when a vessel is involved in a marine casualty consisting of the following:

1. an unintended grounding, or an unintended strike of (allision with) a bridge;
2. an intended grounding, or an intended strike of a bridge that creates a hazard to navigation, the environment, or to the safety of a vessel;
3. a loss of main propulsion, primary steering, or any associated component or control system that reduces the maneuverability of the vessel;
4. an occurrence materially and adversely affecting the vessel's seaworthiness or fitness for service or route, including, but not limited to, fire, flooding, or failure of or damage to fixed fire-extinguishing systems, lifesaving equipment, auxiliary power-generating equipment, or bilge-pumping systems;
5. a loss of life;
6. an injury that requires professional medical treatment (treatment beyond first aid) and, if the person is engaged or employed on board a vessel in commercial service, that renders the individual unfit to perform his or her routine duties; or
7. an occurrence causing property damage in excess of $25,000, this damage including the cost of labor and material to restore the property to its condition before the occurrence, but not including the cost of salvage, cleaning, gas-freeing, drydocking, or demurrage.

(Information taken from 46 CFR 4.05-1—Notice of marine casualty)

Form CG-2692: Report of Marine Accident, Injury or Death is the required form used by the maritime industry to report all marine casualties. While the local Coast Guard Marine Safety Office or Sector conducts marine casualty and pollution investigations, it is the Office of Investigations and Analysis, located at Coast Guard Headquarters in Washington, D.C., that verifies and analyzes the information from the investigation report after it has been entered and stored in the Marine Information for Safety and Law Enforcement (MISLE) database system.

MISLE is a central data depository for various operational programs. It is not solely limited to the Coast Guard's marine investigations program but includes data derived from other programs, such as those overseen by the Office of Compliance in its domestic and

foreign vessel oversight responsibilities. The statistics derived from the data can highlight trends, both positive and negative, within the maritime industry and allow Coast Guard program managers and policy makers at national and local levels to take various actions to prevent future casualties.

Please note that the tables and graphs that follow are not all-encompassing and do not represent the complete range of data captured and maintained within the MISLE database. Fatality and injury information from casualties associated with medical conditions, suicide, and attempted suicide, and those involving recreational craft and public vessels were not included.

Fatalities

In 2004 there were 84 fatalities and 13 missing persons reported onboard U.S. commercial vessels. Most of the fatalities were associated with fishing vessels, passenger vessels, and towing vessels.

The fleet sizes of the various vessel types shown in Table 1 are not included in this basic presentation. Therefore, the relative risk of a particular vessel type cannot be determined from Table 1, as it does not consider, among other items, the fleet size or number of individuals onboard, whether present as crewmembers or passengers.

In 2004 several marine casualties resulted in multiple deaths:

- Four passengers and one crewmember drowned when the *Lady D*, a water taxi in Baltimore, Md., encountered a storm and overturned.
- Five crewmembers on the *Northern Edge*, a commercial fishing vessel, died when their vessel sank in the Atlantic Ocean.
- Two crewmembers on the *Relentless*, a commercial fishing vessel, died in the Gulf of the

LEARNING FROM THE CASUALTIES *Adriatic*

"Vessel calling Mayday, come back! Vessel calling Mayday, come back!"

That ominous request from a Coast Guard watchstander at the Group Atlantic City Operations Center set a desperate tone on January 18, 1999. Having received an unclear Mayday call at 2:58 p.m., the watchstander systematically attempted three callbacks to the vessel and issued an urgent marine information broadcast…all without success. The vessel's name and its location remained unknown until 6:50 p.m., when Station Atlantic City received a phone call reporting that the *F/V Adriatic*, a 74-foot steel-hulled clamming vessel, operating off the New Jersey Coast, was overdue. Speculating that the two events were related, the Coast Guard immediately launched a search and rescue. Early the next morning, the *Adriatic* was found lying on the ocean bottom in 60 feet of water, with no sign of survivors.

What Happened?

What transpired that caused the *Adriatic* to sink, taking with her the lives of all four men aboard? Puzzled by that question, as well as why several other commercial fishing vessels that were involved in the same clamming fishery sank in a short span of time, the Coast Guard established a Fishing Vessel Casualty Task Force. The result of the task force was the March 1999 publication of *Living to Fish/Dying to Fish*.

The report noted many common conditions among the casualties, including poor vessel or equipment condition, inadequate emergency response training, insufficient knowledge of survival gear usage, and lack of awareness and/or ignorance of stability issues. Some of the 59 recommendations included plans to increase the fishing vessel community's awareness of stability, survival gear, and occupational safety issues.

In the case of the *Adriatic*, Coast Guard investigators concluded that flooding of the engine room had resulted in the vessel becoming unstable and ultimately sinking. However, one of the primary causal factors was deemed to be a lack of a high standard of care in vessel maintenance and operation. Examinations of the wreckage by divers found numerous safety discrepancies, including the still-mounted Emergency Position Indicating Radio Beacon (EPIRB). Prior incidents with the *Adriatic*, including an improperly installed EPIRB hydrostatic release, and lack of crew drills also strongly indicated neglect.

In the Wake of Tragedy

Since the *Adriatic* casualty, the Coast Guard has aggressively pursued its efforts to better educate fishermen on vessel stability and other crucial survival issues. Specifically, the Coast Guard developed several hands-on training devices for fishermen—including stability trainers—and it continues to seek industry input though the Commercial Fishing Industry Vessel Advisory Committee. This insight is invaluable, since raising the commercial fishing vessel community's standard of care in maintenance and operation is a collaborative effort.

While historical casualty rates show us that commercial fishing remains inherently dangerous, reviewing accidents such as the *Adriatic* can help the entire maritime community prevent similar events. Ongoing investigations into the accidents from 2004 will continue to look for unsafe conditions or failed defenses and will attempt to find answers to the plaguing question, "How did it happen?" Only by looking back can the maritime community move forward in establishing a safer environment for all.

Table 1: COMMERCIAL VESSEL FATALITIES		
Types / Fatalities	**Accident Type**	
Fishing Vessel / 34	*Drowning*	*11*
	Exposure	*9*
	Fall into water	*5*
	Not specified in data	*3*
	Struck by moving object	*2*
	Dangerous atmosphere	*2*
	Crushed between objects	*1*
	Fall on board	*1*
Passenger Vessel / 28	*Diving (recreational)*	*13*
	Fall into water	*2*
	Drowning	*9*
	Not specified in data	*3*
	Fall on board	*1*
Towing Vessel / 10	*Fall into water*	*5*
	Drowning	*3*
	Exposure	*1*
	Not specified in data	*1*
Offshore Supply Vessel / 7	*Not specified in data*	*5*
	Crushed between objects	*1*
	Fall on board	*1*
Barge / 4	*Drowning*	*1*
	Fall into water	*1*
	Not specified in data	*1*
	Struck by moving object	*1*
Cutter/Dredger / 1	*Fall into water*	*1*
Dead Total		**84**
Missing Persons		
Fishing Vessel	*Missing*	*10*
Passenger Vessel	*Missing*	*1*
General Dry Cargo Ship	*Missing*	*1*
MODU	*Missing*	*1*
Missing Total		**13**

Farallones near San Francisco, when their vessel sank.

- Two crewmembers aboard the fishing vessel *Nancy Christine* died off the coast of Martha's Vineyard, when their vessel sank in heavy weather.
- Two crewmembers died when their shrimp fishing vessel overturned in the Gulf Intracoastal Waterway.

Based on the data in Table 1, it would appear that commercial vessel operators could prevent fatalities by focusing on:

- drowning-prevention procedures, such as the wearing of life jackets and other safety devices;
- precautions that limit a crewmember or passenger's risk of falling overboard, such as the possible use of safety lines and better side railings; and
- reducing the effect of exposure to the elements once overboard, such as the use of exposure suits while operating in colder climates and waters.

Injuries

Similar to the manner in which the fatality information is captured, MISLE uses a pick list to capture the nature of an event that results in an injury to an individual onboard a vessel. The pick list is broad and focuses on contact, noncontact, and other types of situations that lead to injuries. It includes selections for individuals colliding with fixed objects; being crushed between objects; falling into water; falling onto surfaces; being injured while line-handling; being struck by moving objects; being asphyxiated, burned, or exposed to a dangerous atmosphere; and other types of situations that result in injuries.

During the calendar year 2004, there were 573 reported injuries (Table 2).

Commercial vessel owners and operators may be able to reduce injuries, and even deaths, by focusing safety efforts on slip and fall prevention. Roughly 39 percent, or 222, of the total injuries that occurred during 2004 were related to falls. See Table 3. Similarly, with respect to fatalities, falls into water represented about 23 percent of the total deaths for 2004. The fall-related fatalities and fall-related injuries might be associated with the often unsteady surfaces of operating commercial vessels upon which mariners work.

Additional fall-prevention information for marine environments is available from the Naval Safety Center at http://www.safetycenter.navy.mil/acquisition/fall/default.htm. The document, *Accident Prevention Onboard Ship at Sea and in Port*, as developed by the International Labour Office, is available

The worst things that can happen in a real emergency are a lack of personnel knowledge of the emergency equipment or a lack of working equipment.

at www.ilo.org/public/english/support/publ/pdf/accident.pdf. It contains a wide range of information to reduce personnel accidents on commercial vessels.

Conclusion

As a regulatory body, the Coast Guard is responsible for developing and enforcing various maritime regulations. Reviewing statistics like those presented in this article is one method used by the Coast Guard. The Coast Guard also initiates safety actions directly as a result of investigations into casualties. In 2004, the Coast Guard moved forward with a review of small passenger vessel stability and a review of casualty data to identify targets for regulatory safety improvements in the towing vessel and fishing vessel industry.

While only a few of the 2004 casualty and injury statistics are presented in this article, there are many other important insights that investigations, and their resulting statistics, highlight for the Coast

Table 2: COMMERCIAL VESSEL INJURIES

Passenger Vessel / 213	*Fall on board*	*99*
	Diving	*29*
	Struck by moving object	*27*
	Not specified in data	*20*
	Fall into water	*11*
	Crushed between objects	*9*
	Overexertion injury- strain or sprain	*7*
	Line handling/caught in lines	*4*
	Burn	*4*
	Asphyxiation	*2*
	Dangerous atmosphere	*1*
Towing Vessel / 108	*Fall on board*	*38*
	Overexertion injury- strain or sprain	*21*
	Crushed between objects	*13*
	Line handling/caught in lines	*13*
	Struck by moving object	*9*
	Not specified in data	*8*
	Exposure	*4*
	Fall into water	*1*
	Burn	*1*
Fishing Vessel / 98	*Fall on board*	*32*
	Crushed between objects	*15*
	Struck by moving object	*14*
	Not specified in data	*10*
	Line handling/caught in lines	*7*
	Exposure	*5*
	Fall into water	*4*
	Overexertion injury- strain or sprain	*4*
	Dangerous atmosphere	*3*
	Burn	*3*
	Diving	*1*
General Dry Cargo Ship / 29	*Fall on board*	*12*
	Not specified in data	*7*
	Struck by moving object	*4*
	Crushed between objects	*2*
	Overexertion injury- strain or sprain	*2*
	Line handling/caught in lines	*1*
	Burn	*1*
Ro-Ro Cargo Ship / 25	*Fall on board*	*11*
	Overexertion injury- strain or sprain	*6*
	Struck by moving object	*4*
	Not specified in data	*3*
	Exposure	*1*
Bulk Carrier / 24	*Overexertion injury- strain or sprain*	*6*
	Not specified in data	*5*
	Fall on board	*5*
	Line handling/caught in lines	*4*
	Struck by moving object	*2*
	Crushed between objects	*2*
MODU / 22	*Crushed between objects*	*11*
	Struck by moving object	*5*
	Overexertion injury- strain or sprain	*3*
	Fall on board	*2*
	Not specified in data	*1*
Barge / 21	*Fall on board*	*7*
	Burn	*4*
	Overexertion injury- strain or sprain	*3*
	Crushed between objects	*2*
	Line handling/caught in lines	*2*
	Fall into water	*1*
	Struck by moving object	*1*
	Dangerous atmosphere	*1*
Offshore Supply Vessel / 11	*Fall on board*	*9*
	Not specified in data	*1*
	Line handling/caught in lines	*1*
Ocean Cruise Vessel / 6	*Fall on board*	*4*
	Struck by moving object	*2*
Tank Ship / 6	*Overexertion injury- strain or sprain*	*3*
	Not specified in data	*1*
	Struck by moving object	*1*
	Fall on board	*1*
Cutter/Dredger / 3	*Crushed between objects*	*1*
	Fall on board	*1*
	Line handling/caught in lines	*1*
Research Ship / 2	*Not specified in data*	*1*
	Diving	*1*
Cable Laying Vessel / 1	*Fall on board*	*1*
Industrial Vessel / 1	*Line handling/caught in lines*	*1*
Lift Boat / 1	*Not specified in data*	*1*
Pilot Vessel / 1	*Overexertion injury- strain or sprain*	*1*
Pipe Laying / 1	*Struck by moving object*	*1*
Injured Total		**573**

Guard. For example, Block 21 of Form CG-2692 asks if the firefighting, emergency, and/or life-saving equipment failed or was inadequate. That information can help determine problems within a specific company, and it is also valuable when merged with the other marine casualties into a single database. Reviewing the marine casualties together, it is easier to spot potential problems:

- Are there an unusual number of marine casualties occurring on the same waterway?
- Is one company experiencing more marine casualties than its competitors and, if so, why?

TYPE of INJURY	total	% of total*
Fall on board	222	39%
Struck by moving object	70	12%
Not specified in data	58	10%
Overexertion injury- strain or sprain	56	10%
Crushed between objects	55	10%
Line handling/caught in lines	34	6%
Diving	31	5%
Fall into water	17	3%
Burn	13	2%
Exposure	10	2%
Dangerous atmosphere	5	1%
Asphyxiation	2	3%
Total	**573**	

**percentage numbers rounded*

LEARNING FROM THE CASUALTIES *Miss Majestic*

Too often it takes a tragedy to highlight safety deficiencies. Such was the unfortunate case of the *M/V Miss Majestic* and its loss of 13 passengers on May 1, 1999.

The day started off with beautiful, calm weather as the Coast Guard-inspected small passenger vessel began its tour around St. John's Island in Lake Hamilton, near Hot Springs, Ark. Built in 1944 as an amphibious truck (also known as a DUKW) for the U.S. government, the *Miss Majestic* had been converted, like many other DUKWs, into a commercial sightseeing vessel. With the windshield left up, and the side curtains rolled up, a pleasant breeze greeted the 20 passengers and the vessel's master as they set off around noon.

The Incident

The master, who also served as tour guide, began her passenger orientation, casually pointing out the life preservers, but omitting any emergency evacuation procedures. In a sad twist of irony, she later stated that she rarely addressed the topic of evacuation, because it caused undue panic among passengers. Just a few minutes into the ride, though, two passengers noticed a small stream of water entering the vessel. Soon after, the master felt the *Miss Majestic* react sluggishly and list to port. To correct the problem, she attempted to turn the vessel toward shore but then noticed water on deck at the stern and over the floorboards. Recognizing the gravity of the situation, she quickly told the passengers to get off the vessel because it was sinking.

In less than 30 seconds from her recognition of distress, however, the vessel sank with all 21 people aboard. The master and seven passengers somehow managed to swim through its open side windows and rise up to the surface, overcoming confusion and disorientation from the dark waters. Thirteen passengers were later found drowned.

A Coast Guard investigation attributed the main cause of the sinking to flooding through the aft drive shaft housing, after the boot seal had dislodged from the shaft housing. Contributing factors included the inoperability of the Higgins bilge pump and absence of a high-level bilge alarm, two items that might have prevented the rapid sinking, had they been functional. Also noted as contributing factors were ineffective management oversight and a lack of operational testing of recent repairs. Numerous recommendations were made to improve each of the deficient areas.

Recommendations

One of the recommendations from the investigation was to hold meetings between the Coast Guard and the amphibious passenger vessel industry to develop guidelines of DUKW best practices. From these meetings came Navigation and Vessel Inspection Circular (NVIC) 1-01 that contains technical information and guidance related to amphibious passenger vessel inspections and operations. Additionally, the Coast Guard recommended that owners and operators provide the time and resources needed for safety inspections, including evaluations of hull integrity, flooding prevention, and emergency equipment and procedures assessments.

The *Miss Majestic* serves as a painful reminder of the importance of safety orientations aboard passenger vessels. Rather than causing panic, as the master of the *Miss Majestic* thought likely, these orientations should provide security to passengers who are in an unfamiliar setting. Both vessel crewmembers and passengers alike should learn from the *Miss Majestic's* casualty and renew their focus to clearly provide and listen to their vessel's specific safety orientations and evacuation procedures. Knowledge of these procedures is vital, and taking a few minutes at the beginning of a trip to familiarize oneself with them can truly save lives.

- Are the same pieces of equipment on vessels failing?

Questions like these help Coast Guard personnel be proactive in addressing various safety issues associated with marine casualties.

Industry's role in keeping the maritime community safe is obvious. As commercial vessels traverse the waterways, it is the operator's responsibility to abide by all regulations and to focus continually on all safety elements. Quality vessels with up-to-date and well-maintained equipment are important, and so are training sessions for all employees that keep them knowledgeable about the vessel equipment and its capabilities, along with regular drills using fire protection and life-saving equipment. The worst things that can happen in a real emergency are a lack of personnel knowledge of the emergency equipment or a lack of working equipment. It is imperative that industry invest in safety.

Maritime passengers can also play a large role in keeping the maritime community safe. Taking a few minutes upon first boarding a vessel to become familiar with the surroundings, including location of life saving equipment and exits, is a simple but valuable way of protecting oneself. Awareness of one's position on the vessel, before an accident happens, can save valuable seconds if problems do occur.

As with anything in life, prevention is the first key to safety. While marine casualties do indeed happen, many of them can actually be prevented if people take just a little more time to watch what they—and others—are doing.

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Correction

In the Summer 2005 issue, Vol 62, Number 2, an error occurred in the article, "Mariner Credentials," in the "Licensed Deck Department" table, p. 39. The corrected table with the corrected information highlighted is below. For the complete version of the corrected article, please visit www.uscg.mil/proceedings.

Licensed Deck Department

Description	Number of Mariners
Master Ocean Any	3,411
Master Near Coastal Any	93
Chief Mate Ocean Any	875
Chief Mate Near Coastal Any	3
Second Mate Ocean Any	1,417
Second Mate Near Coastal Any	8
Third Mate Ocean Any	3,475
Third Mate Near Coastal Any	102
Master Ocean Not More Than 1,600 tons	5,089
Master Near Coastal Not More Than 1,600 tons	2,742
Mate Ocean Not More Than 1,600 tons	286
Mate Near Coastal Not More Than 1,600 tons	985
Master Ocean Not More Than 500 tons	579
Master Near Coastal Not More Than 500 tons	1,269
Mate Ocean Not More Than 500 tons	78
Mate Near Coastal Not More Than 500 tons	181
Master Ocean Not More Than 200 tons	180
Master Near Coastal Not More Than 200 tons	2,184
Mate Near Coastal Not More Than 200 tons	972
Master Near Coastal Not More Than 100 tons	26,627
Master Uninspected Fishing Industry Vessel	804
Mate Uninspected Fishing Industry Vessel	204
Master (OSV)	130
Chief Mate (OSV)	1
Mate (OSV)	19
Master Great Lakes and In. Any	305
Mate Great Lakes and In. Any	222
Master Great Lakes and In. Not More Than 1,600 tons	155
Mate Great Lakes and In. Not More Than 1,600 tons	53
Master Great Lakes and In. Not More Than 200 tons	30
Mate Great Lakes and In. Not More Than 200 tons	12
Master Inland Any	1,049
Mate Inland Any	241
Master Inland Not More Than 200 tons	438
Mate Inland Not More Than 200 tons	353
Master Inland Not More Than 100 tons	7,451
Mate Inland Not More Than 100 tons	40
First Class Pilot	3,541
OUTV/Master Towing	13,336
2ND-Class OUTV/Mate (Pilot)	185
Apprentice Mate (Steersman)	84
Operator Uninspected Passenger Vessel	30,518
Assistant Towing Endorsement	21,332
Offshore Installation Manager (OIM)	1,784
Barge Supervisor (BS)	632
Ballast Control Operator	351

2005 Association for Rescue at Sea Awards

by Ms. Anne E. Skelton
Treasurer, Association for Rescue at Sea

On October 4, 2005, in Washington, D.C., the Association for Rescue at Sea (AFRAS) presented the AFRAS Gold Medal, three AFRAS Silver Medals, and the Amver plaque for heroic rescues made in 2004. The award ceremony and reception was co-hosted by the Honorable Howard Coble, co-Chairman, U.S. Congressional Coast Guard Caucus.

Honorees included: the Gold Medal winner, U.S. Coast Guard Petty Officer Gregory Gibbons, Aviation Maintenance Technician Third Class; the Silver Medal recipients, U.S. Coast Guard Auxiliarists Richard J. Runde, Jay P. Croy, and his wife, Linda R. Croy; and the Amver plaque recipients, the captain and crew of the Carnival Cruise Ship *Holiday*.

2005 AFRAS Gold Medalist AMT 3 Gregory Gibbons (center) introduces his pilot Lt. Tim Eason, without whom the rescue would not have been possible. At right, AFRAS Chairman Vice Adm. Roger Rufe, USCG (Ret.).

The Gold Medal

Gold Medal awardee AMT3 Gibbons is stationed at Coast Guard Station Kodiak. In 2004 he was serving with a helicopter aviation detachment with USCG HH-65B NR 6513 (Helo 6513) aboard the USCG Cutter *Alex Haley*. The cutter, along with two USCG HH-60J helicopters, had been working to rescue the crew of the *M/V Selendang Ayu*, a 738-foot freighter, hopelessly adrift in very heavy weather in the Bering Sea. Already the two other helicopters had rescued 18 of the 26 persons onboard, but as the helicopters departed the scene to refuel, the master reported that the ship was aground, taking on water rapidly, and all were in extreme peril.

The aviation detachment aboard the USCG Cutter *Alex Haley* was the only remaining rescue asset, but 25- to 30-foot seas and wind gusts as high as 45 knots made launch of a helicopter from the deck of the cutter highly problematic. Nevertheless, the pilot and aviation detachment decided to risk a launch, since others were in such peril aboard the freighter. During the *Alex Haley* helicopter's transit to the scene, USCG HH-60J NR 6020 (Helo 6020) returned from refueling. It was decided that, because

it could take eight survivors at once, Helo 6020 would proceed with the rescue and *Alex Haley*'s Helo 6513 would stand by to assist as necessary. But, after rescuing the first seven survivors, suddenly and without warning, a gigantic wave hit the bow of the *Selendang Ayu*, sending a huge wall of water into the air. Helo 6020 was engulfed in the water and went crashing into the sea, as the crew of Helo 6513 watched in horror.

The crew on the standby Helo 6513 from the cutter *Alex Haley* reacted

Before the crash. Coast Guard rescue helicopter 6020 is pictured transporting motor vessel *Selendang Ayu* crewmembers to the Coast Guard cutter *Alex Haley*. During these rescue efforts, Helo 6020 itself crashed.

An over-flight photo, taken weeks after the rescues, shows the bow and stern sections of the 378-foot freighter *Selendang Ayu* near Skan Bay.

quickly. Petty Officer Gibbons rigged the rescue basket for hoisting, while the pilot, Lt. Tim Eason, moved the helicopter into position from a 150-foot hover, to avoid additional waves.

Throughout the rescue operation, AMT3 Gibbons communicated to the pilot precisely where the helicopter needed to be positioned. The Coast Guard crew was able to position the rescue basket within arm's length of the survivors, including a severely hypothermic, unresponsive member of the ship's crew. All of the observable persons—including the pilot, copilot, and flight mechanic of Helo 6020 were safely hoisted aboard—but the ship's master and the rescue swimmer from Helo 6020 were still on the ship, and six other members of the ship's crew could not be located. Helo 6513 did not carry a rescue swimmer, so the rescue basket was the only hoist means available and Petty Officer Gibbons played a critical role in this whole operation.

After breaking off to refuel at Dutch Harbor, Helo 6513 managed to return through mountainous terrain and very heavy weather to find the *Selendang Ayu*, now broken in two and covered in heavy fuel oil. The vessel master and the Coast Guard rescue swimmer remained on the unlit, powerless bow section. Hoisting at 200 feet through heavy snow that sometimes reduced visibility to zero, the crew of Helo 6513 persisted and eventually retrieved both the master and the swimmer. With both survivors in good health, the crew continued to search for additional survivors until low fuel dictated they depart the scene.

Thanks to the work of the crew of Helo 6513 and Petty Officer Gibbons' skillful and courageous performance as a flight mechanic, six lives were saved, including the four from the downed NR 6020.

The Silver Medal

USCG Auxiliarist Jay P. Croy, coxswain; his wife, Linda R. Croy; and crewmember Richard J. Runde were onboard a USCG Auxiliary Facility—a 20-foot Grady White with cuddy cabin and inboard/outboard engine—performing patrol at the 33rd Annual Leech Lake Regatta in Walker, Minn., in August 2004. Leech Lake is a 460-square mile lake, which is known for unpredictable weather, including strong winds and high seas. On Leech Lake, as in many other large U.S. lakes, there is no Coast Guard presence, other than the USCG Auxiliary.

On the second day of the regatta, there were 10- to 15-knot winds and three-foot seas. The local Auxiliary Patrol Commander decided to deploy his two facilities near Pelican Island, at the farthest end of the race course, where they could rapidly respond to any crisis. Conditions worsened during the race, and, by the time the last participant had rounded the race buoy off Pelican Island, the winds were 15 to 20 knots with gusts as high as 35 knots. The two USCG Auxiliary Facilities began their slow trek back to base, following the regatta participants in, but noted that one of the sailboats had veered away from the course. Coxswain Croy brought his facility alongside the 25-foot scow *Wind Dancer* to find the crew (only two of whom were wearing life jackets) to be suffering from hypothermia, due to the rigors of racing in 57-degree F weather in such heavy winds and seas.

From left, Silver Medalists Jay P. Croy and Linda Croy, U.S. Coast Guard Auxiliary; Vice Adm. Terry Cross, U.S. Coast Guard; and Silver Medalist Richard J. Runde, U.S. Coast Guard Auxiliary.

Coxswain Croy decided to take the sailboat in tow, despite the walls of water coming over his bow and conditions worse than he had ever encountered in his 20 years of expe-

Captain Leonardo Francolla (right), Carnival Cruise Lines, accepts the AMVER plaque from AFRAS Chairman, Vice Adm. Roger Rufe, USCG (Ret.).

rience as an Auxiliarist. The problem was to maneuver close enough to pass a line to the exhausted *Wind Dancer* crew. Coxswain Croy was able to make a successful pass on the first try, and crewmembers Runde and Linda Croy floated a survival pack of extra life jackets and a thermal blanket back to the *Wind Dancer*.

As coxswain Croy worked to keep the bow of his facility into the waves and to maintain a proper tow, his crewmembers kept up a steady conversation over the radio to reassure the *Wind Dancer* sailors. The 3.5-mile tow to the nearest marina took one hour and fifteen minutes, due to high winds and four- to six-foot seas. Once into calmer waters, the two hypothermic sailors were transferred to the cuddy of the Auxiliary facility and given dry clothing and anti-exposure coveralls.

The Auxiliary crew attended to the crew of the *Wind Dancer* throughout the rescue, until the sailors were turned over to emergency medical personnel at Leech Lake Marina. The skillful response of these three volunteers is most heartily commended and is in keeping with the highest traditions of the U.S. Coast Guard and Coast Guard Auxiliary.

The Amver Award

On the night of August 21, 2004, the Carnival Cruise Ship *Holiday* was steaming through the Yucatan Straits in the Gulf of Mexico when two crewmembers came to the bridge to report that they thought they had heard a cry for help while standing on a weather deck. The bridge conning officer immediately instituted man overboard (MOB) procedures, stopped the ship, and called the captain to the bridge. The captain then reversed course and ran back down the global positioning system track to the MOB position shown on the screen.

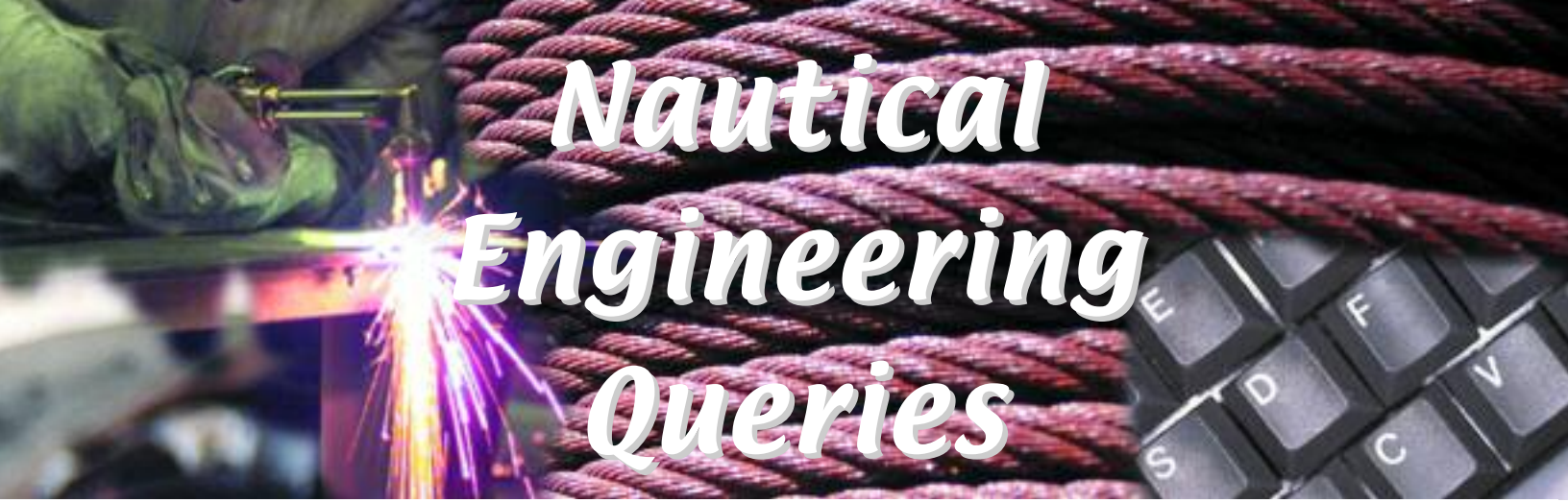
The ship's crew and passengers were mustered, but no one was reported missing. The ship continued to search the dark waters for anyone who may have been lost from another vessel. About 45 minutes later, two persons were located off the port side of the ship and brought on board. They reported that there were three additional persons in the water. The *Holiday*'s lifeboat continued to search for several more hours and located and recovered the three additional survivors. Of the last three recovered, one was a 10-year-old boy and another was his 39-year-old father, who was not wearing a life jacket but was clinging to a piece of wood. The five survivors were from a Mexican fishing boat and, other than being slightly hypothermic, were in good shape.

This rescue was conducted very professionally and represents one of the greatest traditions of the sea—a willingness to come to the aid of others in distress. Five very lucky fishermen are alive today because the captain was ready to stop his ship and carry out a 3.5-hour diversion from course to conduct search and rescue operations, with the help of his crew.

The Association for Rescue at Sea is a non-profit foundation with charitable status, which supports services concerned with saving lives at sea. The Gold Medal presentation was established in 1982, and the medal is presented annually to an enlisted member of the U.S. Coast Guard for an act of extraordinary bravery during a rescue at sea.

AFRAS established the Silver Medal in 2000, and it is presented when a Coast Guard Auxiliarist performs a rescue under the same criteria as that for an enlisted Coast Guard person. Silver denotes the uniform markings of a CG Auxiliarist as opposed to the gold of the Coast Guard.

The AFRAS Amver award was established in 1996 to recognize the contribution of mariners in ships at sea to the safety of their fellow mariners. Nominations for all awards are made by the U.S. Coast Guard's Search and Rescue Division.



1. Auxiliary steam at full operating pressure is supplied direct from the boiler to the _____.

A. turbo-generator
Incorrect: A typical turbo-generator on a steam propulsion vessel is supplied by superheated, main steam.

B. main air ejectors
Incorrect: The main air ejector is supplied auxiliary steam at a reduced pressure via a reduced pressure regulator set to maintain a pressure no less than 150 psi.

C. distilling plant
Incorrect: The distilling plant feed water heater is usually supplied by low pressure extraction steam at approximately 10 psia.

D. soot blowers
Correct Answer: The soot blowers are directly supplied by full auxiliary steam pressure, which may require a pressure reduction according to its location within the tube bank by use of an orifice plate.

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2. While vacuum is being raised on the main unit and the turbine warmed, condensate is re-circulated to the main condenser to _____.

Note: Condensate is re-circulated back to the main condenser to: 1) prevent the main condensate pump from running dry, which would lead to overheating, and uneven expansion of rotating components and eventual wear of close tolerance components. 2) aid in maintaining 10° F temperature differential of main condensate flowing through air ejector condensers, which assists in maintaining proper steam flow through air ejectors to continue removing non-condensable gases from the main condenser, and 3) assists in developing vacuum as a portion of the re-circulated condensate flashes upon entering the condenser, and as it condenses, the reduction in specific volume of the vapor enhances the developing vacuum.

A. ensure the condensation of the air ejector steam
Correct Answer: When raising vacuum, insufficient steam is exhausted to the main condenser. Hence, the quantity of condensate discharged by the main condensate pump through the air ejector condensers will be insufficient to condense the air ejector steam flow. If it were not for condensate re-circulation, the required steam flow rate through the air ejectors would decrease and diminish the ability of the air ejectors to extract non-condensable gases from the main condenser, and prevent vacuum from developing.

B. cool the main condenser shell for better vacuum
Incorrect: Re-circulating condensate does not cool the main condenser shell as shell temperature is a function of ambient engine room temperature and the corresponding saturation temperature to the vacuum maintained.

C. provide a condenser vacuum seal
Incorrect: The gland seal system prevents air from being drawn in along the turbine rotors through the use of low pressure steam supplied to the turbine rotor glands.

D. maintain a proper DC heater water level
Incorrect: The make-up feed and spill (dump) regulators provide the means to control the DC heater level.

3. In readying an auxiliary water-tube boiler for a routine hydrostatic test, which of the following procedures should be undertaken prior to filling the boiler with fresh water?

A. The safety valve escape piping should be disconnected from the valve body and a blank inserted.
Incorrect: Designated safety valve gags should be used when a boiler is being hydrostatically tested. If a blank is to be used, it should be placed on the inlet side of the safety valve, and not on the outlet.

B. The boiler vent valves should be opened.
Correct Answer: The vent valves should remain open while filling the boiler with water to ensure that all air is expelled. Once water exits the vent valves, the valves must be closed to ensure that the hydrostatic pressure will be maintained if all else is tight.

C. All handhole/manhole covers should be tightened up as much as possible to preclude any leaks.
Incorrect: Handhole/manhole cover gaskets should be sufficiently tightened to ensure a leak-proof mating surface. Over-tightening could result in gasket failure and/or handhole damage.

D. All of the above.
Incorrect: Choice "B" is the only correct answer.

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4. The primary source of steam to the auxiliary exhaust system is typically supplied directly from _____.

A. the main engine LP bleed
Incorrect: The LP bleed is a low pressure source of steam (approximately 10 psia) extracted off the main propulsion LP turbine primarily used to supply heat for the first stage main feedwater heater and the distiller salt water feed heater.

B. turbine driven and reciprocating steam pumps
Correct Answer: The exhaust from the turbine driven and reciprocating steam pumps such as steam driven boiler feedwater, cargo, and ballast pumps are the main source of steam for the auxiliary exhaust system.

C. the turbine gland exhaust system
Incorrect: The turbine gland exhaust system collects low pressure steam leak-off from the gland sealing system, and is evacuated by fan to the gland exhaust condenser.

D. all of the above
Incorrect: Choice "B" is the only correct answer.

Nautical Deck Queries

1. BOTH INTERNATIONAL & INLAND: A 200-meter vessel restricted in her ability to maneuver, at anchor, will sound a fog signal of _____.

A. a 5-second ringing of a bell forward and a 5-second sounding of a gong aft at intervals of 1 minute
Incorrect: This is the fog signal for an idle vessel of 100 meters or more in length, at anchor.

B. one prolonged followed by two short blasts every 2 minutes
Correct Answer: This is the correct fog signal for a vessel restricted in her ability to maneuver, underway or at anchor, regardless of her length. Vessels are considered to be restricted in their ability to maneuver, while at anchor, if they are attending to the maintenance of a navigation mark, submarine cable, or pipeline; or if they are engaged in dredging, surveying, or conducting underwater operations. These vessels, while constrained, are required to sound the same fog signal that would be sounded while underway.

C. one prolonged followed by three short blasts every minute
Incorrect: The sounding of a fog signal of one prolonged blast followed by three short blasts is required for a manned vessel being towed. If more than one vessel is being towed, the last vessel of the tow, and only if it is manned, will sound this signal. The sounding of this signal will be at intervals not to exceed two minutes, which may include being sounded at more frequent intervals, such as once every minute.

D. one prolonged followed by three short blasts every 2 minutes
Incorrect: This is a variation of the statement in "C" above. The indicated fog signal is to be sounded by a manned vessel being towed. When practicable, this signal shall be made immediately after the signal is sounded by the towing vessel. These vessels may sound their signals more frequently than once every two minutes, but the increased frequency is not required.

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2. A vessel is heading magnetic east and its magnetic compass indicates a heading of 086°. Which action should be taken to remove this error during compass adjustment?

Note: To enable the compass to indicate magnetic east (090°) by removing this error, the "compass card" must be rotated counterclockwise when the "blue south pole" end of a compensating magnet is attracted to the "red north pole" of the compass. The resultant action of the three incorrect choices will cause the "card" to rotate clockwise. The removal of error on east and west headings is accomplished by utilizing the fore-and-aft compensating bar magnets; three inches in length and fitted horizontally into a tray installed in the binnacle and whose vertical height is adjustable.

A. If the blue ends of the magnets are aft, and the fore-and-aft tray is at the top, you should add some magnets.
Correct Answer: By adding more magnets to the tray, the magnetic flux of the corrector magnets will be increased. Since the blue poles of the corrector magnets are aft of the center of the compass, it will induce a greater repulsion to the blue-south pole end of the compass to the right-hand side of the compass magnet and greater attraction of the red-north pole to the left-hand side of the compass magnet, causing the compass card to rotate counterclockwise as required.

B. If the blue ends of the magnets are aft you should lower the fore-and-aft tray.
Incorrect: By lowering the tray the effect of the magnetic flux is decreased. This reduces the repulsion on the blue-south pole of the compass magnet to the right-hand side and the attraction of the red pole to the left-hand side allowing the compass card to rotate clockwise.

C. If the blue ends of the magnets are aft, and the fore-and-aft tray is at the top, you should reverse the magnets.
Incorrect: Reversing the magnets requires the red ends to be placed aft in the tray. This action will increase the attraction of the blue-south pole on the right-hand side and repulse the red-north pole on the left-hand side causing the compass card to rotate clockwise, increasing the compass error.

D. If the blue ends of the magnets are forward, and the fore-and-aft tray is at the bottom, you should add some magnets.
Incorrect: This action also increases the attraction of the blue-south pole and the repulsion of the red-north pole, causing the compass card to rotate clockwise and increase the compass error.

3. Under the IALA-A Buoyage System, when entering from seaward, a buoy indicating the preferred channel is to starboard may have a _____.

Note: Historically, the International Association of Lighthouse Authorities (IALA) has defined two regions. The IALA-"A" (Region "A") buoyage system is used throughout Africa, Asia and Europe. The IALA-"B" (Region "B") system is used throughout the Americas and in the Philippines. In Region "B," red, even-numbered, "nun" buoys mark the right side of the channel (returning from sea) and thus, the expression, "Red-right-returning." This is reversed in Region "A," with green, odd-numbered "nun" buoys marking the right side of the channel (returning from sea). In both regions, red buoys are always even numbered. Preferred channel buoys are identified with red and green horizontal bands. In both systems, the top band color identifies the main channel, and if this buoy is lighted, the color of the light will be the same as the color of the top band.

A. green light

Incorrect: If a lighted buoy is used to indicate the main or preferred channel, the color of the light must be the same as the topmost color of the buoy, and in this instance would be red, not green.

B. long-flashing light characteristic

Incorrect: If the buoy is lighted, then the light characteristic used to indicate the preferred channel would be a composite group-flashing (2+1). This flashing characteristic is only permitted when indicating the preferred channel. A long-flashing light may be used to indicate a buoy that is otherwise marking the boundary line of the channel.

C. square topmark

Correct Answer: A square shape is shown on a paper chart as an icon for a "can" buoy (cylindrical shape) as if the silhouette of the buoy were viewed at the surface of the water. In both systems, if an unlighted buoy is to be used to indicate that the preferred channel is to its right, a "can" buoy will be deployed. The uppermost band and topmark will be colored red in Region "A."

D. conical shape

Incorrect: A cone-shaped "nun" buoy always indicates the channel is to port when an unlighted buoy is used to indicate the preferred channel.

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4. You are moving a gas free tank barge to dry dock for repairs. The barge must have onboard a valid _____.

A. Gas Free Certificate

Incorrect: There is no requirement to gas free the barge before moving it. In addition, nothing has been stated as to the type of repair that is to be made, of which "hot work" on the barge may not be required. However, certification of an appropriate gas free environment will be required before work is permitted to be performed in a tank, and can be provided after the barge has arrived at the repair yard.

B. Certificate of Inspection

Correct Answer: Since tank barges are inspected vessels, this vessel is required to have a valid Certificate of Inspection at all times.

C. Permit to Proceed and Hot Work Permit

Incorrect: A "Permit to Proceed" would be required for an inspected vessel that does not have a valid Certificate of Inspection. A "Hot Work Permit" is not required to move the barge, and is only required before any cutting or welding may begin.

D. All of the above

Incorrect: Choice "B" is the only correct answer.

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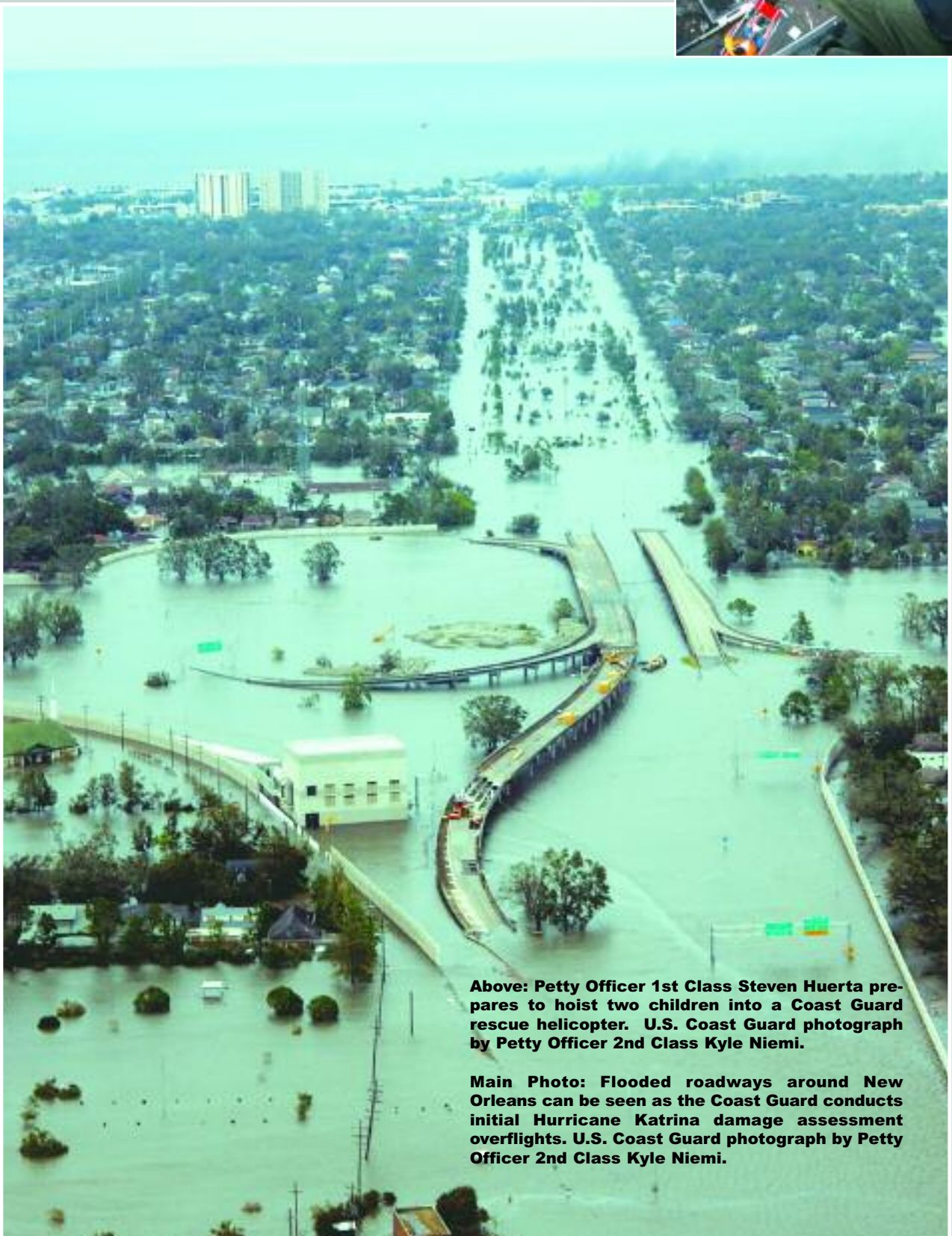

Above: Petty Officer 1st Class Steven Huerta prepares to hoist two children into a Coast Guard rescue helicopter. U.S. Coast Guard photograph by Petty Officer 2nd Class Kyle Niemi.

Main Photo: Flooded roadways around New Orleans can be seen as the Coast Guard conducts initial Hurricane Katrina damage assessment overflights. U.S. Coast Guard photograph by Petty Officer 2nd Class Kyle Niemi.