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Subchapter H Passenger Vessels

100 Years after *General Slocum*

PROCEEDINGS

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On the Cover

The passenger steamboat *General Slocum* prepares for its last voyage in June 1904. The ship caught fire and sank, bringing down more than 1,000 passengers with it. More information on this disaster and its effects can be read on pages 6-11. Courtesy "Ship Ablaze, The Tragedy of the Steamboat *General Slocum*," by Edward T. O'Donnell. **www.general-slocum.com**

A Safer Industry

Incident Analysis

Industry Involvement

Special to this Issue

On Deck

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A Safer Industry
The *Belle of St. Louis* was built as an integrated unit under the two-vessel concept. This system uses a dedicated towboat to push the passenger barge, although the vessels were built to appear as one vessel. Courtesy Gateway Riverboat Cruises. Man and ocean images copyright © 2003 USCG and its licensors.

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Industry Involvement
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Assistant Commandant's Perspective

by Rear Adm. THOMAS H. GILMOUR
Assistant Commandant for Marine Safety, Security & Environmental Protection

We learn from our experiences. Though we are committed to preventing maritime-related deaths and injuries, occasionally accidents occur. When they do, our job is to learn all that we can about what went wrong so we can take corrective measures to prevent recurrence of similar tragedies.

We saw this recently with the horrific ferry accident in New York. Despite the fact that millions of people use the U.S. ferry systems each year to go about their daily business, the industry has enjoyed a relatively safe record. There were only eight deaths on U.S.-flagged passenger vessels from 1992 to 2000, none of which were related to a major vessel accident such as a collision. No other transportation system can boast such a record.

This record was achieved after many years of experience; we evaluated what we did right and what needed improvement. Members of the maritime community worked together to identify and implement measures to ensure the safety of passenger vessels. We put in place regulations to help certify the safety condition of vessels by requiring that vessels carrying more than six passengers be inspected annually. We established professional standards that require mariners on these vessels meet minimum training and experience qualifications. We implemented the latest in technology, including a system of cameras, radars, and communication equipment to help mariners by alerting them of any vessel traffic service safety concern. And we have integrated the human factor into our inventory of preventive measures by trying to accommodate the needs of mariners into watch standing and other onboard responsibilities.

Despite these measures, a calamity occurred. Our goal now is to understand what went wrong so we can take the right action to prevent future tragedies.

When the unexpected occurred, however, we were ready. The Coast Guard and New York City Police and Fire Departments immediately responded to this emergency, tending to victims and searching for persons in the water. We quickly executed a security zone to prevent further loss and damage. And our Memorandum of Understanding with the National Transportation Safety Board was in place, enabling the investigation to begin immediately.

As the investigation into this tragedy unfolds, our job is to continue our mission of enforcing marine safety regulations to prevent deaths and injuries. In the meantime, we will search for answers to prevent such an accident from ever occurring again. We will learn from this experience.

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Champion's Point of View

by Capt. MICHAEL B. KARR
Chief, U.S. Coast Guard Office of Investigations & Analysis

This issue of *Proceedings* features large U.S. flag passenger vessels regulated under Subchapter H of the Code of Federal Regulations. You will read that these vessels transport passengers safely and reliably, with relatively few casualties or loss of life.

Accidents can occur and all of us involved in safety processes must make sure we do our best to prevent them. This issue of *Proceedings* marks the 100th year since the *General Slocum* fire and sinking, the horrible tragedy that occurred in June 1904, in which more than 1,000 lives were lost in New York's East River. The issue begins with a recounting of that tragedy and focuses on the causal factors related to the shortcomings of the regulators as they operated at that time. Let us regulators in 2004 mark the 100th year by using the *General Slocum* fire and sinking as a reminder to dedicate ourselves to perfecting our duties for preventing accidents.

The industry and the vessels have changed markedly since 1904. The large passenger vessel population now includes an active fleet of 177 vessels, including ferries, excursion and tour vessels, gaming vessels and other cruise vessels that operate with greater regulation, improved technology, and under an industry committed to safety.

Despite 100 years of advancement, accidents can still occur. The death toll of the *Andrew J. Barberi* allision of Oct. 15, 2003 on Staten Island, N.Y., has climbed to 11 with many other serious injuries. Generally, safety experts have said that seven to 58 "things" have to occur for an accident to take place. I expect that the NTSB and Coast Guard investigation and the study by the Global Maritime and Transportation School at the U.S. Merchant Marine Academy, ordered by the City of New York, will reveal many detailed facts and conclusions that can be identified as causal factors of this accident. When the final report of this accident is released, we should all look to see if any of the causal factors exist in our own organizations. This should be our continuous pursuit. The more of the "seven to 58 things" we can eliminate, the less likely an accident will occur. That is how we keep the low probability, high consequence event from occurring.

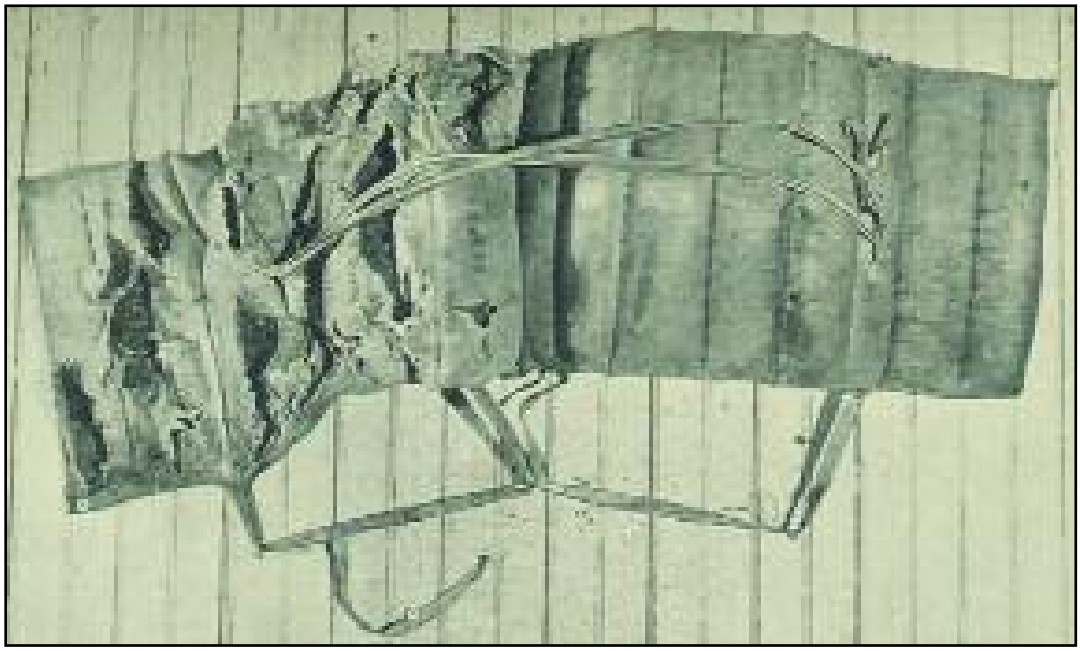
The lessons of the *General Slocum* can be applied to the security work that the Coast Guard will begin when enforcing the Maritime Transportation Security Act and the International Ship and Port Security (ISPS) code in 2004. Let's use the lessons of the *General Slocum* to make sure the day-to-day security compliance efforts of our people are carried out as originally intended. The *General Slocum* showed that when regulators fail their prevention duties, a disaster could happen.

Defending Safety:

Sound Inspector Performance is Key

The Lessons of the General Slocum *Disaster*

by Capt. MICHAEL B. KARR
Chief, U.S. Coast Guard Office of Investigations & Analysis



ONE OF THE LIFE PRESERVERS

The life preserver shown in this illustration was taken from the body of a drowned woman found on North Brother Island. One of the most horrible facts that came to light was that proper safety appliances were not provided on the boat. The life preservers were rotten and filled with corkdust, which quickly becomes water soaked.

All photos within this article, unless otherwise noted, are from "Report of the United States Commission of Investigation Upon the Disaster to the 'General Slocum.'" (Washington, D.C.: GPO, 1904)

A tragedy occurred in New York City that killed more than a thousand people, saw heroic rescue attempts, launched the city and the world into sorrow, was witnessed by thousands of New Yorkers, occupied the headlines for months, and caused the President of the United States to appoint a commission to investigate the tragedy. Was this September 11?

No. This was the fire and sinking of the *General Slocum*, an excursion vessel that burned and sank on the East River in New York. June 15, 2004 will mark the 100th year since this tragedy. Can a tragedy similar to this ever occur again? I hope not. I hope that we have learned from this and other vessel accidents. This article will focus on the failings of the 1904 marine inspection program, addressed in the Report of the Commission to investigate the *Slocum* disaster.

I recommend that all U.S. Coast Guard Officers in Charge Marine Inspection, Acting Officers in Charge Marine Inspection, Chiefs of Inspections, Chiefs of Investigations, and marine inspectors become familiar with this tragedy, in particular the role of the Inspection Service. The Steamboat Inspection Service inspectors of 1904 are today's Coast Guard marine inspectors. You can learn about the casualty by first reading the book, "Ship Ablaze: The Tragedy of the Steamboat *General Slocum*," by Edward T. O'Donnell, Broadway Books, 2003. His research paints a picture of the accident, the investigation, The Steamboat Inspection Service, the rescue attempts, the owner, the crew, the community, the politics and the press. I then recommend that you read the Report of the Commission. Most of the published Report of the Commission focuses on the results of their investigation into the actual workings of The Steamboat Inspection Service. The report describes the causal factors involving The Steamboat Inspection Service that led to the disaster and includes the recommendations to prevent the recurrence of similar disasters.

hoses used to fight the fire burst under the pressure of the fire main because of their poor condition, and life preservers were in such bad condition that they actually contributed to the death of many who wore them

The *General Slocum* was a paddle-wheel excursion steamer and was almost entirely of wooden construction. Its length was 250 feet, and draft, about 7.5 feet of water without load. At the time of the accident the vessel was drawing from eight to eight and one-half feet. It had three decks including the main deck. The passenger steamer *General Slocum* was built in 1891: the hull by Devine Burtis, the engines by W. & A. Fletcher Company of Hoboken, N.J.; and the upper works by John E. Hoffmire & Son of New York City. Its home port was New York and its route "bay and harbor of New York and rivers tributary thereto, Long Island Sound, and coastwise between Rockaway Inlet and Long Branch." The vessel was owned by the Knickerbocker Steamboat Company of New York and licensed to carry 2,500 passengers. It was last inspected by U.S. Assistant Hull Inspector Henry Lundberg and Assistant Boiler Inspector John W. Fleming on May 5, 1904. The previous inspection was completed May 15, 1903. The certificate of inspection current at the time of the disaster was issued May 6, 1904, by James A. Dumont, inspector of hulls, and Thomas H. Barrett, inspector of boilers, the board of local inspectors at the port of New York.

During the first part of the season and until about the end of June the steamer was usually open to charters or special excursions, being chartered for a lump sum under a regular contract; for the remainder of the season it was usually run to Rockaway, N.Y. charging so much per passenger.

On June 15, 1904, shortly after getting underway on the East River in New York City, with more than 1,350 passengers, a fire started in the forward compartment below the main deck. The vessel burned and eventually sank. During the accident, hoses used to fight the fire burst under the pressure of the fire main because of their poor condition, and life preservers were in such bad condition that they actually contributed to the death of many who wore them. This accident resulted in 1,021 fatalities.

The Report of the Commission of the *Slocum* disaster listed a number of practical deductions from their investigation related to the inspection of the vessel by Steamboat Inspection Service personnel. These included:

- Total lack of fire drills, boat drills, and established discipline.
- Total failure of the fire hose.
- Badly defective condition of life preservers.
- Inefficient inspection of the vessel.

The organization used to carry out inspection of vessels in 1904 was very similar to our current organization. Assistant Inspectors of Hulls and Assistant Inspectors of Boilers carried out all of the vessel inspections in the Port of New York in 1904. The assistant inspectors carried out these inspections on behalf of the local inspectors of hulls and local inspector of boilers. The local inspectors performed the combined duties of today's Officer in Charge Marine Inspection (OCMI) and the Chief Inspection Department (CID). The assistant inspectors served as the equivalent of today's marine inspectors.

The Commission concluded that the local inspectors carried out their duties inefficiently and unsatisfactorily. The report stated that certain sections of the inspection statutes and rules and regulations were being wholly disregarded.

One example used was the testing of fire hoses. The statute read that fire hoses should have been "of sufficient strength to stand a pressure of not less than one hundred pounds to the square inch, long enough to reach to all parts of the vessel." It was obvious to the board that the only way to ensure compliance with the statute was to conduct a measured pressure test of the fire hose.

The inspection books used to document the vessel inspections in 1904 contained these blanks to be filled in:

Hose, length, _____ feet.
Pressure hose will sustain, _____ .

The Commission found that for many years the practice of the assistant inspectors was to make no measured pressure test of the fire hose, except such as might incidentally (and rarely) take place by the use of the hose for the testing of boilers. The local inspectors, (the equivalent of today's OCMI) admitted that they knew of this lack of proper test: all of the inspection books were submitted to them and the blank was uniformly filled in "In good condition," showing on its face the omission of the pressure test. There was no excuse offered for the omission of the pressure test.

DECKHAND COAKLEY TESTIFYING (above)

John J. Coakley was called to the stand and testified that he was never present at a fire drill onboard the *Slocum* and that he had never been instructed what to do in case of fire. He gave a vivid description of the outbreak of the fire.

CHIEF ENGINEER CONKLING GIVING HIS TESTIMONY (below)

Benjamin T. Conkling, chief engineer of the *General Slocum*, testified that he went about the boat with the Inspector the last time the latter came onboard. He said that no test was made of the fire hose upon any of the standpipes.

In trying to find an explanation, the Commission concluded from the testimony of the assistant inspectors and from the admissions of the local hull and boiler inspectors, that the local hull inspector had never reviewed the vessels inspected by the assistants and the local boiler inspector had rarely done so; further, neither of them had taken steps to check and verify the performance of their assistants and subordinates. The Commission concluded that this condition of affairs constituted one of the gravest charges against the local inspectors, the equivalent of today's OCMI/CID.

The Commission also concluded that there was a complete failure on the part of the local inspectors to properly instruct new employees upon their entrance into the service as assistant inspectors. Such new employees, upon beginning their duties, were given copies of the statutes and regulations, and were sent out to learn their duties merely by accompanying an experienced assistant inspector. They thus based the entire concept of their duties and the methods of performing them from such sources only, and without any personal instruction or supervision by their superiors, the local inspectors. The Commission concluded that all original and subsequent errors were perpetuated instead of being corrected, and an inefficient system was taught to new officials at the very beginning of their work.

The Commission also found a complete failure on the part of the local inspectors to issue from time to time such instructions and directions as would be reasonably necessary to guide the assistant inspectors in the performance of their duties. The Commission found that the only instructions the local inspectors provided were in the form of circular letters to the assistant inspectors, copies of which were submitted to the Commission, showing very little detailed instruction on essential points of inspection. Some instances were found of verbal instructions to assistants, but they were infrequent and of very slight importance.

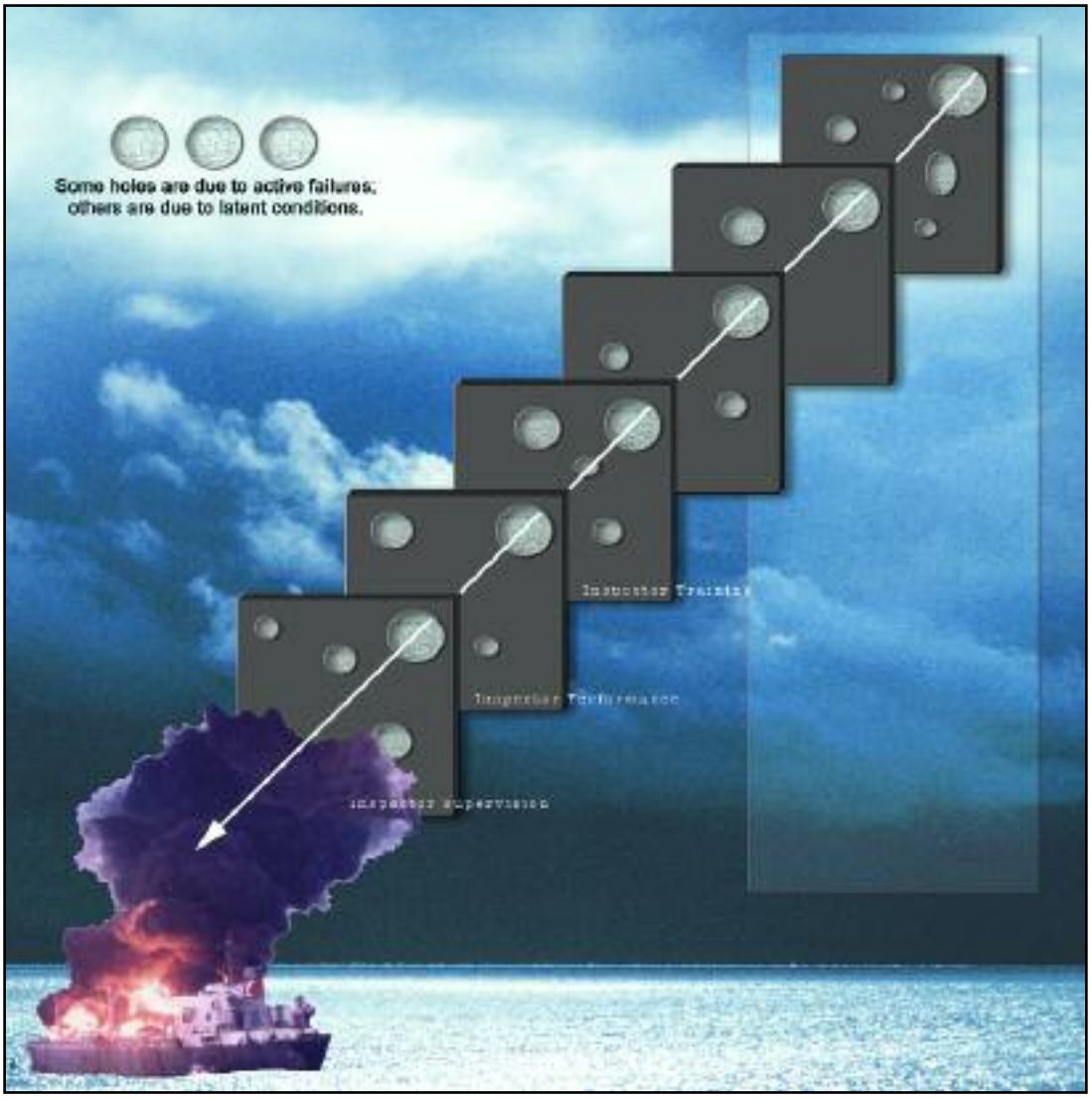
Considering the non-conformities in the supervisory processes noted above, it did not surprise the Commission as to what they found when they investigated how the assistant inspectors functioned under such a system. The Commission found that the assistant inspectors did no more than they were instructed to do by their superiors; they failed to properly test hoses and to apply proper tests to safety appliances. The uniform system of inspecting a hose, as testified to by the assistant inspectors, was merely a visual inspection; they asserted that they could tell whether a hose was good or not by such inspection, and some of them went so far as to say that they could actually tell what pressure the hose would stand by simply "looking it over," whether it was laid on the deck or coiled up; that they never used a test gauge for such purpose, and, what is more extraordinary, that a test gauge was never used or required by the service in the port of New York for making the test of hose required by law. The Commission noted how absurd these claims were following the results of testing of hoses onboard all vessels in New York, following the sinking of the *General Slocum*. Hoses burst on reinspection under pressures below the statutory requirement, and varying from five to 95 pounds. On some vessels, 60 percent of the hose equipment was condemned.

INSPECTOR LUNDBERG ON THE WITNESS STAND

Henry Lundberg, inspector of hulls in the Steamboat Inspection Service, instead of giving the assistance expected of him at the inquest, refused to answer all questions of importance on the ground that they might incriminate him.

The Commission also found that the process used to examine life preservers was usually confined to merely looking at them and taking down only the ones that "looked bad." Assistant inspectors rarely handled the life preservers and in particular, they did not apply any force in testing the covers and straps. Assistant inspectors did not lower boats, and frequently omitted any test of the falls and lowering equipment. In the majority of cases, no tests were made of fire pumps by actually operating them. The Commission concluded that the inspections, as carried out in New York, became as they did as a result of the natural deterioration that occurs when subordinates perform work without any effectual supervision by their superiors, and following the lines of tradition only.

"Swiss Cheese" Model of Defense



Latent conditions in safety programs, illustrated by "holes," can cause accidents. The *General Slocum* incident was a terrible disaster that could have been prevented if the assistant inspectors performed their work correctly. USCG illustration based on "Managing the Risks of Organizational Accidents" by James Reason.

Historically, when The Steamboat Inspection Service began, most of the job description for the positions that we now call the OCMI and the CID were to make sure vessels were inspected correctly. That initial tasking still is the main duty for those two positions in the process known as marine inspection. As such, the personnel occupying those two positions play a key role in the inspection program. As can be seen in the James Reason "Swiss Cheese" defense model, holes due to latent conditions in the programs designed to reduce deaths and injuries, such as improper supervision by the OCMI and CID, can line up and lead to an accident.

The *Slocum* casualty involved the failure of the assistant inspectors to properly inspect life preservers, fire hoses and boat launching equipment. OCMIs and CIDs should ensure that inspectors are carrying out their assignments correctly within these areas of vessel inspection. We certainly would not like to be making the same types of mistakes made 100 years earlier. Don't stop there. Learn the lesson of the Commission. Evaluate your supervision processes and then decide how to implement changes to ensure that your unit is properly overseeing the inspection program in all areas of vessel regulatory requirements.

We have a regulatory program in place and nearly 500 Coast Guard personnel assigned to vessel inspection duties. Measured by annual federal spending, our Coast Guard inspection program is

OCMIs and CIDs need to take away the important lesson from the *Slocum* casualty that supervisors need to supervise their personnel to make informed decisions, and must ensure that their inspectors are competent, adequately trained and carrying out inspections correctly. The condition of the fire hoses and the life preservers on the *General Slocum* were not "material failures." The failure of the fire hoses and the life preservers were human errors that can be attributed to the owner, the master, the crew and the inspectors. Today, the Coast Guard, through the supervision of the OCMI and the CID, must ensure satisfactory inspector performance as part of the safety system.

the national government's main defense to prevent the loss of life and injuries onboard passenger vessels[1]. The regulatory and vessel inspection programs have been very successful in continuing to reduce the death and injury statistics for Subchapter H vessels. Consequently, there have been no calls for additional resources to attack this problem of passenger vessel deaths and injuries because the outcome numbers have continued in a downward trend and remain low.

Under our current business guidelines, we depend on our commanding officers to use their unit's resources as they best deem fit to meet mission needs. Let the *General Slocum* disaster serve as a reminder that Commanding Officers should ensure that they evaluate all processes used to carry out legislated missions and then fix any non-conformities found. The *General Slocum* was a terrible disaster that could have been prevented if the assistant inspectors did what they were supposed to do.

The OCMI and the CID must maintain a vigilant inspection program in their ports. The supervisory program has to be active, and able to stand up to the scrutiny of the ultimate review, that of a Coast Guard Marine Board of Investigation or a National Transportation Safety Board investigation. It's a typical investigation process to examine the human factors and systems in a casualty. The investigators of the Coast Guard or the National Transportation Safety Board will explore whether all the safety strategies worked, including whether the Coast Guard Inspection Program performed as would be expected.

When great tragedies affect our nation, our nation takes steps to keep history from repeating itself. Following September 11, the President of the United States created the Department of Homeland Security. After the sinking of the *General Slocum*, President Roosevelt faulted The Steamboat Inspection Service people and training and oversight processes and directed improvements in the organization. Today, let us use the lesson of the *General Slocum* to ensure that we meet the vision of President Roosevelt 100 years later.

We are in the safety business. We conduct our business by enforcing regulations. The *General Slocum* disaster reminds us that the inspection processes involved in our work cannot be left on autopilot, especially the oversight and training of our inspectors.

The General Slocum Memorial Association

The General Slocum Memorial Association is dedicated to keeping alive the memory of the *Slocum* tragedy and honoring its victims, survivors, and rescuers. Every year, on the Saturday before June 15, the General Slocum Memorial Association holds an ecumenical memorial service at Trinity Lutheran Church in Middle Village, Queens, NY, near the cemetery where most of the *Slocum* victims are buried. This year, the ceremony will begin at 10 am on June 12, 2004 at the Slocum Monument in Lutheran All Faiths Cemetery. This monument memorializes the 61 unknown victims buried there. The Memorial Service will follow in the Church at 11:15 am. All are welcome to attend.

To join the General Slocum Memorial Association, or get more information about the organization and its annual memorial ceremony, call Mr. Ken Leib at (516) 781-8925 or email him at **lazerken@aol.com**.

The Slocum Monument. Courtesy "Ship Ablaze, The Tragedy of the Steamboat General Slocum" by Edward T. O'Donnell. www.general-slocum.com

[1] For a description of the regulated passenger vessel safety strategies, read: Defining Safety for Owners, Operators, Crews, Coast Guard and the Public with the Regulatory Process; *Proceedings of the Marine Safety Council*; Volume 59, Number 1; January–March 2002; Pg 3.

Historic Disasters of the 19th Century Shaped Subchapter H Industry

by Jim Law
U.S. Coast Guard Compliance Analysis Division

Explosions in 1823 alone killed more than 1,000 people and destroyed 14 % of all steam vessels in the U.S.

Often, industry regulations are developed in response to disasters to prevent recurrence of similar tragedies. The domestic passenger vessel industry is no exception. Many of the regulations in force today were developed in response to passenger vessel disasters, several of which occurred in the 19th century. A few of the cases described below—some of which are often cited in maritime history—have resulted in regulations that continue to impact the domestic passenger vessel industry.

Steam Propulsion Arrives

The introduction of steam engines to sailing ships in the early 19th century freed ships from the vagaries of the wind, giving them greater control to stay out of harm's way. The Evans steam engine (circa 1804) had a vertical cylinder and a double-acting steam reciprocating piston. Steam was generated by a boiler made of copper and reinforced iron bands, providing steam at pressures of several atmospheres. The boiler was one of the first "fire tube" boilers; the tubes were actually flues installed in such a way as to carry the combustion gases several times through the vessel in which the water was being heated. This type of boiler, with many refinements and variations, became the basic boiler design of the 19th century. With the benefits that steam engines brought, there were also some dangers. They required ships to carry large quantities of combustible fuel, a major concern with respect to fire. The lack of construction standards for boilers put them at risk for catastrophic failure.[1]

A number of explosions of fire tube boilers and their subsequent shipboard fires created a call for legislation and regulation to stem the loss of life. Explosions in 1823 alone killed more than 1,000 people and destroyed 14 percent of all steam vessels in the United States.[2]

Congress authorized the secretary of the Treasury in 1824 to investigate the causes of the large number of disasters involving boiler explosions, but did not allow for standards for the construction and operation of steam vessels. The United States was still in its infancy and was deciding between adopting a strong federal government with national regulations, or stronger state governments with local and state regulations. The latter philosophy was reflected by Treasury Secretary Richard Rush when he remarked in 1825, "Legislative enactments are calculated to do mischief rather than prevent it."[3]

[1] FAQs from the Historian Office. U.S. Coast Guard Internet Web site. Nov. 16, 2002.
[2] Bureau of Naval Personnel. Principles of Naval Engineering. Superintendent of Documents, 1970. Pp 6-7.
[3] Report of the Cruise Ship Safety Review Task Force, Oct. 31, 1995. U.S. Coast Guard Publication.

State governments tried to establish safety standards for steam vessel construction. Due to the level of the technology, as well as the interstate nature of marine transportation, there was no uniformity among the states. The catalyst for stronger federal regulation was the loss of the steamship *Pulaski* in September 1837.

Loss of the *Pulaski*

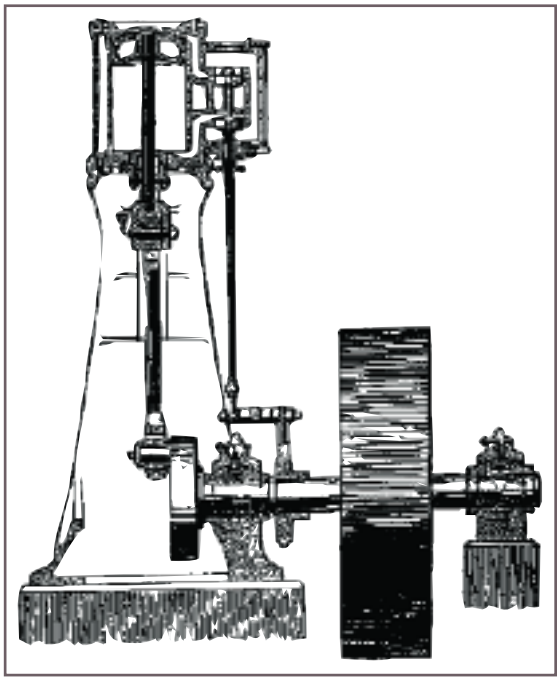
The steam packet *Pulaski* was on its fourth voyage serving the ports of Savannah, Charleston and Baltimore. It had a crew of 37,[4] and only recently had come into service, taking the place of the steam packet *The Home*, which had been lost in September 1837. The *Pulaski* was of a different design than *The Home*. Instead of a sailing ship with steam propulsion assistance, it was a low-pressure steamer, with paddle wheels amidships and no sails whatsoever. It departed Charleston the evening of June 13, 1838, heading north to arrive the next day in Baltimore with approximately 160 passengers onboard. [Note: Charleston-Baltimore is a two-day trip, but summary is from first-person account.] Sometime around midnight on June 14, the boiler exploded and the ship was torn in two about 30 miles off the North Carolina coast. Two of the three small boats launched from the stern of the vessel made it to shore the next day with 16 survivors. The schooner *Henry Camerdon* rescued 43 more surviving passengers and crew on June 19, after they had clung to wreckage for five days and survived a gale force storm[5]. No cause for the loss of the boiler was ever determined. According to press accounts, 59 people survived but more than 100 lives were lost.

On July 7, 1838, Congress passed an act that called for a system of inspectors to be appointed by U.S. District Judges and under the control of the Department of Justice to "provide better security of the lives of passengers onboard vessels propelled in whole or in part by steam.[6]"

In spite of the legislation, the number of ship disasters involving boiler explosions increased. Among them was the *G.P. Griffith*.

Loss of the *G.P. Griffith*

The burning of the steamer *G.P. Griffith* on Lake Erie was a tragic event in the early morning hours of June 17, 1850. The vessel was carrying cargo and 320 passengers from Buffalo to Cleveland and they were racing another vessel as they approached the harbor. Steamboats very often competed for the right to be called the fastest on a route and took great pride in these titles. The combination of bragging rights, the bonus of advertisement, and the thrill of riding a vessel that was faster than others added to the fervor of steamboat racing and the thrill of that form of travel.



The vertical stationary steam-engine used a boiler that became the basic boiler design of the 19th century. Courtesy Robert H. Thurston, A.M., C.E., "A History of the Growth of the Steam-Engine" (New York: D. Appleton and Company, 1878).

To keep up the increased speed for the race, the engine was fired to such an extent that the engine room became overheated, setting fire to several barrels of lubricating oil. Upon discovering the boat was on fire, the captain was urged to put in at Fairport, whereby all onboard could have been saved, but he replied, "I will run her into Cleveland ahead of the other boat, or run her to hell." When the boat turned toward the shore the wind was in the south and the flames drove the people overboard. The captain then ran the vessel aground with the ship engulfed in flames. Of the 320 passengers onboard, only 87 survived the disaster.[7, 8]

Steamship Losses of 1852

The Loss of the Henry Clay

The loss of the steamboat *Henry Clay* on July 28, 1852 was one of the most notable and fatal disasters on the Hudson River. The vessel had almost reached New York City on its way from Albany when it was discovered to be on fire. The captain headed it for the shore at Riverdale and ran it hard aground, but unfortunately most of the passengers were at the stern, which was in deep water, and imprisoned by the flames. Sixty lives were lost, including a number of well-known New Yorkers, among them a sister of Nathaniel Hawthorne,[9] and Andrew Jackson Downing. Downing was one of the leaders of the movement to create Central Park in Manhattan.[10] Though the captain of the *Henry Clay* and the owners insisted there had been no rac-

[4] Preventive Safety. Coast Guard Enlisted Association, Colonial Branch, Web page **http://cgea.coastguard.org/preventative_safety.htm**
[5] Wilmington Advisor, June 18, 1838. Web page **http://hometown.aol.com/eleanorcol/Pulaski.html**
[6] Rebecca J. McLeod. Wreck of the *Pulaski*. **http://members.aol.com/eleanorcol/WreckPulaski.html**
[7] U.S. Coast Guard Historian Office. Nov. 16, 2002.
[8] William Melton. The Disaster of the *G.P. Griffith* Steamer. Web site **www.willowickohio.com/About_Willowick/History/Griffith/griffith.html**
[9] Henry C. Priday. Web site **www.willowickohio.com/About_Willowick/History/Burning/burning.html**

ing, the passengers claimed there had; the coroner's jury found it had been racing all the way down the river with the steamboat *Armenia* and the disaster was without doubt the result of the woodwork catching fire from the overheated boilers.

The Loss of the Atlantic

The Lake Erie steamer *Atlantic* disaster is a little different from the previous disasters. The *Atlantic* was a large steamer running from Buffalo on Lake Erie and was known as a propeller, driven by a screw in the stern. The *Atlantic* collided with the *Ogdensburg* and sank around 2 a.m. on Aug. 20, 1852. The *Atlantic* was carrying more than 500 passengers, mostly German and Norwegian immigrants,[11, 12] following the favorite route westward for the large immigration of the 1850s. Immediately after the collision an awful confusion arose on the boat. The crowded condition of the craft, the fact that the immigrants could not understand the orders given, the use of life preservers with which the passengers were unfamiliar, and an injury of the captain all served to demoralize both passengers and crew. The boat was immediately headed towards land, but shortly the water extinguished the fires in the furnaces and the boat sank in about 15 fathoms of water. The *Ogdensburg*, after inspection of its damages, followed in the wake of the *Atlantic* and picked up the survivors. More than 300 were drowned.[13] The reason for this strange collision is something of a mystery. The hearing held by a committee of inquiry revealed that the steering apparatus of the two boats was in order and that the first mate, who was at the wheel of the *Ogdensburg*, saw the lights of the *Atlantic*. Two theories remain regarding the cause of the casualty: first, that there was careless miscalculation on the part of one or both of the pilots, possibly induced by a desire to "make time;" and, secondly, that one of the pilots deliberately tried to injure a rival boat.

On Aug. 30, 1852, Congress passed the Steamboat Act, creating the Steamboat Inspection Service as a separate agency under the Department of Treasury. The new service was to establish stricter regulations and better oversight of vessels with steam propulsion.

Other Steamship Losses of 1852

Aug. 23, 1852—The Ohio riverboat *The Franklin, #2* had a boiler explosion. Fifteen were killed and 40 severely injured.[14]

Sept. 4, 1852—the boilers of the *Reindeer* burst near Bristol, N.Y., 40 miles below Albany on the Hudson River. The vessel was one of the larger and popular steamboats on the Hudson. Six persons were killed and 25 others died afterwards of their injuries.[15] These accidents, following so closely one after the other, resulted in a public outcry that in part secured the enactment of the Steamboat Inspection Bill of that year.[16]

On Aug. 30, 1852, Congress passed the Steamboat Act, creating The Steamboat Inspection Service as a separate agency under the Department of Treasury. The new service was to establish stricter regulations and better oversight of vessels with steam propulsion. Later that year, Congress mandated licensing of engineers and pilots on steamboats carrying passengers, tightened many safety requirements, and reorganized The Steamboat Inspection Service. Still, the ship disasters continued.

Loss of the Sultana

The worst maritime disaster in U.S. history took place on April 27, 1865. The *Sultana* was a typical side-wheeler built in Cincinnati in 1863 for the lower Mississippi cotton trade. It was registered at 260 feet in length, with a 42-foot beam and a hold seven-feet deep. It required a crew of 85, and for two years had been on a regular run between New Orleans and St. Louis. It was authorized to carry 376 persons including crew. The *Sultana* left New Orleans on April 21, 1865, on what began as a regular run. It had from 75 to 100 cabin passengers, and cargo of 100 hogsheads of sugar and 100 head of assorted livestock.

[10] David Lear Buckman. Old Steamboat Days on The Hudson River. The Grafton Press, 1907.

[11] The Parks Library. The Library Branch. No. 11, July 2002.

[12] The Norwegian-American Historical Association, Northfield, Minn. Web site **http://naha.stolaf.edu/publications/volume04/vol4_07.htm**

[13] Ibid. The Cummings Evening Bulletin, for Aug. 24, 1852, states that there were 510 passengers, of which 400 were immigrants. That is approximately the number given by the newspapers. **www.naha.stolaf.edu/publications/volume04/vol4_07.htm#6**

[14] Ibid. Stephen Olson of Manitowoc, Wis., who accompanied the immigrants from Norway as interpreter, reported the names of those drowned and the places from which they came. His report was published in Scandinavian, Oct. 27, 1852 (this copy was found in the Kunglige Bibliotek in

The chief engineer discovered steam escaping from a small fracture in the steel plating of the starboard side fire tube boiler. They underwent repairs two days later in Vicksburg and discovered a dangerous bulge had formed on the amidships boiler. The repairs to the bulging boiler were limited to a soft iron patch, amounting to a "doubler" plate, instead of the replacement of two sheets of steel on the boiler as recommended by the local boilermaker. To make up time and increase their speed from Vicksburg to Memphis, the engineer increased the boiler pressure to 145 pounds per square inch (PSI), instead of its normal 90 PSI, which was a normal practice of the time.

The U.S. Army Quartermaster Corps often arranged for transit of troops up and down the Mississippi and Ohio rivers on steamboats, paying 50 cents a head. The *Sultana* took on 1,800 to 2,000 repatriated Union soldiers at Vicksburg. Many of these soldiers had been prisoners of war in Andersonville Prison or in Vicksburg, and were anxious and energized about going home. The *Sultana* was unbelievably overcrowded, with soldiers everywhere, including the bridge deck, and on top of the bridge. The vessel departed Vicksburg and arrived without incident two days later in Memphis, again to discharge cargo and take on more passengers. It departed Memphis just after midnight on April 27, overcrowded with soldiers, passengers and cargo, and headed up the Mississippi River to Cairo, Ill. At about 2 a.m., the boiler exploded and the vessel caught fire. The entire ship was soon engulfed in flames and burned to the waterline. More than 1,450 people perished from smoke inhalation, drowning or exposure.[17]

There was no outcry as a result of this casualty for a few reasons: it occurred right after the completion of the Civil War and 11 days after the death of President Lincoln, and most of the major papers were on the East Coast. Two members of the Army Quartermaster Corps were prosecuted under the Code of Military Justice, but there was no remedial legislation forthcoming.

By 1871 Congress reorganized The Steamboat Inspection Service. The mission of the Service was broadened to include the oversight of crew safety in addition to its task of ensuring passenger safety. Congress also passed legislation that added masters and chief mates to the list of crew that had to be licensed.[18]

On July 7, 1838, Congress passed an act that called for a system of inspectors to be appointed by U.S. District Judges and under the control of the Department of Justice to "provide better security of the lives of passengers on board vessels propelled in whole or in part by steam."

Continuing efforts by many people led to steady improvements in the steam engine and in particular to the reciprocating steam engine. The last years of the 19th century saw the introduction of the first practical steam turbines. The earliest successful application of a steam turbine for ship propulsion was made in 1897. Sir Charles Parsons fitted a 110-ton vessel with a steam turbine, which was directly coupled to the propeller shaft. He then demonstrated its operation by "buzzing the fleet" during Queen Victoria's Diamond Jubilee Review.

Steamboat casualties continued into the next century, but the use of fire tube boilers aqnd reciprocating steam engines diminished with the increase of technical capability for production of steam turbine plants. While iron and steel hulls decreased the potential for fire onboard ship, wood was still used extensively for superstructures and internal furnishings. U.S. and international regulations in the 20th century eventually addressed these final problems. Nevertheless, it was the historic disasters of the 19th century that led to federal regulation of the domestic passenger vessel industry.

Stockholm). Though Olson's report states that 68 were drowned, only 67 names are given. A letter published in Christiania-Posten, Oct. 16, 1852, contains some information about the emigrants. **www.naha.stolaf.edu/publications/volume04/vol4_07.htm#6**

[15] The Norwegian-American Historical Association.

[16] Buckman. Old Steamboat Days on The Hudson River.

[17] The Parks Library. July 2002.

[18] Death on the Dark River, The Story of the *Sultana* Disaster in 1865. Web site **http://rootsweb.com/~genepool/sultana.htm**

[19] The second Act of 1852 reorganized The Steam Boat Inspection Service and required licenses to be issued to engineers and pilots of vessels carrying passengers. The subsequent 1871 reorganization of The Steam Boat Inspection Service required the additional licensing of masters and chief mates.

Mass Rescue Operation Program

Preparing for the Unthinkable

by Lt. Cmdr. JASON D. NEUBAUER
U.S. Coast Guard Office of Compliance

The image of a large number of people in distress is very unsettling and is, unfortunately, all too easy to imagine, particularly in light of recent events. September 11, major airline disasters, and sinking passenger ferries leave us with unforgettable images of how everyday events can go terribly wrong. Thousands of passengers are carried by a wide variety of vessels in the United States every-day. While the domestic passenger vessel industry enjoys an excellent safety record, it is not immune from the probability that a significant disaster might occur, as evidenced by the recent ferry tragedy in New York.

With vessel size and passenger capacity increasing, and operations pressing into ever more remote regions of the world, the risk of these low-probability, high-consequence events continues to grow. In the United States, a worst-case scenario might involve a large passenger ship with thousands of tourists and crewmembers. Providing adequate rescue assets to the scene of such an emergency could rapidly overwhelm rescue capabilities in even the busiest of ports. A similar emergency taking place several miles offshore or in a remote port requires special contingency planning. It was the recognition of the unique planning elements of these types of events that was the main impetus for the implementation of the Mass Rescue Operation (MRO) program.

A mass rescue incident is generally defined as "an incident that exceeds the capabilities of the search and rescue assets assigned to a specific region." Thus, emergencies involving small U.S. excursion vessels operating in remote coastal areas (subject to the jurisdiction of the United States) and inland rivers must be considered in addition to potential incidents involving larger foreign flag cruise ships. Emphasizing this point is the fact that domestic passenger vessels carried approximately 200 million passengers in 2002, and large cruise ships embarked about 6.5 million U.S. passengers in 2002.

Collectively, the U.S. Coast Guard and the passenger vessel industry have come to the realization that incidents requiring mass evacuation pose a significant challenge, and we are taking active measures to mitigate any threats to maritime safety. Just over a year ago, the Coast Guard established 22 passenger vessel safety specialist billets. These billets are assigned (see Figure 1) to enable frequent outreach and coordination with industry, particularly in those regions with significant passenger vessel operations. These passenger vessel safety specialists are working closely with safety managers from the large cruise ship companies and other segments of the industry, as well as both the marine safety and operational elements of the Coast Guard, to ensure a coordinated response to future incidents. The overall goal is to prevent accidents by encouraging

investments in training and equipment at the early stages of a potential incident, thus preventing completion of an incident causal chain. Outreach, exercise planning, and exercise execution are critical elements for accomplishing this goal.

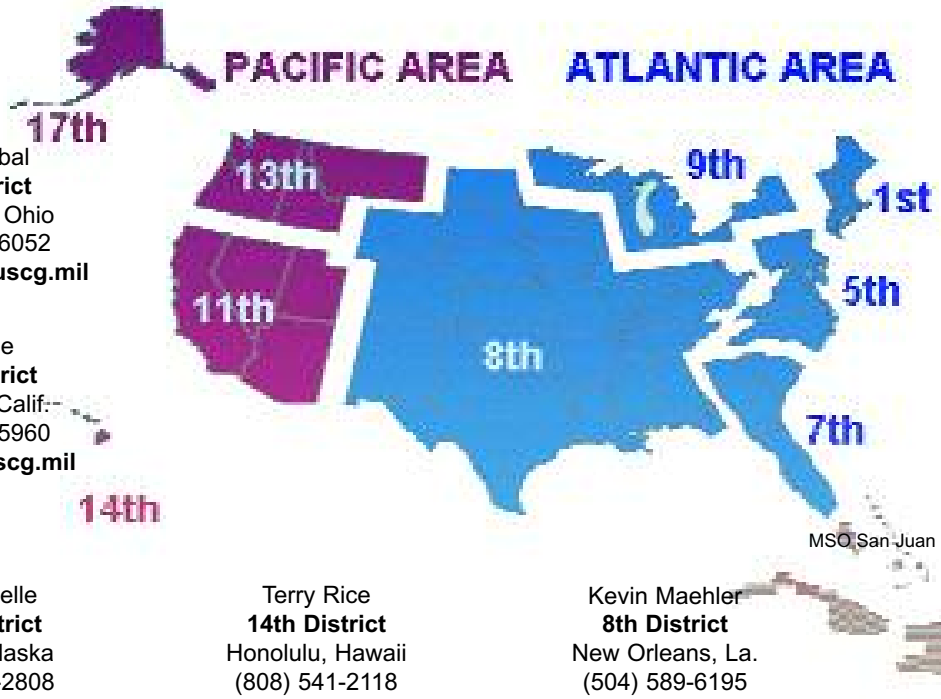
The MRO program is currently using the passenger vessel safety specialists to actively engage with industry leaders, including the International Council of Cruise Lines (ICCL) and the Passenger Vessel Association (PVA) to work on methods to prevent and mitigate emergencies. By using simple risk-based philosophies such as breaking the causal chain at the earliest point possible (see Figure 2, next page), companies can reduce the probability of a potential disaster. Investigations into maritime accidents often point to a series of small events and human errors that eventually combine to create a serious incident. Eliminating any one of these minor events is frequently enough to prevent the incident.

To spread this message, safety specialists from across the country attend industry forums and provide information at such events as the February 2004 Passenger Vessel Association Conference in New Orleans, La. Safety specialists provide workshops, including a tabletop exercise, demonstrating the response community's Incident Command Structure, and facilitate an open discussion on the latest safety issues and concerns.

Under the MRO program, safety specialists are developing and holding field exercises; they recently conducted several successful exercises at ports around the country. Exercises are designed to mimic real life as closely as possible by involving a wide range of public and commercial rescue assets including other cruise ships, local fire/police departments, and military assets beyond Coast Guard resources. Normally, the ideal platform for responding to a cruise ship emergency are other cruise ships because they have significant passenger capacity, are often in close proximity to an incident, and have the necessary emergency equipment (i.e., rescue boats, liferafts, etc.) to effect a rescue. To date, most of the exercises have been held in high passenger vessel traffic areas such as Miami, Juneau, and San Francisco. Continuing to test these response capabilities at a wide range of ports is critical to the success of the program. Along those lines, a recent exercise on Lake Erie simulated a freight ship and passenger vessel collision. The exercise provided an excellent gauge of the region's mass rescue and pollution response capabilities and involved response assets from several states, including four Coast Guard commands.

Figure 1

U.S. Coast Guard
Passenger Vessel Safety-Mass Rescue Operations Specialists



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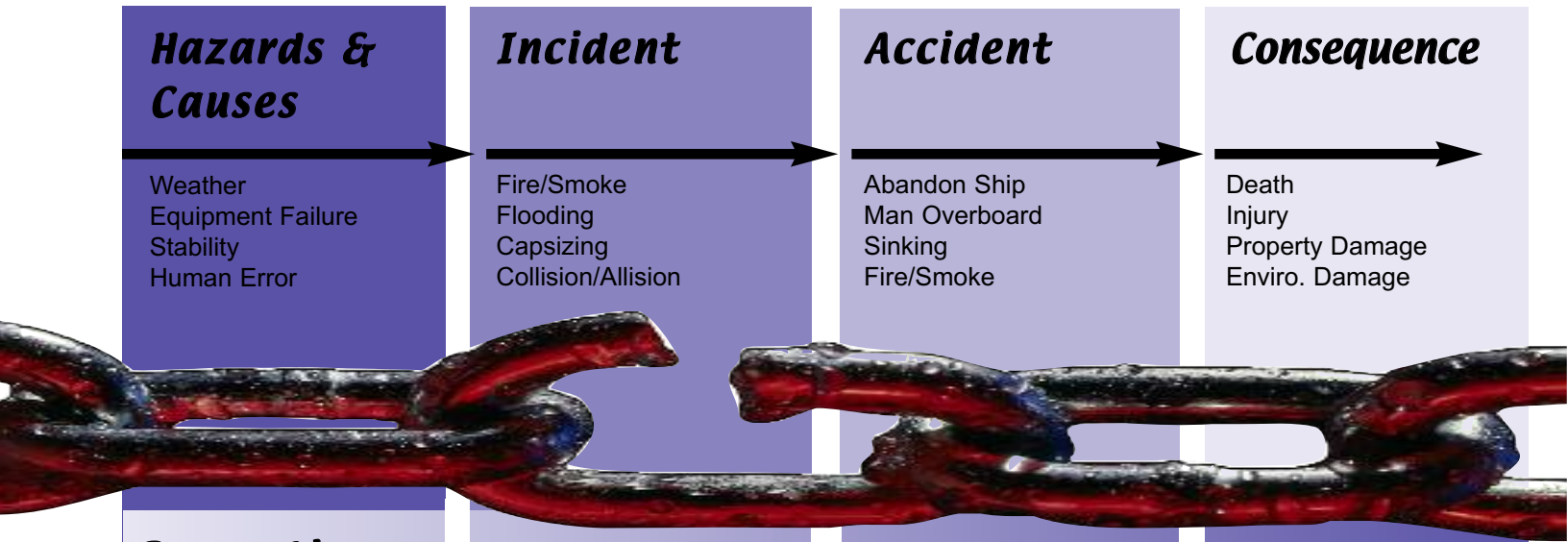
Large-scale mass rescue exercises can be quite costly since response assets are mobilized whenever possible. To reduce the financial burden and maximize the benefit of the exercises, the Coast Guard is combining multiple contingencies into future exercises. One option being tested is the combination of MRO exercises with the National Preparedness for Response Exercise Program (PREP), which has been in place for years, to test multi-agency response to pollution incidents. Combining the two exercises makes sense when considering that a sinking large passenger vessel poses a significant environmental risk in addition to the mass rescue concerns. To better facilitate industry planning and involvement, the Coast Guard is putting the finishing touches on a comprehensive five-year exercise schedule that will include all required contingencies (a list that has recently seen growth due to new security related exercises).

One of the major long-term goals of the MRO program is to consider and train for contingencies beyond passenger vessel emergencies. For example, the September 11 attacks on the World Trade Center created the need for a mass evacuation of tens of thousands of people stranded on lower Manhattan Island. The Coast Guard coordinated the impromptu evacuation through the use of all available public, private and government assets. The Manhattan Island evacuation was ultimately a success due to some quick thinking and the high volume of available assets in the Port of New York. That incident also illustrates the need for the Coast Guard to remain flexible and consider non-traditional mass evacuation or rescues that can stem from both man-made and natural disasters. As such, MRO planners need to be creative when considering contingencies that require evacuations from sources such as simulated land-based disasters and plane crashes.

Planning for the unexpected enables a proactive stance toward accident prevention and mitigation. Doing so will help to ensure that resources are identified and ready to respond to the "unthinkable event."

Breaking the Causal Chain



Hazards & Causes	Incident	Accident	Consequence
Weather Equipment Failure Stability Human Error	Fire/Smoke Flooding Capsizing Collision/Allision	Abandon Ship Man Overboard Sinking Fire/Smoke	Death Injury Property Damage Enviro. Damage
Preventions			
Remove, Avoid and Prepare for the Hazards & Causes Adequate Training Correct Equipment Preventative Maintenance System (PMS) Procedures Etc.	Human Error (awareness, training, rest, alarms/remote sensors; avoid risky situations) PMS Procedure shortfalls (provide checdklists, feedback to fix shortfalls) Proper Equipment	Prepared Response Drills Special procedures; i.e.: heavy wax, hazardous bar Proper Equipment	Reduce the Harm Response Plans Emergency Instructions Drills & training Life-Saving Equipment & Maintenance

Figure 2

Stacking the Deck for "H" Boat Safety

by Tim Farley
U.S. Coast Guard Office of Investigations and Analysis

"H" vessels are passenger vessels having a gross tonnage of over 100 that operate with more than 12 passengers onboard.

Subchapter H vessels are regulated under Title 46 CFR Subchapter H, Parts 70 – 80; thus, their common designation as H boats. Typically, these vessels are ferry boats, gaming vessels, river boats, excursion and tour boats. Because of the potentially high numbers of passengers transported on H vessels, they present many distinct marine safety issues for the U.S. Coast Guard. Therefore, great care is placed on ensuring that the safety of the passengers, crews and vessels is maintained through all available regulatory means, such as inspection, licensing and the enforcement of operational rules. Operating and crewing these large passenger vessels is an immense responsibility as they carry a most valuable commodity, human life!

Operators and crewmembers working onboard H boats must be properly credentialed by the Coast Guard and have an appropriate license and/or merchant mariner's document for the type, size and route of the vessel they are employed upon. These mariners are bound by many different federal requirements designed to keep the vessel, crew, waterways and environment as safe as possible. Penalties for violating those regulations can range from warnings, simple civil penalties and fines, administrative suspension or revocation of the Coast Guard license of the vessel operator(s) involved, or criminal prosecution.

Coast Guard data estimates that as of September 2003, 177 H boats were operating on the navigable waters of the United States. Mariners work aboard a wide variety of H boats of many different sizes, shapes and configurations, night and day, day in and day out, in all types of weather and sea, river

Above: A Circle Line tour boat awaits passengers in New York City's harbor. Lt. Joe Lally, USCG.

and water conditions. The Coast Guard, as the agency charged with marine safety, takes the carriage of passengers and the operations of these types of vessels very seriously and will pursue administrative action to revoke or suspend the privilege of anyone to possess a Coast Guard-issued credential (license or merchant mariners document) if they commit misconduct, operate a vessel negligently, are incompetent, violate a law or regulation, are convicted of a dangerous drug law, or use or are addicted to the use of dangerous drugs. While most infractions in this segment of the industry are attributable to drug and alcohol use and abuse, the Coast Guard also imposes penalties for negligence, misconduct and violations of regulations and laws.

In many parts of the world stringent safeguards or defenses guarding against unsafe operations of these types of vessels have been absent or go unenforced. Unfortunately, this has led to the unnecessary deaths of innocent passengers. While not fail-safe by any means, the safety measures that were established by law in the United States and put in place by our governing regulations, as well as the appropriate enforcement of those rules, are the backbone of a safe marine transportation system. Without these safeguards the unsuspecting passenger who ventures onboard a gaming type H vessel for an evening of fun takes a gamble of a different sort.

Other Recent Administrative Cases

Summary of Offense	Sanction
An Able Bodied Seaman refused a lawful order from and then threatened a Superior Officer.	ALJ ordered a six month suspension of the AB's Merchant Mariners Document.
An officer failed to disclose prior convictions to the Coast Guard during the licensing application process.	ALJ revoked all Merchant Mariner Credentials (MMD and License).
Failure to conduct a pre-departure safety brief as well as failure to post an Emergency Checkoff List in a conspicuous location.	ALJ revoked the mariner's license.

One Engineer, Two Ferries

A fire broke out onboard the ferry *Ascension* while its engineer was working onboard. The fire resulted in the ferry losing all steering control in the Port Allen Locks. The investigation found that the engineer was not manning the engine room at the time of the fire as was required by Title 46, Code of Federal Regulations, Part 62 and by the vesssel's certificate of inspection. After the ferry had initially lost steering, the captain noticed that it was taking quite a long time to bring the emergency generator on-line and called the engineer to the bridge. At that point the engineer admitted that he was not in the engine room or even aware that a problem existed. The engineer then returned to the engine room and brought the emergency generator on-line but was unable to determine cause of failure, which was attributed to a ruptured oil supply line. As a result of this incident and because the engineer was fully aware that these vessels were required to have a continuously manned engine room at all times, the Coast Guard charged this mariner with misconduct.

About one week later, the same engineer was working in the same capacity onboard the ferry *Iberville* when the vessel lost steering due to the failure of the main generator. Ultimately, it was found that the generator's bearings were burned out after the generator was operated in an unsafe manner. The damage done to the generator was consistent with operating it at too high a frequency for an extended time (three and one-half to four hours). Therefore, a negligence charge was added to the original misconduct complaint.

The engineer signed a settlement agreement and admitted the factual and jurisdictional allegations of the complaint. A final decision and order were issued by the Administrative Law Judge affirming the conditions of the settlement agreement and the engineer agreed to a three-month suspension, with two months stayed on 12 months probation.

Ill-Suited Bridge Team

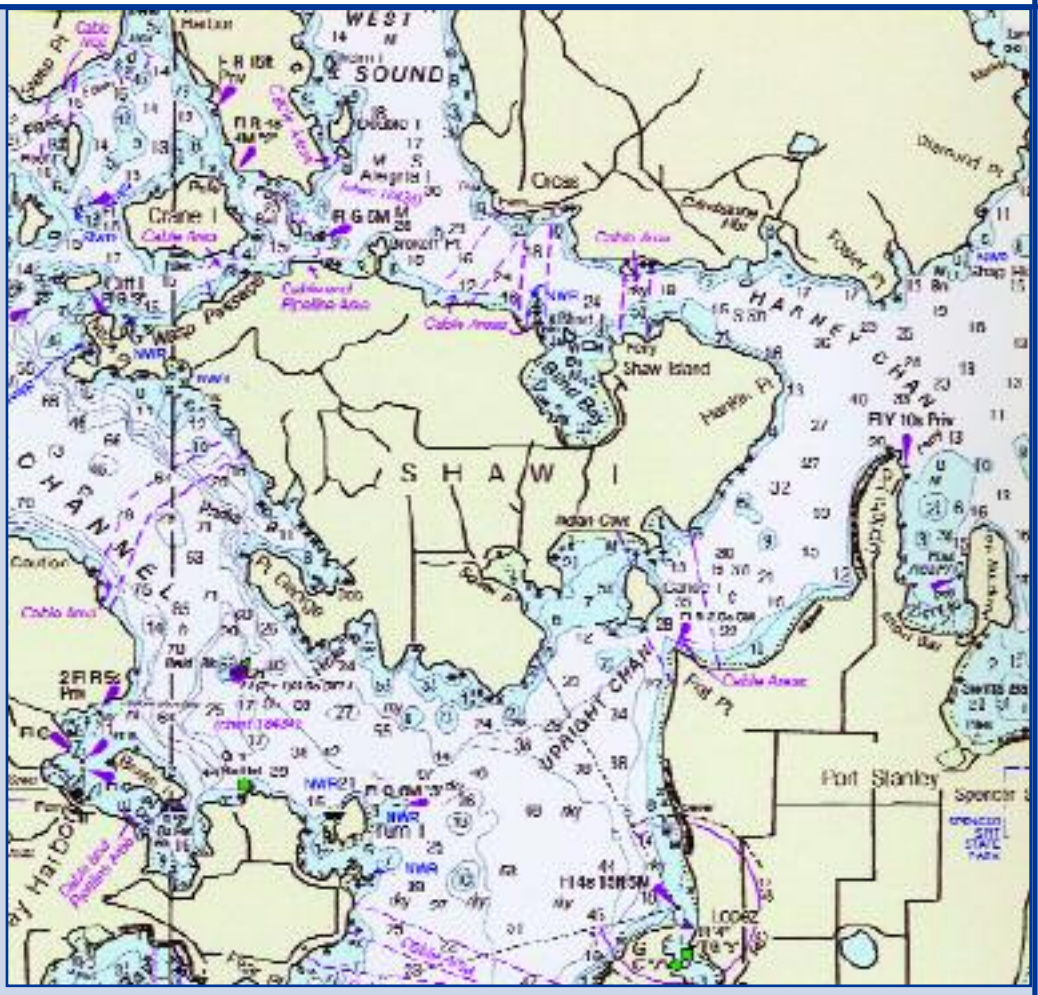


Chart of San Juan Island area transmitted by the *Sealth*.

The operator of the Washington state passenger ferry vessel *Sealth* was operating in the Puget Sound north of Seattle, Wa., in the San Juan Islands area on a voyage from Orcas Island, en route to Friday Harbor in May 2001. On that day, the master and the helmsman were serving together in the pilothouse of the vessel as the navigation team, directing the operation and the manuevering of the vessel. After the master had turned the vessel off of the Orcas dock on its intended voyage to Friday Harbor, the master turned over control of the vessel to the helmsman and said, "You got it, keep it in the middle." The helmsman completed the turning manuever and settled on a mid-channel course. As the vessel rounded Harkin Point, Shaw Island, the helmsman looked back to the master, seeking direction. When no direction was given, he took it upon himself to apply five degrees of right rudder twice, to bring the vessel around Harkin Point and centered down Upright Channel. Upon approaching Flat Point, the helmsman once again looked back to the master for direction. Receiving none, he continued to manuever the vessel on course proceeding down the center of the channel. The vessel speed was approximately 15 knots.

The master took a radar position approximately one-fourth to one-half mile past Flat Point. After completing this position check, the master sat down to review company correspondence. Again, the helmsman looked to the master for direction transiting Upright Channel. Receiving none, he remarked to the master, "I don't get to do this often, I used to work in the cabins." The master acknowledged this point and replied, "Yes, I've seen you working in the cabins." The helmsman then noticed the vessel *Illahee*, which also was enroute to Friday Harbor and was approximately one mile ahead. Knowing that the *Illahee* was heading for the same place, and receiving no course direction or rudder commands from the master, the helmsman decided to follow the wake of the *Illahee*. Soon thereafter, the master looked up from his paperwork and noticed that the vessel was out of the desired position. The master yelled to the helmsman, "What the hell are you doing?" and took over the helm. Immediately afterward, the *Sealth* struck bottom on a two-fathom shoal.

After making initial damage assessments and finding no obvious hull breach, the master decided to continue the voyage to Friday Harbor, where about 50 passengers were offloaded. The *Sealth* was then taken to the auxiliary moorings at Friday Harbor to await Coast Guard response personnel from Marine Safety Office Puget Sound.

Once Coast Guard personnel arrived on-scene to conduct interviews and assess damage to the *Sealth*, it was determined that approximately 2,000 gallons of fuel had entered the #2 bilge through a suspected crack in the #1 and #4 fuel tanks.

Additionally, damage was sustained to the keel and the starboard aft keel cooler, and the grounding had caused a misalignment of the vessel shafts and motors.

The investigation also revealed that all navigation equipment (radar and global positioning system) onboard the vessel was fully functional at the time of grounding. No position plots were observed on the local area chart and no compass courses, or other course directions, were given to the helmsman. Current Notices to Mariners of up to two weeks prior to the grounding were posted on the bridge. Additionally, the master had never ascertained the level of experience nor the qualification of the helmsman on watch. He said he used his own personal experience to determine if the helmsman was properly qualified. However, the master failed to question the helmsman directly concerning his experience or qualifications even though the helmsman made comments to the master concerning his lack of experience.

Further, it was determined that the master effectively gave navigation control of the *Sealth* to an inexperienced helmsman when he allowed himself to be distracted by the company correspondence while transiting narrow waterways through the junction of several channels. Bridge watchstanding orders state that the master shall ensure that:

- The helmsman steers correct courses; and,
- The steering gear responds properly to helm orders.

The master was unable to demonstrate compliance with either order because no courses were ever passed to the helmsman, and without course direction or rudder commands, it cannot be determined by the master if the steering gear is responding properly to helm orders.

The helmsman also took it upon himself and improperly chose to follow the wake of the *Illahee* without direction from the master. As it was, the *Illahee*, which was approximatley one mile ahead of the *Sealth*, had made a west-north westerly course change to make the approaches to Friday Harbor. The wake that the helmsman observed and chose to follow was not an indication of the true course of the *Illahee* as it was a residual wake that had been pushed in a northerly direction by the tidal current, which was out and away from the safe channel.

The helmsman's lack of experience contributed to his making faulty assumptions in the navigation of the *Sealth*. Additionally, the helmsman failed to seek the master's advice or direction when in doubt as to the proper course or action to take. This reluctance by the helmsman is attributed to his general inexperience, his lack of familiarity with the master, and fear of embarrassment. The helmsman later indicated to investigators that he did not want to "look stupid" in front of the master.

While the master appeared to be a highly experienced captain, poor communications between him and the helmsman demonstrated a poor understanding of the bridge "team" concept and the tenets of good bridge resource management. Interviews with the master showed an undesireable level of aloofness that could prohibit open communication between him and his crew.

The Coast Guard filed a complaint against the master charging him with negligence and misconduct for his involvement in the grounding of the *Sealth* and stated that he failed to properly monitor the course and direction of the vessel under his command while on watch. The master voluntarily deposited his Coast Guard license in a good faith deposit and agreed to a settlement agreement resulting in a one-month outright suspension of his Coast Guard license, two months suspension of his license remitted on 12 months probation, and a requirement that he complete a bridge resource management course. After meeting these requirements his license was returned to him.

Regarding the helmsman, it was found that he failed to properly steer the vessel, failed to notify the master of the *Sealth* of any unusual or uncertain circumstances as required by the Washington State Ferry system's bridge standing orders, and his actions thus caused the grounding of the *Sealth*. He was issued a Coast Guard letter of warning.

Large U.S. Passenger Vessels

They're Not Just Cruise Liners

by David H. Dickey
U.S. Coast Guard Compliance Analysis Division

When hearing of large passenger vessels, most people think about highly publicized ocean cruise liners. It is important to understand that all cruise liners now sailing from U.S. ports are operated under foreign flags. While the U.S. Coast Guard performs safety checks and oversees security procedures on foreign cruise ships sailing from U.S ports, the "flag states" retain primary responsibility for the safe operation of these vessels.

Operating under the U.S. flag is a variety of large passenger vessels that are prominent in transportation, recreation, and entertainment.

Large Passenger Vessels Defined
In the United States, the difference between "small" and "large" passenger vessels is defined in Title 46 of the Code of Federal Regulations (46 CFR). Sections 70 through 80 of 46 CFR, also known as Subchapter H, contain the safety regulations for such vessels.[1] By definition, large passenger vessels:

- are over 100 gross tons, and;
- carry more than 12 passengers.

Also, to operate as a U.S. flag vessel and travel between U.S. ports, federal law requires that vessels be constructed and maintained in the United States, owned by a U.S. enterprise, and crewed by U.S. mariners.

When approved for U.S. passenger service, the Coast Guard will issue a Certificate of Inspection, specifying the number of passengers allowed, manning requirements and other operating conditions. Inspection certificates are valid for one year, with quarterly safety checks.

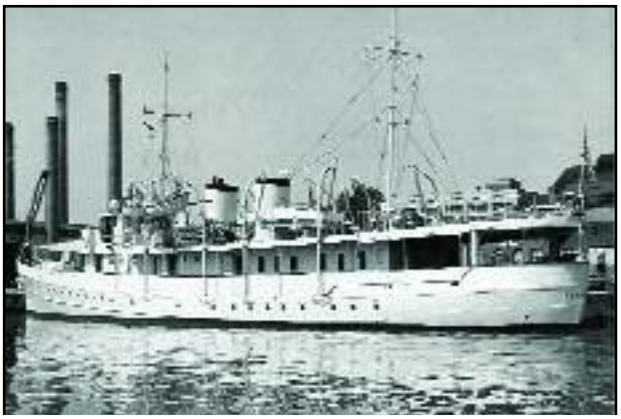
Given the above criteria, it is possible for a large vessel to carry 12 or fewer passengers, without being subject to the more stringent Subchapter H regulations. For example, many U.S. cargo ships have been constructed with a few passenger staterooms.

The Vessel Population
As of September 2003, the Coast Guard's database of vessels with active Certificates of Inspection showed 177 large passenger vessels with a total capacity of 164,414 passengers. Vessel capacities ranged from 120 to 5,992 passengers.

Excursion Vessels
An "excursion vessel" engages in short cruises for special events or recreational purposes. The operation of an excursion vessel is often seasonal and it is much more common for such vessels to be in the "small" passenger vessel category—those under 100 gross tons.

Vessel Type	# of Vessels	Total Capacity
Excursion	20	15,430
Ferry	113	94,914
River Cruise	4	1,371
Attraction	2	1,150
Gaming	38	82,015
Total	**177**	**194,880**

Among the group of large excursion vessels is the *USS Potomac*. The *Potomac* was constructed in 1934 and commissioned as the Coast Guard cutter *Electra*. Soon thereafter, the vessel was transferred to the U.S. Navy for conversion to Presidential service, as a replacement for the yacht *Sequoia*. Franklin D. Roosevelt was the first president to ride the *Potomac* in March 1936. After being decommissioned in November 1945, the *Potomac* changed hands multiple times, including a brief period of ownership by Elvis Presley. The vessel is now owned by The Potomac Association in Oakland, Calif., running dockside tours, history cruises and special events in San Francisco Bay.[2]



Commissioned as the Coast Guard cutter *Electra*, the presidential yacht *Potomac* now operates in San Francisco Bay.

Ferries

The majority (62 percent) of large U.S. passenger vessels are ferries; they have 47 percent of the passenger capacity. Most of the vessels are operated by state or local agencies, including the city of New York, and the states of Alaska, North Carolina, Louisiana and Washington. They are a vital part of the transportation network. In terms of passenger capacity, some ferries transport more people than oceangoing cruise ships, which typically carry 1,800 to 2,000 passengers. For example, nine of Washington state's ferries have capacities of 2,000 to 2,500 passengers, plus vehicles. The Staten Island ferry *Andrew J. Barberi* can accommodate 5,992 passengers. The importance of ferries was emphasized on September 11, 2001 when water transportation became the only viable way off Manhattan, other than walking.[3]

Passenger capacity is a good indicator of vessel size, but it is not a true measure of the contribution of ferries to the transportation system. A more accurate figure would be the number of passenger embarkations per year. Unfortunately, such figures are not collected on a nationwide basis. Some of the largest operators, however, provide their own usage statistics. In 2002, for example, the Washington state ferries transported 25.1 million passengers and more than 11 million vehicles.[4] The Staten Island ferries carried more than 19 million passengers.[5] The Alaska Marine Highway System, which transports goods and people between remote locations in the state and the "lower 48," carried 314,409 passengers and 92,403 vehicles.[6] By comparison, oceangoing cruise ships embarked approximately 7.6 million passengers in U.S. ports during the same year.[7]

The Washington State Ferry *Spokane* can carry 2,000 passengers and up to 206 vehicles. Steven J. Brown, courtesy Washington State Ferries.

River Cruise

The three river cruise vessels, *Delta Queen*, *Mississippi Queen*, and *American Queen*, are all operated by the Delta Queen Steamboat Company, Inc. Each of the vessels is propelled by a fully functional paddlewheel, driven by a steam reciprocating engine. The vessels are well appointed and operate on a variety of overnight routes, from three to 11 nights in duration. The vessels call upon cities from New Orleans to Minneapolis/St. Paul, and as far east as Pittsburgh. The *Delta Queen*, built in 1927, is listed as a National Historic Landmark. In August 2003, a fourth river cruise vessel, *Empress of the North*, began operating between Washington state and Alaska.

Attraction Vessels

Coast Guard policy has recognized that, occasionally, there are large vessels of unique design or use that do not need to meet the full requirements of Subchapter H to operate safely. For example, some vessels, known as "attraction vessels," only have

[1] For a review of small passenger vessels, see the January-March 2002 *Proceedings of the Marine Safety Council*, Volume 59, Number 1, which can be viewed online at **www.uscg.mil/proceedings**

[2] The Potomac Association, **www/usspotomac.org**

The three river cruise vessels, (top to bottom) *American Queen*, *Mississippi Queen*, and *Delta Queen*, meet beneath the Gateway Arch in St. Louis, Mo. Courtesy Delta Queen Steamboat Company, Inc.

passengers onboard while moored. Coast Guard policy defines attraction vessels as follows:

"Attraction vessels are vessels that are put on public display or used as a platform for a public exhibit and carry "passengers" only while temporarily moored to dock. By charging visitors some form of admission to board, or accepting donations or some other valuable consideration, attraction vessels are subject to U.S. inspection laws as passenger vessels….Attraction vessels may be of unique or unusual design, have some historical significance, be restored or constructed as replicas of former vessels or provide some related maritime interest to the public. Generally, the design or construction of an attraction vessel precludes conformance with or retrofitting to meet U.S. passenger vessel requirements without damaging the originality of the vessel.[8]*"*

An example of such a vessel is the *HMS Bounty*. The *Bounty* was built in 1960 by MGM Studios for the film "Mutiny on the Bounty" and is a fully functional sailing ship. The vessel operates a number of underway training programs with cadets and/or passengers.[9] However, while operating in U.S. waters with more than 12 passengers onboard, the vessel remains moored at the dock.

Gaming Vessels

The Coast Guard's database lists 38 inspected gaming vessels. For purposes of safety inspections, gaming vessels are a new form of excursion or tour vessel. Inspection records indicate that each of the vessels is capable of navigation. However, with the emphasis on gaming and live entertainment, vessel operators tend to keep the vessels dockside. In fact, 16 of the vessels have inspection certificates limiting them to dockside operation while passengers are onboard. Passenger capacities range from 440 to 4,557. According to the Transportation Institute, dockside gaming is allowed in three of the six states with such vessels; vessels in the other three states operate underway.

The Return of U.S. Cruise Ships

There have been no operational U.S. flag cruise ships since the fall of 2001, when American Classic Voyages Inc. declared bankruptcy and laid up all of its vessels, including the *SS Independence*. At that time, the *Independence* was making inter-island voyages in Hawaii.

In recent months, however, there have been developments that suggest the return of cruise ships

[3] *Proceedings*, Volume 60, No. 2, April-June 2003, Pg 6.
[4] Washington State Department of Transportation, **www.wsdot.wa.gov**
[5] New York City Department of Transportation, **www.ci.ny.us/html/masstran/ferries/statferry.html**

The Cincinnati **was built in 1923 to carry passengers and freight between Louisville, Ky. and Cincinnati, Ohio, and was in that trade until 1929. The vessel was bought and turned into an excursion vessel, coming out July 4, 1933, and named *The President*.**

under the U.S. flag. In August 2002, Norwegian Cruise Line (NCL) purchased two partially completed cruise ship hulls from the Northrop Grumman shipyard in Pascagoula, Miss.[10] Construction of the vessels, known as the "Project America" shipbuilding program, was started for American Classic Voyages and stopped when that company declared bankruptcy.

On Feb. 21, 2003 a Public Law was enacted that included some special amendments to existing shipping laws. Section 211 of the new law allows NCL to complete construction of the "Project America" vessels in a foreign shipyard and operate them under U.S. flag with U.S. crews. In addition, NCL will be allowed to re-flag an existing ship under the U.S. flag.

Artist's version of the future *Pride of America* to begin U.S. flag service in 2004. Courtesy Norwegian Cruise Line.

On May 6, 2003 NCL announced that the first "Project America" ship, to be named *Pride of America*, and the reflagged *Norwegian Sky* will begin operating inter-island cruises in Hawaii. About the same time, NCL announced that it had purchased the laid-up *SS United States*, which holds the speed record for crossing the North Atlantic, with plans to return the ship to U.S. service.[12] Thus, in the next few years there could be as many as four U.S. flag cruise ships in operation.

This article has presented a cross-section of the large U.S. passenger vessel community. Clearly, those vessels make significant contributions to recreation and transportation. Not only is this segment of the marine industry healthy, but it is growing, as new ferries, riverboats, and cruise ships continue to go into service.

[6] Alaska Marine Highway System, **www.dot.state.ak.us/amhs**
[7] Cruise Industry News, *Annual 2003 International Guide to the Cruise Industry*, 16th Edition, pg. 107
[8] *U. S. Coast Guard Marine Safety Manual*, Volume II, (Commandant Instruction Manual 16000.7A), Sec B, Chapt. 4, Part CC.
[9] HMS Bounty Organization, LLC. **www.tallshipbounty.org**
[10] Norwegian Cruise Line press release, Nov. 11, 2002. **www.ncl.com/news/pr111102.htm**
[11] Norwegian Cruise Line press release, May 6, 2003. **www.ncl.com/news/pr050603a.htm**
[12] Norwegian Cruise Line press release, April 14, 2003. **www.ncl.com/news/pr041403.htm**

A Review of Large Passenger Vessel Casualties

by Cmdr. Andrew Palmiotto
U.S. Coast Guard Compliance Analysis Division

The large passenger vessel industry is a relatively safe one, and the overwhelming majority of casualties that occurred from 1992 to 2000 were caused by loss of maneuverability. These findings were presented in a recent U.S. Coast Guard report, "Overview of Marine Casualties Involving U.S. Passenger Vessels Regulated Under Title 46 CFR Parts 70-89 (Subchapter H), 1992-2000," which was prepared by the Coast Guard Office of Investigations and Analysis.

Vessels regulated under Subchapter H fall into several subcategories: excursion/tour vessel, ferry, general, harbor cruise vessel, and ocean cruise vessel. A vessel regulated under Subchapter H of 46 CFR must be annually inspected and certified by the Coast Guard. Vessels are reinspected quarterly to verify that the operators maintain standards throughout the certification period. The Certificate of Inspection issued to each vessel specifies the number of passengers and the route and conditions of operation. Also, an individual holding a masters license consistent with size of the vessel and route over which the vessel is operated must command the inspected vessel.

The study looked at seven types of casualties:

- Loss of vessel maneuverability;
- Loss of electrical power;
- Allision;
- Grounding;
- Fire;
- Flooding; and
- Collision.

The report did not include crew/passenger deaths and injuries or pollution incidents. Pollution incidents and other casualties were part of the initial data search, but were not specifically addressed in this study because pollution incidents have a significant public interest and would not be sufficiently addressed in the overview. Incidents occurring less frequently, such as abandonment, explosion, or sinking, are atypical and do not carry enough data to provide trend analysis. Other factors drive interest in these casualties, particularly the significance of any consequences associated with the event.

Data Summary

During the nine-year period, the Coast Guard identified 1,228 distinct events of single or multiple casualties. More than half of those casualties, 683, were caused by vessel maneuverability. Figure 1

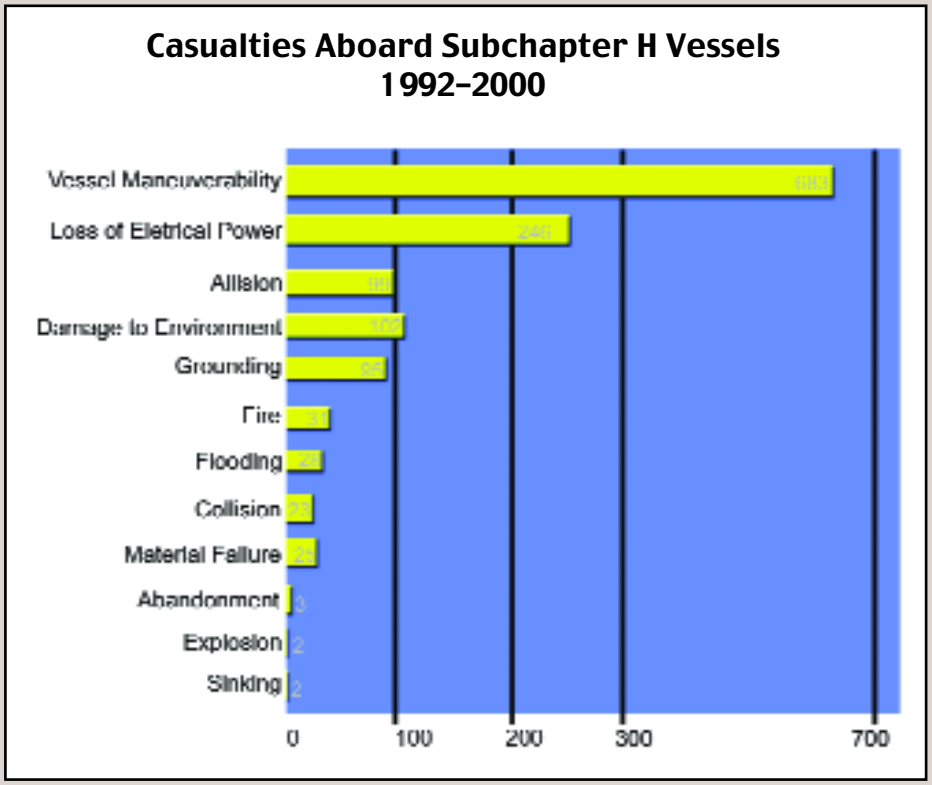


Figure 1

presents the breakdown of all casualties from 1992-2000. Due to the extensive number of casualties, only those cases involving allision, grounding, collision, fire, and flooding were reviewed. The narrative summaries were read and various fields were checked to ensure applicability and that an adequate description of the casualty was evident. A control chart was prepared for each casualty type to ascertain whether the number of incidents fell within normal variation or were signals of problematic trends.[1] Other data was also charted where available and relevant.

The report noted that the consequences of the vessel casualties were minimal to crew and passengers. While no death or injury is acceptable, the large passenger vessel industry is relatively safe. This may be a result of the consistency of the industry, well-established operators on well-established routes, with average growth. The report further cautioned that with consistency and average growth comes the desire to extend the useful life of capital assets, and the industry must be diligent in ensuring that vessels aren't overextended to the point that casualties are exacerbated. The vast majority of casualties involve vessel maneuverability, caused by mechanical and electronic system failures, generally on aging systems. The average age of the vessels involved in the study was 31 years. Information on many of the casualty cases was obtained from summary information in the case files.

ground • ings
\ˈgraun-diŋ\

1 : when a vessel's underwater hull or protuberances make contact with the bottom of the body of water in which it is being operated.

2 : they are usually further broken down into incidents that occur either within or outside a navigable channel.

3 : weather influence, mariner influence, and maneuverability influence are all factors in groundings.

searching for Groundings graph

Some Examples of Groundings

A vessel was caught by wind at entrance to ferry terminal. The vessel briefly touched bottom with no damage.

A vessel struck a charted shoal while attempting to find its correct course. One of two radars was operational. The master's chart was uncorrected and no fixes were taken.

While a vessel was making its way through the narrows, the master slowed to below bare steerage resulting in a loss of control and vessel grounding.

A vessel grounded while attempting to avoid a collision with a sailing vessel. The vessel allided with a daymarker, damaging two blades on port prop. There was no collision with the sailing vessel.

A ferry was departing its terminal at low tide when the stern section touched bottom. Diver examined vessel and found no damage. Shoaling has been reported in this area. The state agency was aware of shoaling and was planning to dredge the area.

searching for Groundings graph

ves•sel ma•neu•ver•abil•i•ty

\ˈves-əl\ \-ˌn(y)uv-(ə-)r əˈbil-ət-ē\

1 : encompasses casualties involving loss of steering or loss of propulsion. This is the most prevalent reportable casualty type. It is important to single this out because it can be a precursor to other casualties in that losing maneuverability in a waterway or while mooring can lead to groundings, collisions, and allisions.

Some Examples Maneuverability Loss

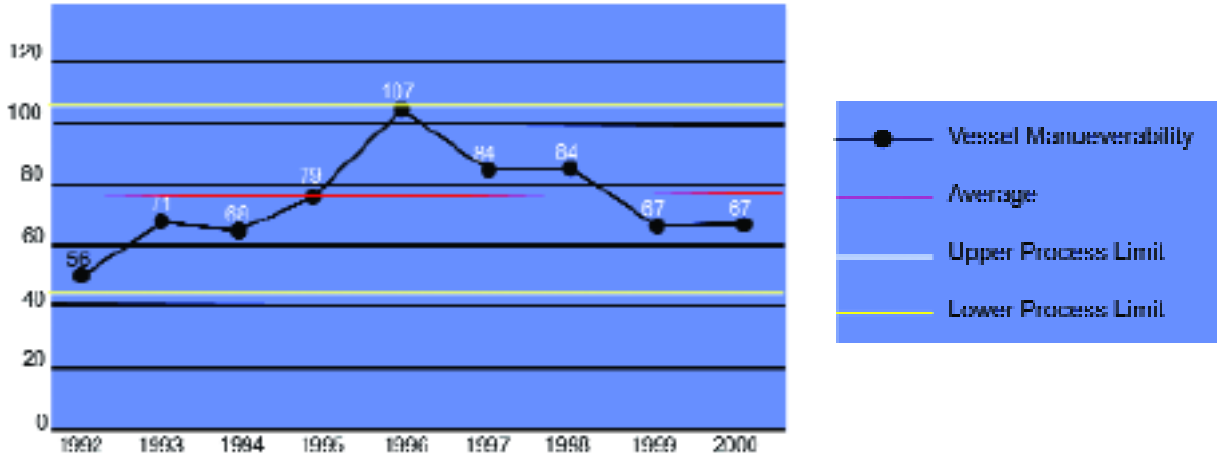
Fuel supply valve was found closed after a ferry suffered a loss of power. Normal operations resumed after the valve was opened.

An engine's computer control system caused the "B" engine to shut down while underway.

A ferry's #1 main engine oversped and tripped off-line. The vessel proceeded on one engine and the speed-regulating governor was replaced.

A vessel's main condenser overboard seawater-circulating valve failed to open resulting in port main propulsion unit failure.

Failure of a ferry's aft rudder was caused by one of the hydraulic rams being unscrewed from the piston.



loss • of • elec•tri•cal • power

\i-ˈlek-trik\

1 : involves partial or total loss of power, and can have an effect on the vessel's ability to maneuver or operate safety equipment.

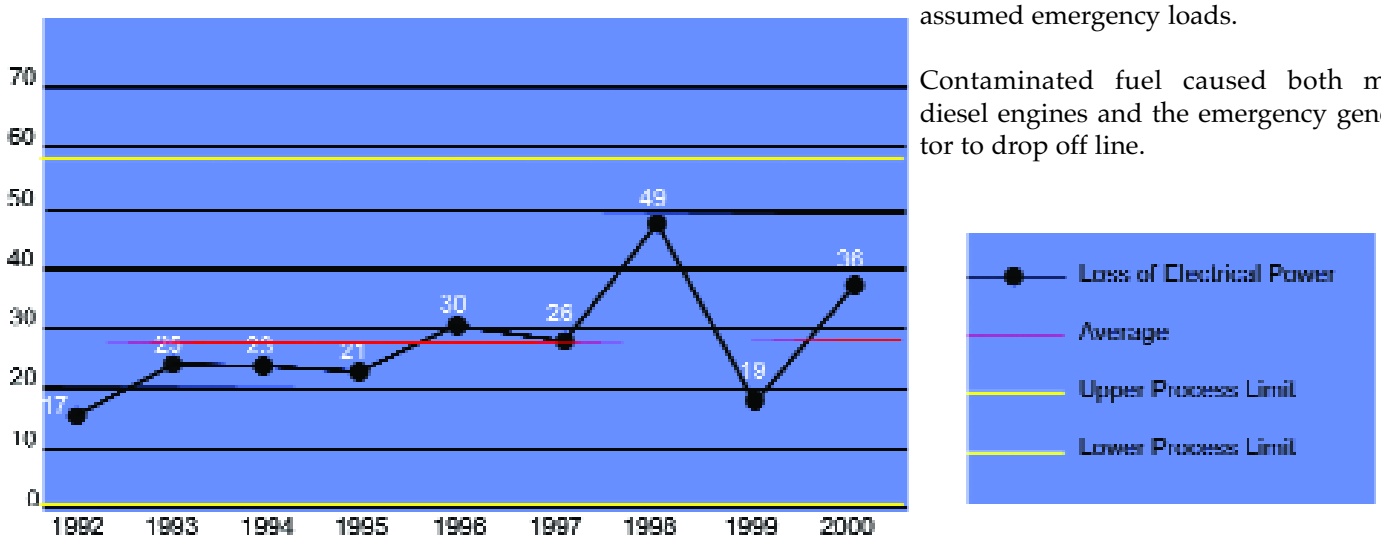
Some Examples Electricity Loss

During initial start-up of a vessel's #1 service generator, the crankshaft bearing on #1 piston failed; apparently caused by wear and tear.

The voltage regulator on a vessel's #1 generator malfunctioned and tripped main switchboard circuit breaker on #1 steering system.

A vessel's #4 service generator lost voltage control and tripped off line, causing an overload to the ship's electrical system. This caused a loss of normal ship's power and air conditioning. The emergency generator started automatically and assumed emergency loads.

Contaminated fuel caused both main diesel engines and the emergency generator to drop off line.



al•li•sions
\əl-ˈlizh-ən\

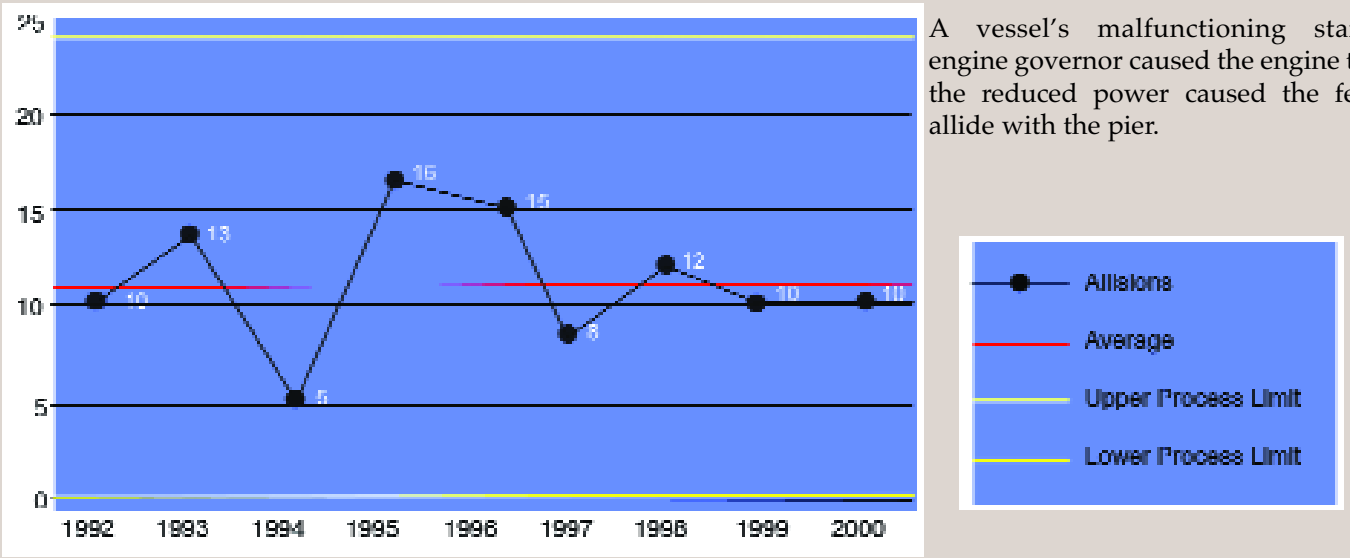
1 : when vessels strike immovable objects like bridges, piers, and other vessels that are anchored or moored. These casualties can be caused by weather (16 percent), execution of vessel navigation, mariner influence (44 percent), maneuverability, or mechanical influence (40 percent).

Some Examples of Allisions

A vessel was underway upbound with apparent sluggish rudder response. When rudder finally responded it went full right, causing the vessel to strike the east draw stone abutment on the starboard bow.

A ferry lost air to pilot house engine controls. It overran the stern of a moored tug, with minor damage to tug. This could be caused by scale (corrosion/deposits) clogging pilot house air control transfer valve.

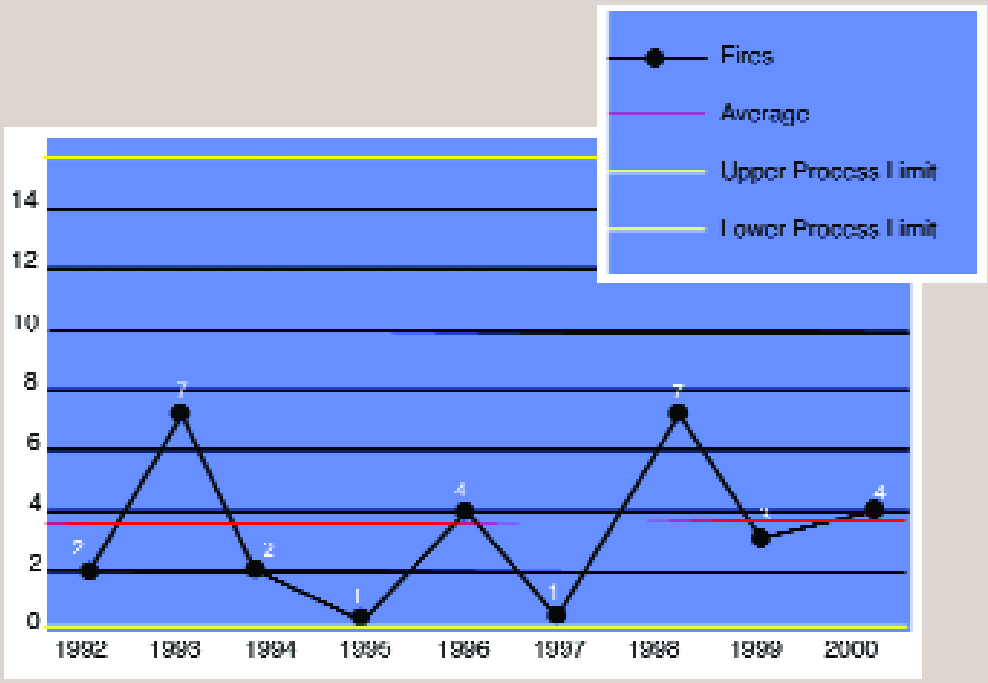
A ferry allided with an upriver slip, causing damage to cement pilings that support the car-loading ramp.



A vessel's malfunctioning starboard engine governor caused the engine to stall; the reduced power caused the ferry to allide with the pier.

fires
\ˈfi(ə)r\

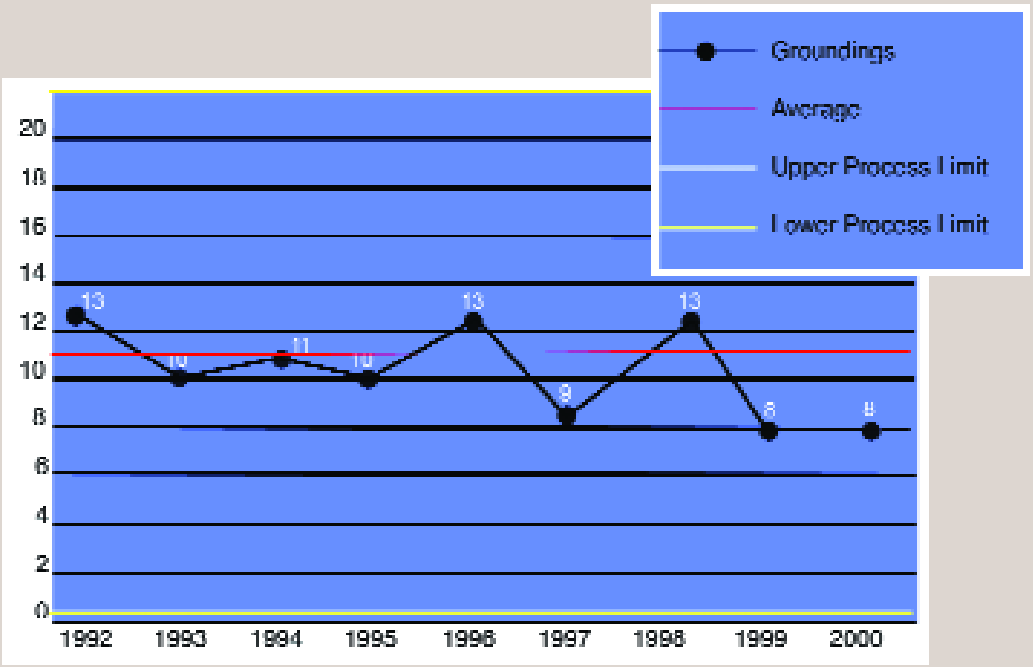
1 : the majority of fires (61 percent) deal with machinery (e.g., shorted solenoid, seized bearing). The second greatest cause (29 percent) was due to actions of people (e.g., welding, cigarette in trash). Situational fires (10 percent) include spontaneous combustion or material placed near a heat source catching fire.



[1] Methodology for control charts is taken from Donald J. Wheeler, Understanding Variation: The Key to Managing Chaos, 2nd ed. (Knoxville: SPC Press, 2000), pp. 33-44

col•li•sions
\kə-ˈlizh-ən\

1 : the majority of vessel collisions (57 percent) occurred with vessels meeting. Other vessel relationships at the time of collision were overtaking (22 percent) and crossing (17 percent), and four percent were not specified.

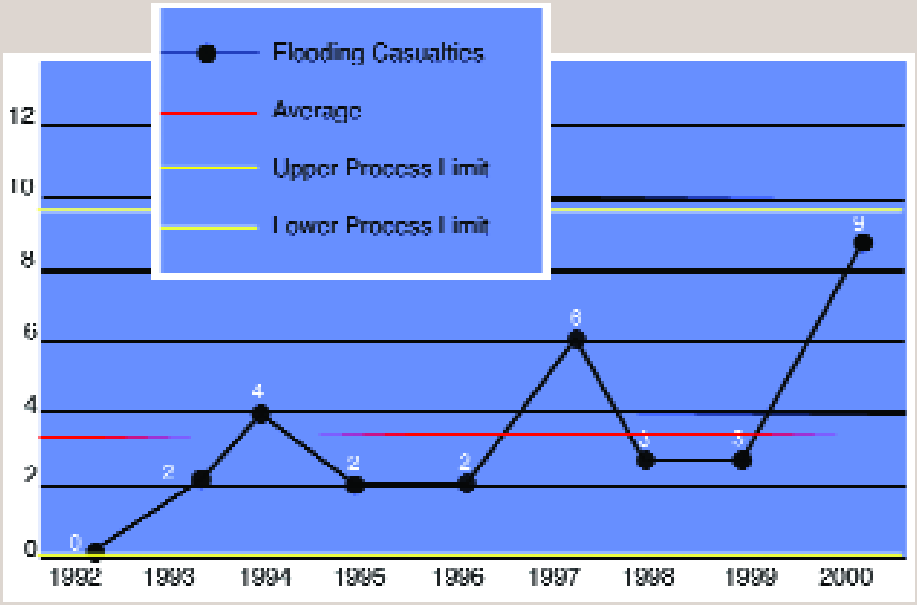


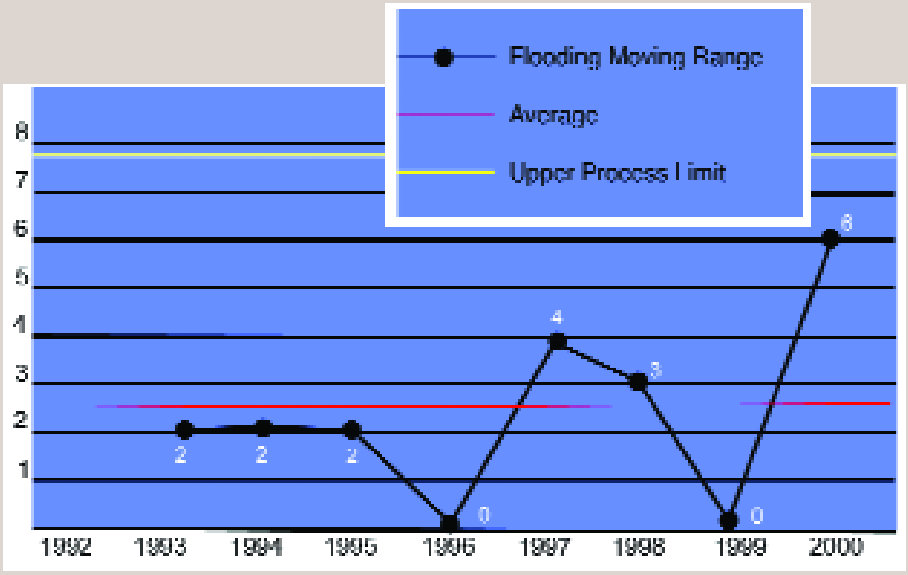
flood•ings

\ˈfləd\ **1 :** the following graphs utilize the complete control charting method to analyze incidents of flooding on large passenger vessels.

2 : the addition of the moving range chart provides a more thorough look at how the change between year-to-year values fits into variation analysis. This is one step further than looking at whether the actual amount in a year falls within normal variation.

3 : although the incidents of flooding are within limits, there is the possibility of trend as shown in both graphs. This is cause for concern, and may require analysis of additional data to determine if this trend signals an undesired change.





Heroes:

The World's Best Coast Guard

Rear Adm. Richard Bennis, USCG (Ret)

by Chief Public Affairs Specialist P.J. Capelotti, Ph. D.
U.S. Coast Guard Reserves

He had just been selected for flag rank when he was diagnosed with incurable melanoma, and the cancer eventually invaded both his lungs and his brain. He endured surgery in the summer of 2001, and afterwards, on Sept. 10, 2001, as Rear Adm. Richard Bennis, captain of the port of New York and New Jersey, had staples removed from the back of his head, he and his wife decided that maybe the time had come to slow their lives down. They decided to head south to look for a retirement home early the next morning.

By mid-morning on September 11—driving south through Virginia—Bennis' country and port were under attack. He turned around, headed back north and reached Station Sandy Hook, N.J., where he was met by a U.S. Coast Guard Reserve coxswain who drove the admiral's boat from Sandy Hook, past the Verrazano Bridge, with its view of Manhattan that had always been so awe-inspiring and was now full of smoke and fire. Bennis saw all of the crew had tears in their eyes.

Bennis never did get a chance to enjoy retirement. But as a career port operations and marine safety expert, September 11 made him a national hero.

When he saw the scope of devastation, he put out a call to the rest of the Coast Guard to send as many assets as possible. By mid-morning, the Coast Guard had nearly 40 boats operating in the harbor along with several cutters closing at flank speed.

By the afternoon of September 11, Bennis' Activities New York had assisted in evacuating an estimated 750,000 people. The massive Coast Guard presence symbolized to all potential passengers that the harbor was closed and secure.

Bennis had a team in whom he retained complete trust, and he let them know right up front. They would work this problem together without burning each other out. During the endless rounds of briefings that followed the attacks, he would only ask a probing question here or there, just to make sure that everyone was headed in the right direction. After the initial rush of adrenaline-charged days were over, Bennis circulated amongst his team to find those personnel who needed to get away or needed family time, and prodded them away from their posts, if just for an hour. The concern went both ways.

At one point in the crisis, Bennis heard a petty officer talking with one of his chiefs. He didn't know what made him do it, but Bennis paused out of sight to listen in. The petty officer said, "Chief, we need a break; we need a couple of hours off." To which the Chief responded, "The Old Man just had brain surgery, and he's been working for twenty-three hours a day for five days!" Bennis smiled to himself, then tiptoed back in the other direction. It was at such moments that the Admiral allowed himself to believe that perhaps he had been kept around for a reason.

The people of New York certainly felt that way. Awaiting a visit by the president, Bennis found himself talking with a firefighter from Ground Zero whose company lost 16 men that day. He said, "You know how you feel when a fire truck comes through the neighborhood and you feel reassured. That's the way my family feels when they see the racing stripe out on the water." It was a feeling Bennis knew well, and one he made sure all citizens of a stricken New York felt after the worst terror attacks in American history.

For his efforts during September 11 and a career of outstanding service, Bennis was awarded the Transportation Department Distinguished Service Medal. Bennis retired from the Coast Guard in 2002 and was appointed associate undersecretary for maritime and land security for the Transportation Security Administration. He died Aug. 3, 2003 after a four-year battle with melanoma.

Most Subchapter H Injuries and Deaths Not Vessel Related

by MARC I. LANGERMAN
U.S. Coast Guard Compliance Analysis Division

The number of deaths and injuries onboard large passenger vessels has been relatively low over the past decade, and the vast majority of injuries that did occur were not associated with a marine casualty such as a collision, allision, fire or grounding. According to a recent U.S. Coast Guard report of deaths and injuries on large passenger vessels from 1992 to 2000, eight fatalities occurred on board these vessels during that period.

The report, "Analysis of Subchapter H Vessels: A Review of Deaths and Injuries Aboard U.S. Flagged Passenger Vessels over 100 Gross Tons, Calendar Years 1992-2000," was prepared by the Coast Guard Compliance Analysis Division. It examined all death- and injury-related casualties reported to the Coast Guard Marine Safety Offices of inspected U.S. flagged passenger vessels operated under the regulations in 46 CFR Subpart 70-89 (Subchapter H). A large passenger vessel must be annually inspected by the Coast Guard and can only carry as many passengers as the Certificate of Inspection allows. In addition, an individual holding a Masters license consistent with the size of the vessel and route over which the vessel is operated must command the inspected vessel. The study excluded death/disappearance and injuries from foreign vessels and platforms, and any death/disappearance that was determined to be from natural causes or the result of an intentional act, such as altercation, homicide, and suicide.

Data Summary

From 1992 to 2000, there were 663 casualty cases involving 788 people—470 employees and 318 passengers. In that period, there were eight fatalities: five passengers, two deck hands, and one homeless man. There were 780 total injuries: 312 passengers, 248 employees, 141 deck crewmembers, 34 engine crewmembers, 17 steward department employees, nine engineering officers, seven deck officers, six vessel masters, five not elsewhere classified, and one government employee.

To test whether the number of casualties per year fell within expected tolerances, the Coast Guard used control chart methodology and plotted the number of casualties against the expected limits of normal variation. The control chart in Figure 1 shows that personal casualties have been under control since 1998. During 1995, marine casualty cases totaled 183, which was above the upper process limit of 173.7. The case counts in 1994 and 1996 were above average. In 1995, the Coast Guard initiated several policies to reduce casualty report demands on both industry and the Coast Guard. As a result, the number of personal injury cases in the Coast Guard database after 1996 dropped by eliminating the reporting of minor injuries.

Personal Casualty Cases	
1992	41
1993	42
1994	132
1995	183
1996	114
1997	64
1998	31
1999	27
2000	29
Total	= 663

Each chart accompanying this article represents injuries on Coast Guard-inspected vessels over 100 gross tons between Jan. 1, 1992 and Dec. 31, 2000.

Figure 1

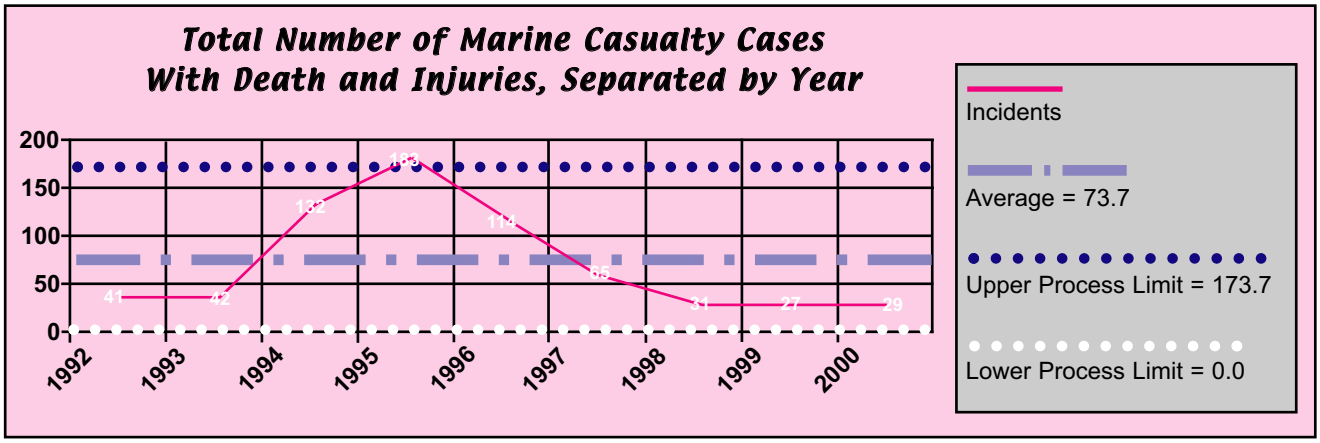


Figure 2

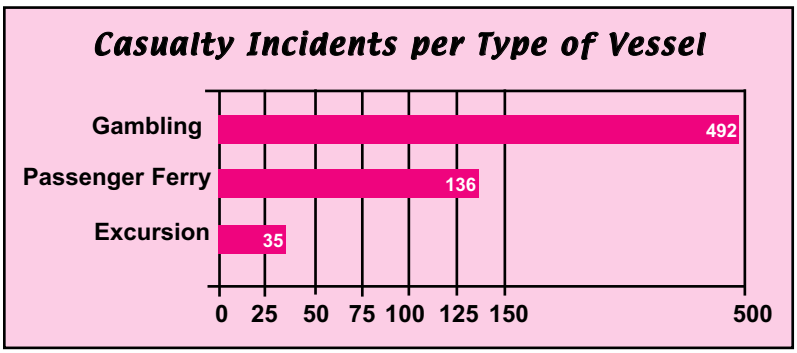


Figure 3

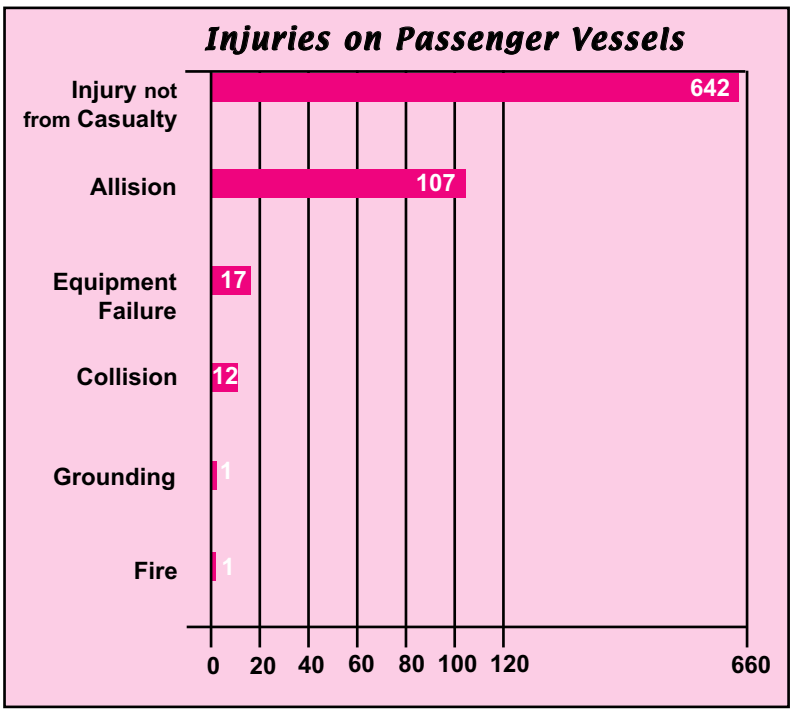
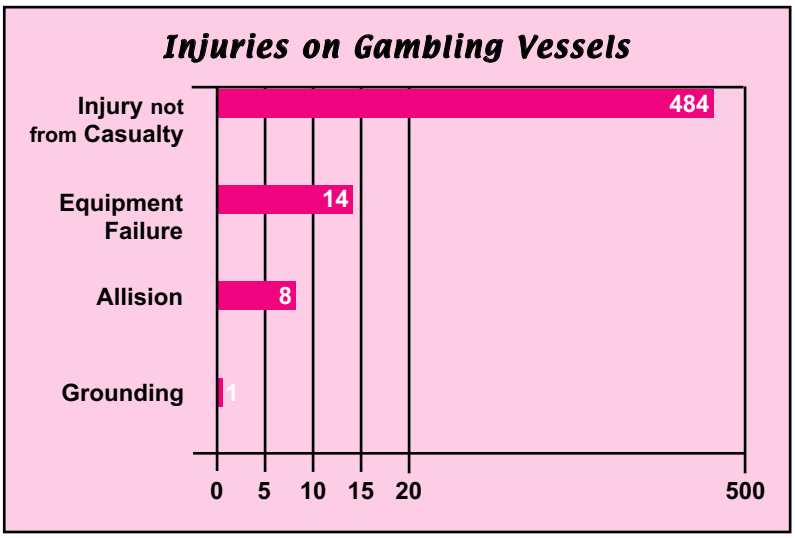


Figure 4



The study reviewed U.S. flagged passenger vessels in the following categories: excursion vessels (which includes Circle Line tour boats, River Paddle Wheelers, harbor/dinner cruise ships, and ocean cruise ships), gambling vessels (which includes gambling cruise ships and moored barges, and passenger ferries (which includes ferry vessels, Staten Island ferries, state ferries, car ferries, and lake car ferries).

Figure 2 shows the number of incidents on large passenger vessels involving deaths or injury over the period of study by type of vessel.

Figure 3 shows the number of injuries resulting from vessel activities. It is important to note that the overwhelming majority of injuries were not associated with a marine casualty, such as a collision, allision, fire or grounding. The accident reports further showed that nearly all of the injuries associated with allisions occurred during vessel docking.

Though the majority of incidents occurred on gambling vessels, they had the fewest number of casualties related to a vessel casualty. Figure 4 shows injuries on gambling vessels.

The greatest number of injuries on passenger ferries resulted from an allision. Figure 5 displays the injuries on Coast Guard-inspected passenger ferries.

About half of the injuries on excursion vessels resulted from allision. Figure 6 displays injuries on excursion vessels during the study period.

Information on many of the casualty cases was obtained from summary information in the case files.

Figure 5

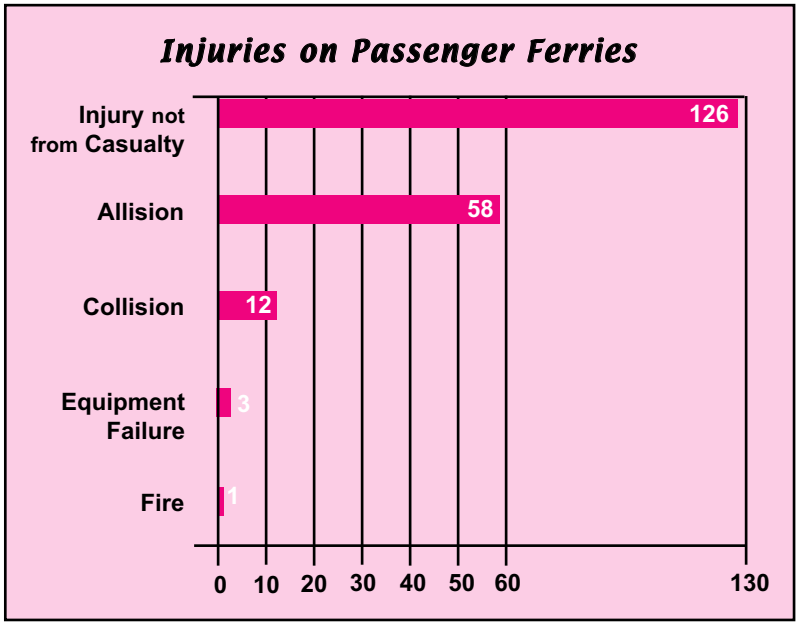
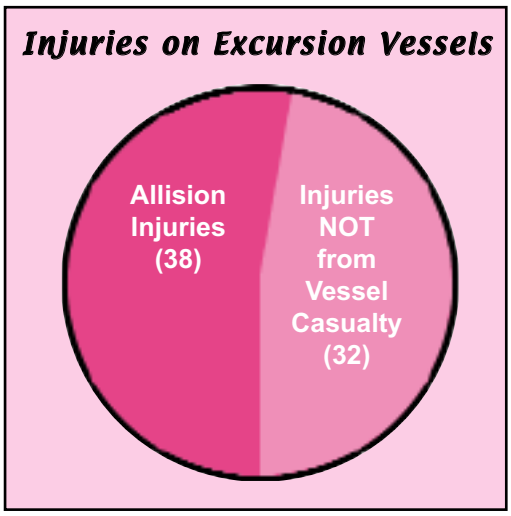


Figure 6



Eight Deaths in Nine Years

The following summaries describe the eight cases during the study period, Jan. 1, 1992–Dec. 31, 2000, that resulted in death.

An unidentified, homeless adult male died aboard the NYC Staten Island Ferry when he activated the CO^2 system. CO^2 flooded the CO^2 room because, for unknown reasons, one of the flexible loops was not securely connected. The vessel was out of service and moored at the time. The deceased was the only person known to be aboard the vessel.

A deck crewman sustained a fatal blow to the head while manning a hand-operated winch on the starboard bow of the vessel during a routine mooring adjustment to the Memphis Queen Lines dock/fleet. During the mooring adjustment, tension on the cable caused the winch hand crank handle to spin around and hit him in the head.

A passenger on a gaming vessel lost consciousness while using the urinal. Due to a blood alcohol content of .239, he fell backwards and hit his head on the deck. Emergency Medical Technicians were called to the scene for immediate attention. The passenger later died from the injuries sustained to his head.

While en route on a lake car ferry from Manitowoc, Wisc., to Ludington, Mich., a passenger was found unconscious in her stateroom. Crew efforts to revive her were ineffective, and another passenger (RN) checked vital signs and determined the victim was beyond medical assistance. The woman had apparently become trapped between the bed she was on and the bulkhead. The Manitowoc coroner determined the cause of death to be mechanical asphyxia due to external chest compression.

The Chief Mate aboard a gambling cruise ship conducted a drill using the ship's rescue boats. The drill began at approximately 4 a.m. while it was dark on the Mississippi River. The two rescue boats collided killing one person, paralyzing one, and injuring two others.

A gaming vessel passenger was transiting down the stairs on the port forward ladder leading to the main deck from the upper casino deck. He lost his balance and fell down the remaining steps. He received head trauma and was transported to the hospital where he later died.

A passenger aboard a casino vessel was struck and fatally injured by a fragment from the vessel's portside electric rescue boat which came apart during underway man-overboard boat drills.

A passenger drowned in the Lower Mississippi River with the apparent cause to be misconduct on his part. While under the influence of alcohol, he had tried to steal a lifeboat aboard the casino vessel. While doing so, he fell into the river and drowned.

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With Precautions, Parasailing Can Be Low Risk, High Fun

by Paul Eulitt
U.S. Coast Guard Compliance Analysis Division

Parasailing is a fun way to take in breathtaking views while soaring in the sky. And, though not without risk, it's relatively safe. A recent U.S. Coast Guard report showed that parasailing accidents resulted in 64 injuries and three deaths from 1992 to 2001, and many accidents can be avoided if passengers and operators take a few precautions.

The report, "A Review of Casualties Aboard Inspected and Uninspected U.S. Flagged Vessels Engaged in Parasailing for Hire, CY 1992-2001," examined all casualties reported to the Coast Guard Marine Safety Offices of inspected and uninspected U.S. flagged passenger vessels operated under the regulations found in 46 CFR Subpart 175.00 (Subchapter T) and 46 CFR Subpart 24.01 (Subchapter C). The data for the study was extracted from the Coast Guard's Marine Safety Management System (MSMS), which is a static database, populated with data from the Marine Safety Information System (MSIS). The MSIS was the Coast Guard's repository of marine casualty data from Jan. 1, 1992 through Dec. 13, 2001.

An inspected vessel must be annually inspected by the Coast Guard and can only carry as many passengers as the certificate of inspection allows. Also, an individual holding a Masters license consistent with size of the vessel and route over which the vessel is operated must be in command of the inspected vessel.

Uninspected passenger vessels may not carry more than six passengers at any time and must be underway in the control of an individual holding at least an Operator of Uninspected Passenger Vessel (OUPV) license.

Parasailing Regulations

The study included inspected and uninspected U.S. flagged passenger vessels that carried "passengers for hire" and engaged in the commercial activity of parasailing.

The majority of incidents reported occurred aboard uninspected vessels, since most parasail vessels choose to operate under these regulations. Within the 59 reported cases, 12 casualties involved inspected passenger vessels and 64 involved uninspected passenger vessels.

The Coast Guard does not regulate the actual parasailing activity. In some areas, parasailing activities have been reg-

Marine Casualty Cases Per Year & Quarter

	Quarter				
	1st	2nd	3rd	4th	
1992	3	0	0	1	= 4
1993	2	1	2	0	= 5
1994	1	2	3	0	= 6
1995	0	2	1	0	= 3
1996	0	1	0	2	= 3
1997	2	1	3	0	= 6
1998	1	0	3	2	= 6
1999	2	2	4	1	= 9
2000	1	3	3	1	= 8
2001	2	5	2	0	= 9
Total	**14**	**17**	**21**	**7**	**59**

ulated to a degree by local city or town ordinances. Particularly, local city agencies have regulated the parasailing activities by issuing permits or licenses to conduct business within their jurisdiction. Mostly, the only stipulations or regulations they have are to adhere to are when (time of day) and where (between certain areas and a particular distance offshore) the parasailing activity may take place.

To fill what is felt to be a void in the oversight of the parasailing activity, the Parasail Safety Council (PSC) was organized in 1998 (**www.parasail.org/psc_directory.htm**) and the Professional Association of Parasail Operators (PAPO) organized in 2003 (**www.teampapo.org**). The councils are attempting to bring together parasail business owners and operators to promote standard operating practices and to agree on standard technical equipment for the parasail industry. Both groups have developed guidance that set specifications for equipment, standards for operating conditions and requirements for crew training they hope will be adopted by all parasail operating companies. Their goal is for a heightened and more uniform level of safety for parasailing activities.

Report Findings

While the number of reported cases in the United States has been very low—59 throughout the 10-year period—it has been increasing, from four reported cases in 1992 to nine in 1999 and 2001. The report broke down the number of cases by year and quarter. Not surprising, the casualty rate is greater in the third quarter (July-September) at the height of the summer vacation season. There were more cases in the first quarter (January-March) than in the third quarter (October-December) because of winter vacationers going to warmer climates where parasailing activities are conducted year-round. All 14 casualty cases in the first quarter occurred in Tampa, Mobile, Honolulu and Guam.

The 59 marine casualty cases reported to the Coast Guard involved a total of 64 injuries and three deaths: 59 passenger injuries and two deaths, and seven crewmember injuries and one death. Nine cases did not involve any injuries, and 17 cases involved

Failed tandem harness strap from the parasail vessel, *Hang 'Em High*, casualty.
Courtesy USCG MSO Tampa.

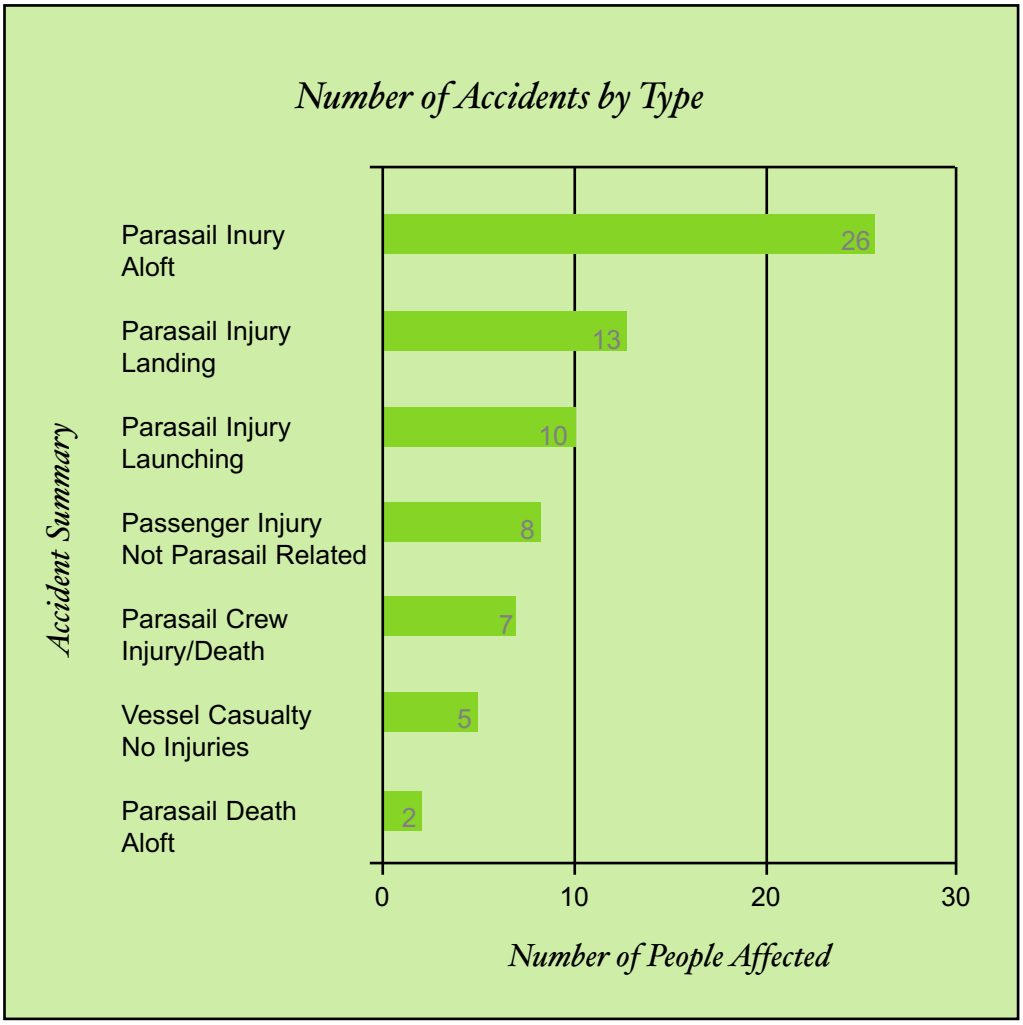
instances in which more than one person was injured. The majority of accidents occurred while the parasail was aloft. The two passenger deaths occurred in July 2001 when a 37-year-old woman and her 13-year-old daughter died after the pair fell more than 200 feet into three feet of water while tandem parasailing off Fort Myers Beach, Fla.

The most common casualty was an injury from a fall aloft while tandem parasailing from an uninspected vessel, the fall being caused by an equipment failure or vessel operator error. In many cases the prevailing weather conditions or a sudden violent change in the weather was a contributing factor that set in motion the events leading to the casualty.

Operators of parasail vessels should be cognizant of current and forecast weather and the limitations it will place on parasail operations. They should also be able to recognize the formation of severe weather as it occurs. In the latter case, they should be prepared to take appropriate evasive actions in sufficient time to ensure the safety of their passengers and vessel.

The condition of their equipment is also important. Operators should be alert for signs of damage and unusual wear and replace items in a timely manner.

The objective is for operators to recognize a serious situation as it develops and take appropriate action before a casualty occurs. As long as operators remain aware and take precautions, parasailors can enjoy the view with minimal risk.



This article was adapted from a report titled "A Review of Casualties Aboard Inspected and Uninspected U.S. Flagged Vessels Engaged in Parasailing for Hire, CY 1992-2001." A copy of the full report, including a synopsis of the MSIS cases, is available by contacting Paul Eulitt at **Peulitt@comdt.uscg.mil**.

Coast Guard, Passenger Vessel Association Partnership Update

by Gary Frommelt
President, Passenger Vessel Association

by Lt. Cmdr. Wayne R. Arguin
U.S. Coast Guard Office of Design & Engineering Standards

The Passenger Vessel Association (PVA) and the U.S. Coast Guard established a formal partnership on Jan. 22, 1996 to promote passenger, personnel, and property safety within the domestic passenger vessel industry and to protect the environment within our nation's waters. The partnership also serves to improve communication between the passenger vessel industry and the Coast Guard.

A Partnership Action Team (PAT) was created in conjunction with the signing of the partnership, serving as a venue to discuss relevant passenger vessel issues in an open forum. The PAT meets three times a year and is comprised of PVA/Coast Guard leadership, including the PVA President and members of the Board of Directors; the Assistant Commandant for Marine Safety, Security and Environmental Protection; the Director of Field Activities; and the Director of Standards.

The PAT reviews current passenger vessel-related issues with an eye to develop non-regulatory solutions. A Natural Work Group (NWG) may be formed and tasked with specific deliverables to address an issue in question. The work of the NWG is reported back to the PAT for final approval and implementation.

The following issues have been (or are currently being) addressed by the PAT since last reported in *Proceedings* in July 2001:

Maritime Transportation Security Act of 2002 (MTSA)
The PAT actively worked to develop an industry-standard program to satisfy requirements prescribed by MTSA. The PVA Industry Standards for Security of Passenger Vessels and Small Passenger Vessels will satisfy what is referred to in the Coast Guard's maritime security regulations as an Alternative Security Program (ASP). PVA's Security Task Force presented a draft ASP for Coast Guard approval in June 2003. This draft is currently in final review by the Coast Guard and expected to be approved in the near future. For additional information on PVA's involvement in the security regulation process, you can view PVA's submission to the security regulations' dockets on the Web at **www.passengervessel.com/.**

Merchant Mariner Document (MMD) Re-issuance
Concerns were raised of the significant impact to the maritime community that resulted from the Coast Guard's decision to re-issue all MMDs. The PAT has worked to identify and address many actual and perceived problems leading to delays in the licensing renewal process. Easy access to Coast

Guard-maintained licensing information can be found at **www.uscg.mil/stcw/index.htm**.

Port-Wide Passenger Vessel Risk Assessments
The PAT chartered an NWG to investigate ways to proactively improve passenger vessel safety. The group recognized that while the number of incidents aboard domestic passenger vessels was low, continuous improvement in safety was necessary. The NWG developed a port-wide risk assessment tool that identifies areas for potential improvement within a Captain of the Port Area of Responsibility. This tool incorporates port stakeholder input and identifies the most cost-effective, non-regulatory solutions using basic risk management techniques. The port-wide risk assessment tool is now managed in each Coast Guard district by the newly created Passenger Vessel Safety Specialists. The Coast Guard Web site **www.uscg.mil/hq/gm/risk** provides a wealth of information on risk-based decision making.

High-Speed Craft Navigation and Vessel Inspection Circular (NVIC) Update
An NWG worked to align existing Coast Guard guidance on the staffing requirements for U.S. high-speed craft. Results were published as revisions to the Marine Safety Manual and updates to NVIC 5-01, *Guidance for Enhancing the Operational Safety of Domestic High-Speed Vessels*. This NVIC can be found on the Web at **www.uscg.mil/hq/g-m/nvic/**

Streamlined Inspection Program (SIP) Update
The current SIP program has stepped into the electronic age. The PAT has worked to develop a completely electronic enrollment process, further streamlining an already effective ship safety management program. For additional information on the SIP, visit the Coast Guard SIP Web site at **www.uscg.mil/hq/g-m/sip/siphome.htm**.

The Web sites below provide additional information.

Passenger Vessel Association
www.passengervessel.com

Risk-Based Decision Making
www.uscg.mil/hq/gm/risk

Merchant Mariner Licensing Information
www.uscg.mil/stcw/index.htm

Streamlined Inspection Program
www.uscg.mil/hq/g-m/sip/siphome.htm

Coast Guard Navigation and Vessel Inspection Circulars
www.uscg.mil/hq/g-m/nvic/

Alternative Security Program / *PVA Industry Standards for Security*
www.passengervessel.com/special-update-110203.html

Coast Guard Marine Safety, Security & Environmental Protection
www.uscg.mil/hq/g-m/gmhome.htm

Members of the Natural Working Group that developed a risk assessment tool to proactively improve passenger vessel safety aboard Boston Harbor Cruises high speed ferry *Salacia*. FRONT, left to right: Capt. Peter Lauridsen (ret.); Lt. Cmdr. Wayne Arguin; Rick Nolan of Boston Harbor Cruises; Bernie Jacobsen of IBJ Associates; and Tricia Nordone. BACK, left to right: Lt. Cmdr. Martin Walker; Cmdr. Bryan Emond; Dick Purinton of Washington Island Ferries; Joseph Myers; David Dickey; and Gary Frommelt, PVA President. Courtesy PVA, photo by Dick Purinton.

The *President* in New Orleans Harbor, carries 3,000 passengers. It was renovated in 1991 to become a casino, and was the largest riverboat gaming vessel at that time. Courtesy Murphy Library Research Center–University of Wisconsin, LaCrosse.

Preserving a Legend

the *Delta Queen*

by Gary Frommelt
President, Passenger Vessel Association

Many maritime and safety regulations have been based on a specific tragedy. During accident investigations, faults in design, maintenance, and operational procedures are often identified. Regulation and legislation following accidents is often needed and well intended but may be too broad and extreme. The story of the *Delta Queen* is a real life example of how perseverance and dedication to safety can achieve a common goal. The tireless efforts of a few and the support of many saved a national historic landmark that still safely carries thousands of passengers each year on the mighty Mississippi and its tributaries.

The sternwheel steamers *Delta Queen* and *Delta King* were built in 1926 to carry passengers and freight on the Sacramento River between San Francisco and Sacramento, Calif. The hull for each of these vessels was built in Scotland, the paddlewheel shafts were cast at the Krupp Iron Works in Germany and the hardware was shipped to the United States for final assembly and outfitting in Stockton, Calif. These grand steamboats were fitted with exotic woods from all over the world and comfortable accommodations for overnight passage. These California Transportation Company vessels carried honeymooners, movie stars, legislators, families and freight until the U.S. Navy took over the vessels at the advent of World War II. In 1940, the *Delta Queen* and *Delta King* were draped in gray and began ferrying reservists and, later, wounded soldiers across San Francisco Bay. The boats were mothballed in 1946, and in 1947 Capt. Tom Greene of Cincinnati, Ohio purchased the *Delta Queen* to join the fleet of Greene Line Steamers. This inland steamer was boarded up and prepared for a journey of more than 5,000 miles of open sea. It made the trip down the West Coast, through the Panama Canal, on to New Orleans, up the Lower Mississippi and finally the Ohio River to Pittsburgh, Pa., for an extensive renovation. On June 21, 1948, the *Delta Queen* began a long, successful career of carrying overnight passengers on the inland waterways.

In 1966 it appeared that the life of this venerable old steamboat was heading for an abrupt and unceremonious end. Due to fires and fire-related fatalities on older passenger vessels such as the *Lakonia*, *Yarmouth Castle*, and *Viking Princess*, the Maritime Safety Committee of the then International Maritime Consultative Organization (IMCO; now IMO), met to improve fire safety on passenger vessels. In November 1966, members of IMCO adopted amendments to the Safety of Life at Sea Convention (SOLAS) outlining additional fire protection standards for existing passenger vessels. The major points of the amendments required all overnight vessels of 50 or more passengers be constructed of steel with separation of accommodation spaces from machinery, cargo and service spaces, protection of control stations, stairways and lifts; reduction in the amount of combustible materials used in accommodation spaces; and the installation of automatic sprinklers or fire detection systems.

The *Delta Queen* races up the Mississippi River in New Orleans. The vessel, built in 1926, carries overnight passengers on the Mississippi and Ohio River systems. USCG illustration; photo by Yeoman Joseph Relle, USCG.

The amendments to SOLAS were driven by disasters on ocean-going vessels. As the United States adopted these measures, it became apparent that many historic vessels were going to be tying up for the last time. Although the 285-foot, 192-passenger *Delta Queen* has a steel hull, its superstructure is made of wood. In their desire to adopt the international rules, Congress failed to recognize the difference in the environment between ocean-going vessels and inland vessels. The *Delta Queen*, an inland vessel, was about to be an unintended victim of this legislation.

The owners and managers of the *Delta Queen*, Richard Simonton, Letha Greene, Bill Muster, E. J. Quinby and Betty Blake, began a decade-long campaign to keep this rare piece of Americana cruising and operating safely for future generations. In 1966, they testified before the Senate and persuaded the legislators to add an amendment granting the historic vessel another two years before it had to comply with current safety regulations or be retired. While the future of the vessel appeared bleak, the company petitioned Congress for time to meet the intent of the new safety regulations. The efforts to save the boat continued in earnest by Bill Muster, who in 1968 requested a complete exemption or at least another two-year extension for the *Delta Queen*. That year, President Johnson signed into law HR 15714, introduced by Rep. Leonor K. Sullivan of Missouri, granting the vessel another two years of operating life.

In 1971 Betty Blake organized a grass roots campaign to "Save the *Delta Queen*." School children submitted drawings of the boat to persuade their senators and representatives to help. There was hardly a car in the inland river system that did not have a Save the *Delta Queen* bumper sticker. In no time at all, Ms. Blake amassed more than 250,000 signatures by citizens from all around the United States to save America's last overnight paddlewheel steamboat.

Movies and documentaries were made touting the boat's history. Appearances on the television shows "What's My Line" and "Queen for a Day" brought additional attention and support. An amendment to the Merchant Marine bill to save the *Delta Queen* was killed in committee despite a recommendation of support from 195 members of Congress. It appeared that this was truly the end for the *Delta Queen*. It received national attention as the paddlewheel churned the muddy water down the Lower Mississippi one last time. As the vessel pulled into New Orleans on Nov. 2, 1970, it was greeted by a harbor-full of vessels of every kind and given a true jazz funeral. Steamboats never seem to wear out and neither do their supporters.

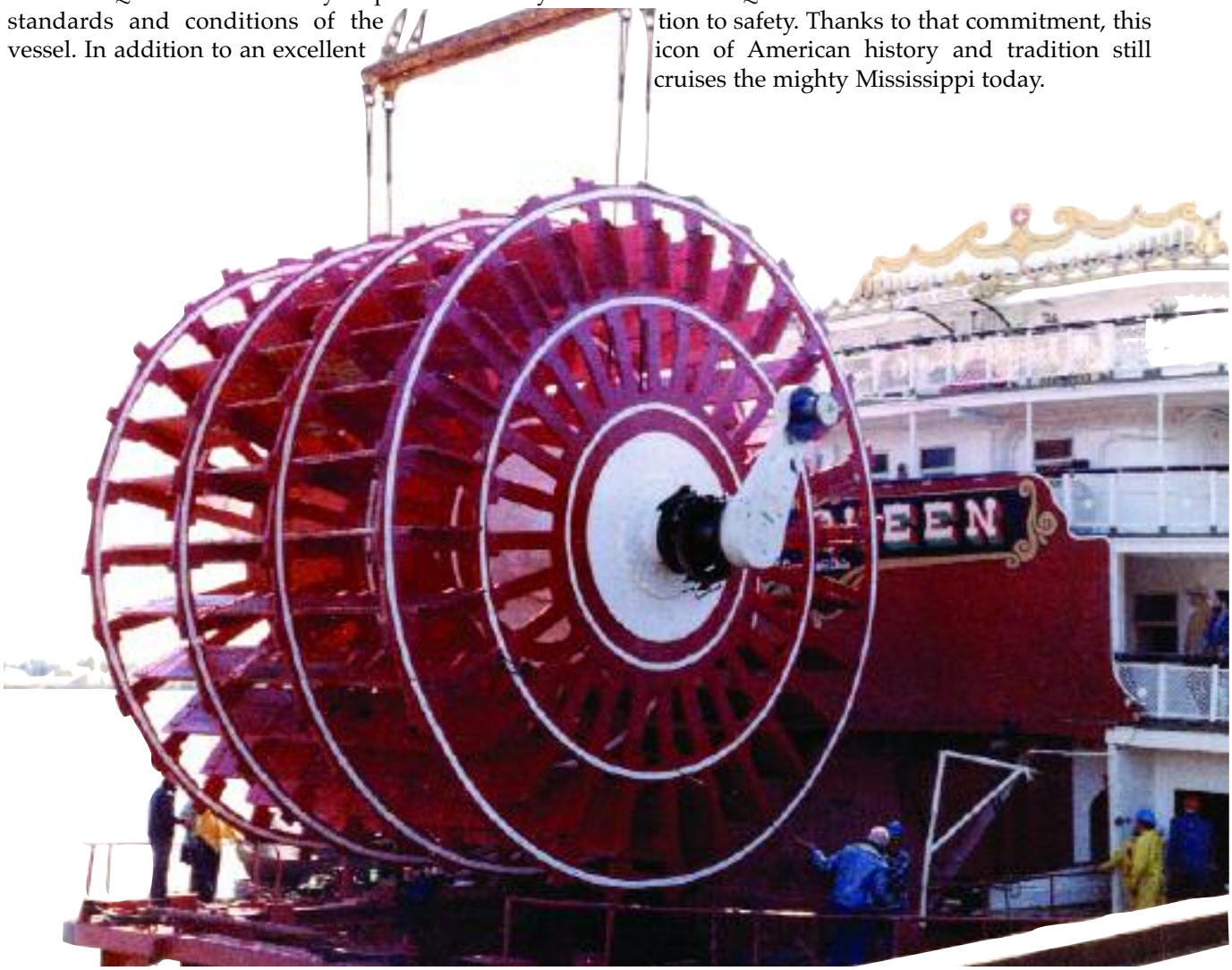
NEXT PAGE: The paddle wheel of the *Delta Queen* is lifted to perform maintenance on the bearings. Courtesy Gary Frommelt.

Thanks to the efforts of Sen. Marlow Cook of Kentucky, an amendment was added to a private relief bill (HR 6114) that was signed into law by President Nixon granting the *Delta Queen* another three years of life. Cook was well known for saving the *Avalon*, a 1914 steamboat that sailed almost every mile of the Western Rivers. Serving as Jefferson County Judge at the time, Sen. Cook purchased the boat at a bankruptcy auction in 1960 and took it home to Louisville, Ky. As the *Belle of Louisville* it still plies the scenic Ohio River today.

The legislative activity to keep the *Delta Queen* sailing continued. A bill introduced in 1971 to permanently exempt the vessel from the requirements of SOLAS generated a heated debate in Congress and serious opposition from the U.S. Coast Guard. In July 1974, legislation passed and was signed into law by President Nixon granting the vessel another two years of operating life. This began a series of first two- then four-year exemptions from Congress. In 1996, through the efforts of Cornel Martin, Vice President of Governmental Affairs for the Delta Queen Steamboat Company, Congress granted an exemption that continues until Nov. 1, 2008. This exemption recognized the dedicated efforts on the part of the owners and operators of the *Delta Queen* to continually improve the safety standards and conditions of the vessel. In addition to an excellent safety record, the *Delta Queen* has a new hull, drastically reduced the amount of combustible material on board, a state-of-the-art sprinkler and fire detection system and high standards for safety training and emergency drills. The *Delta Queen* is manned by a dedicated crew of professional mariners and each year goes into an extensive winter lay-up for maintenance and repairs.

It is the duty of the industry and the regulatory community to continually raise the bar on safety. In the process however, we must never lose sight of common sense solutions and alternative methods that provide the same result. Due to the success of the *Delta Queen* the company built two more sternwheel steamboats. The *Mississippi Queen* joined the overnight trade in 1976 and the *American Queen* in 1995. These luxurious vessels are outfitted with modern amenities and equipment while still maintaining the ambiance of the Victorian era.

The *Delta Queen* is still safely carrying passengers today thanks to the dedicated efforts of many supporters and the constant commitment to safety by its owners. The story reflects how legislative efforts can be balanced to protect historic treasures, as long as public safety remains a central concern. Owners of the *Delta Queen* have demonstrated that dedication to safety. Thanks to that commitment, this icon of American history and tradition still cruises the mighty Mississippi today.



Judge Boggs Retires, Dean of Coast Guard Law Judge Corps

by George Jordan
U.S. Coast Guard Director of Judicial Administration

Judge Archie Boggs, the longest-serving U.S. Coast Guard Administrative Law Judge (ALJ), retired in October 2003. Judge Boggs served in New Orleans since 1949, as an ALJ for as long as the Coast Guard has had judges. He presided over many cases and is responsible for the development of much of the current case law.

Judge Boggs' involvement with the Coast Guard predates his appointment as a jurist. During World War II, he served as an officer in the Coast Guard, primarily in the South Pacific. He served aboard the *USS Murzim*, a Coast Guard-manned vessel. His ship saw significant action and survived Kamikaze attacks.

He was appointed as a hearing examiner with the Coast Guard on July 6, 1949. This was the first group of hearing examiners appointed to preside over cases under the Administrative Procedures Act. As one of the first jurists appointed under that act, Judge Boggs helped develop the process and procedures that would protect the rights of mariners and help keep the merchant marine safe.

The New Orleans office has traditionally been the busiest in the program. From 1991 through 1999, he presided over 27 percent of all cases filed with the Coast Guard—more than any other judge. Since the inception of new procedural rules, he still has the highest number of contested cases. Since 1984, Judge Boggs presided over nearly 2,600 cases. Coast Guard records do not go back far enough to capture just how many cases Judge Boggs heard over his career; however, the best estimate is well more than 6,000.

With New Orleans being the confluence of most of the many types of maritime traffic, he also had the most diverse caseload of any judge. Some cases involved deep draft vessels and pilots; others involved the towboat industry on the rivers and the Intracoastal Waterway.

Judge Boggs' tenure saw the development of the licensing of towboat operators and the licensing of offshore supply vessels in support of the oil industry. As these new licenses added new case law to Coast Guard adjudications, Judge Boggs was tasked with hearing many cases of first impression requiring him to interpret new laws or regulations. Judge Boggs heard cases that dealt with the scope of licenses and jurisdictional issues that arose with these new licenses.

Coast Guard ALJs celebrated Boggs' retirement this past October when Boggs was presented with the U.S. Coast Guard Distinguished Civilian Award. Left to right: George Jordan, Dir. of Judicial Administration; Walter Brodzinski, ALJ New York; Joseph N. Ingolia, Chief ALJ; Judge Archie Boggs, ALJ New Orleans (ret.); Rear Adm. Robert Duncan, Commander Eighth Coast Guard District; Peter A. Fitzpatrick, ALJ Norfolk; and Parlen L. McKenna, ALJ Alameda, Calif.

Streamlined Inspection Program (SIP) as a Training and Hiring Tool

by Lt. Steven M. Garcia
U.S. Coast Guard MSO Louisville, Ky.

The U.S. Coast Guard's Streamlined Inspection Program (SIP) is a unique alternative to traditional safety inspections on Coast Guard certificated commercial vessels. The program, which was designed to help keep Subchapter H and other commercial vessels in compliance with federal laws and regulations, has displayed other training and hiring benefits to marine employers and employees.

SIP is believed by some to be a significant financial and opportunities cost savings to the Coast Guard. Not withstanding startup costs, the latest research paper on SIP suggested that the time spent by Coast Guard personnel inspecting commercial vessels for safety was significantly reduced when a successful SIP was in place. Since it was instituted in 1998, SIP has displayed other advantages: **(1)** it has been used as a highly effective training tool; **(2)** it helps instill a sense of ownership in the employees; and **(3)** it may help marine employers develop competency models that describe the knowledge and skills an applicant would need to effectively perform the job.

The Coast Guard Marine Safety Manual, which acts as the primary guidance for Coast Guard personnel in carrying out marine safety activities, explains SIP in this manner: SIP is an alternative to traditional Coast Guard inspections that was developed in response to the Maritime Regulatory Reform Initiative. The Initiative challenged the Coast Guard to re-evaluate its regulatory programs and to develop alternatives that would ensure the same level of safety. The significant difference between SIP and the traditional annual inspection program is in the *process* of how compliance is ensured. SIP is primarily an "overlay" of the Code of Federal Regulations (CFR) requirements that regulate vessel safety. It identifies an alternative process for ensuring compliance with the CFR, where company personnel conduct frequent, periodic examinations of the various vessel systems, document their findings, and take the necessary corrective actions specified in Coast Guard-approved plans when discrepancies are discovered. The Coast Guard will still conduct required inspections of the vessel(s), however, the manner of conducting the inspection will be considerably different.

The SIP documentation elements are much like the CG-840 Booklets, which are guides used by Coast Guard marine inspectors to not only ensure commercial vessels are in compliance with applicable safety regulations, but also train entry-level inspec-

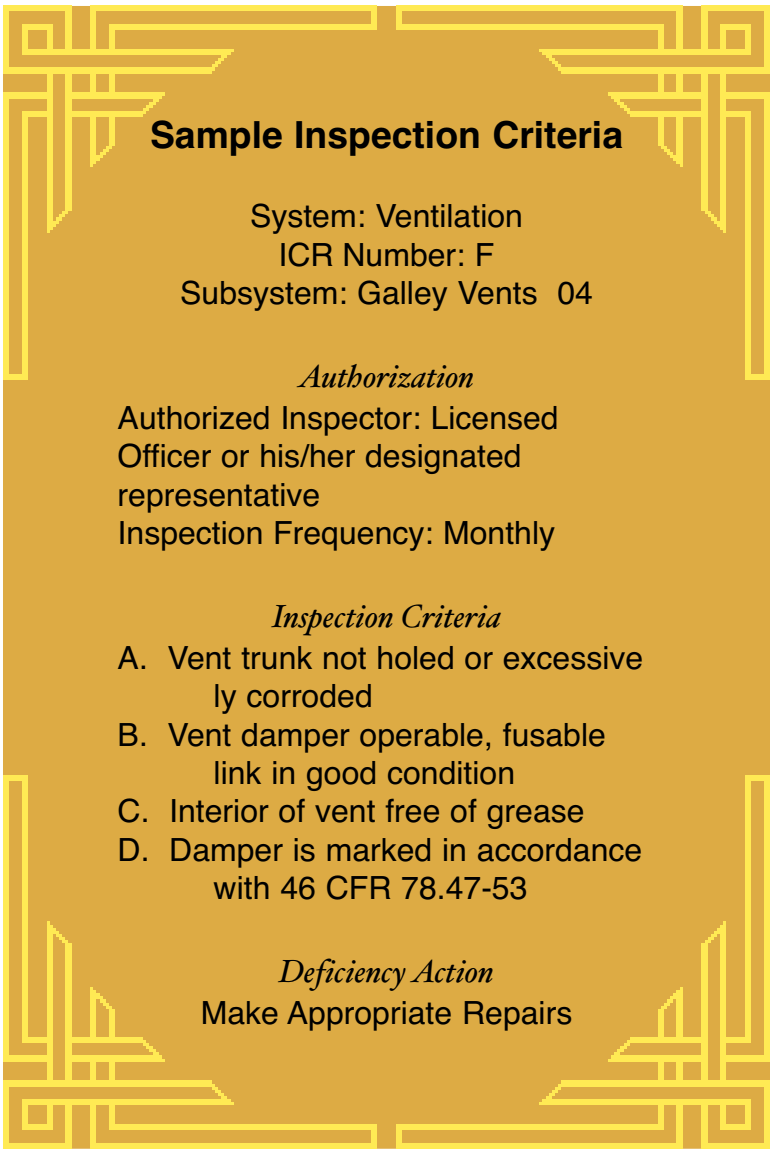


Figure 1

tors while on the job. SIP documentation can help employees learn, and become proficient at, key vessel safety procedures.[1] Figure 1 is an example of SIP documentation.

Empowerment of Employees with SIP

A common theory in the business world is that, in order to enjoy maximum success and profitability, an organization must encourage and, more importantly, empower its workers to become stakeholders—not just employees. In other words, people at all levels of an organization must feel a sense of ownership in their specific jobs, and in the company as a whole. A systematic, structured approach designed to allow employees to carry out the business of the company is the most effective way to encourage this sense of ownership. One of the principal goals of SIP is to do just that—instill ownership in every marine employee. In fact, the Coast Guard Marine Safety Manual says that one of the benefits of SIP is that companies may enjoy an increased involvement and "ownership" by vessel personnel for the safe operation of the vessel. Ownership typically equates to a sense of pride.

The first steps towards giving marine employees that sense of pride and ownership is to provide clear, step-by-step directions for carrying out each of their duties, as well as allowing them to identify improvement opportunities, understand the purpose of various processes, and correct each shortcoming using systematic and simple steps. Figure 1 is an example of one of dozens of individual SIP-related forms called Inspection Criteria References (ICRs) that guide the marine employee through various safety inspection processes. Not only do the ICRs easily convey to the employee what steps to take to complete each task, they also provide the opportunities to identify shortcomings and make corrections accordingly. In a sense, ICRs empower the employees to manage their responsibilities and correct any problems with minimal direction. A final purpose of ICRs is to convey the company's expectation of the employees while completing each inspection. This could help avoid confusion as to what is expected of the employee while completing various inspections.[2]

Next, the employees must understand and have input to the company's overall goals and visions for a safe, efficient vessel; a business plan so to speak. The Company Action Plan (CAP) element of SIP can be considered the "business plan for a safe, legal vessel." When a business plan is written, a company's operations are closely examined and, more importantly, improvement opportunities are discovered.[3] When an employee reviews the CAP, he gains a big-picture view of the company's safety goals and parameters.

There are differences in the function of roles in the empowering process between employees and leaders.[4] Some of the key elements in the empowerment process are to provide direction for—and help

develop—followers and subordinates. It is essential to encourage involvement by employees in determining the actions needed to accomplish whatever is necessary to meet the company's goals. The primary goal for marine employers, even above turning a profit, is the safety of lives. SIP can be a "one-stop-shopping" tool to accomplish all of this.

Training and Development with SIP

Training and development have a significant impact on staffing.[5] It may be easier to attract and retain quality employees when a company has a reputation for having a stellar training program. SIP can also be an effective means for setting training goals for new employees in training. For example, an employee in training may set a personal goal to learn and then demonstrate tasks related to five ICRs per day. The ICR can double as a type of lesson plan with the objective being to understand the standards set forth in each one. The ICR can also be the standard against which individual performance can be measured.[6] In the process of achieving each goal, the employee would gain a comprehensive knowledge of the federal regulations associated with each ICR and then be able to explain pertinent aspects to another qualified employee, who will then witness inspection demonstrations and attest to their successful completion. Depending upon the employee, the loftiness of the goals can vary.

Stephen Covey referred to goal-setting as a powerful process, and a "common denominator of successful individuals and organizations."[7] Both individual and organizational goals are critical to productivity and upward mobility. Goal setting was also regarded as "eating an elephant one bite at a time;" if the learning process aboard a commercial vessel is tackled in smaller, easier-to-handle increments, then the process as a whole won't seem so overwhelming and may appear to be much more achievable.

Goals are also viewed as roadmaps to success. Zig Ziglar wrote of goals and having strategic plans as "Knowing where you are and where you want to go."[8] When no goals are established, it is highly likely that you'll end up somewhere you probably don't want to be. Ziglar further asserts that written plans help to establish mental pictures for people. With a combination of the CAP, Vessel Action Plan (VAP), and the ICRs, a pretty solid picture is established. Depending also on the skills, learning abilities, and attitudes of the trainees, the goals (e.g., the number and speed at which the ICRs are learned) of the training program can be altered to fit the individual. Goals often times need to be reframed, and sometimes managers may have to settle on more modest and achievable goals for certain employees.[9]

The first steps towards giving marine employees that sense of pride and ownership is to provide clear, step-by-step directions for carrying out each of their duties, as well as allowing them to identify improvement opportunities, understand the purpose of various processes, and correct each shortcoming using systematic and simple steps. Copyright © 2003 USCG and its licensors.

The SIP can also act as a systematic quality control mechanism for vessel safety and the training process. Capt. Alan Bernstein, owner of BB Riverboats in Cincinnati, Ohio said, "SIP has played a significant role in both our quality control system and continuous training process. It gives our employees the tools they need to keep the boats safe and functioning. SIP also helps keep our people's professional knowledge and skills sharp." BB Riverboats currently has two of many passenger vessels on SIP, including one of only two high capacity passenger vessels enrolled in the United States.

Competency Modeling for the Hiring Process

Many successful employers have developed writ-

Sample Competency Model

Activity	Competency Needed	Employee Must Demonstrate:	Role
Inspect various ventilation systems for safety problems	Knowledge and understanding of Title 46 CFR 72 Knowledge of the inspections frequency of this activity Knowledge of marking regulations of 46	Attention to detail Basic knowledge of marine practices	Licensed Engineer

Figure 2

ten job descriptions for each of the positions within the company. The job descriptions let the potential employee know not only what skills are needed to do the job, but also make clear the employer's expectations. SIP can also assist in this area.

A basic step in putting together a job description is developing a competency model that best illustrates the skills needed to do a specific job. One-size-fits-all competency models often fall short of their intended objectives because not all jobs, however similar they may seem, are exactly the same. Nancy Parsons claims that, "Too often, cookie cutter competency models limit leadership potential and performance and sometimes derail business strategy. Force-fitting an executive competency template limits talent, subjectively reduces the candidate pool, fuels artificial performance accountabilities, and narrows business perspective."[10]

To avoid cookie cutter competency models, ICRs can be used to extract detailed information. For example, Figure 2 is a competency model put together using the information from Figure 1, which is a standard ICR for large passenger vessels (Subchapter H). This particular ICR guides the marine employee in inspecting galley ventilation systems.

Once the company is satisfied with, and has validated, the competency models for each task, the models can be either used as is, or combined into position-specific (i.e., licensed engineer) narratives. In either case, potential employees can gain a fairly complete perspective of the company's expectations. Conversely, it may be easier for the company to determine if new applicants have the knowledge and/or background to fill a particular position with the company. And finally, for those employees who do not have the appropriate backgrounds, but do show a strong potential and desire for learning, the competency models can be referenced to create a targeted training agenda.

SIP has proven to be versatile tool for marine employers. In addition to reducing the cost of operations associated with Coast Guard inspections, SIP can help to bolster a company's efficiency and instill a sense of ownership in marine employees. Most importantly, it assures that commercial vessels are in compliance with applicable safety regulations, helping to ensure the safety of lives at sea.

[1] Bennis & Nanus (1985). Leaders; The Strategies for Taking Charge. New York: Harper & Row, Publishers
[2] Hill, N. (1984). How to Increase Employee Competence. New York: McGraw-Hill Book Company
[3] Covello & Hazelgren (1995). Your First Business Plan. Naperville, Illinois: Sourcebooks Inc.
[4] Shriberg, Shriberg, & Lloyd (2002). Practicing Leadership. New York: John Wiley & Sons, Inc.
[5] Caruth D. & Handlogten G. (1997). Staffing for the Contemporary Organization Westport, Conn: Praeger
[6] Werther & Davis (1989). Human Resources and Personnel Management. New York: McGraw-Hill Book Company
[7] Covey, Merrill & Merrill (1994). The Power of Goals. First Things First. NewYork: Simon and Schuster
[8] Ziglar, Z. (1998). Focusing on Needed Goals. Success For Dummies. Foster City, CA: IDG Books Worldwide
[9] Nicholson, N. (2003). How to Motivate Your Problem People [electronic version]. Harvard Business Review, January 2003, Vol. 81 Issue 1, p56, 10p. Retrieved from **http://web22.epnet.com**
[10] Parsons, N. (2001). Why Cookie Cutter Competency Models Don't Work [electronic version]. Excerpted from article from Assessment Advisor. Retrieved from **www.cdrassessmentgroup.com/cookiecutterexcerpts.pdf**

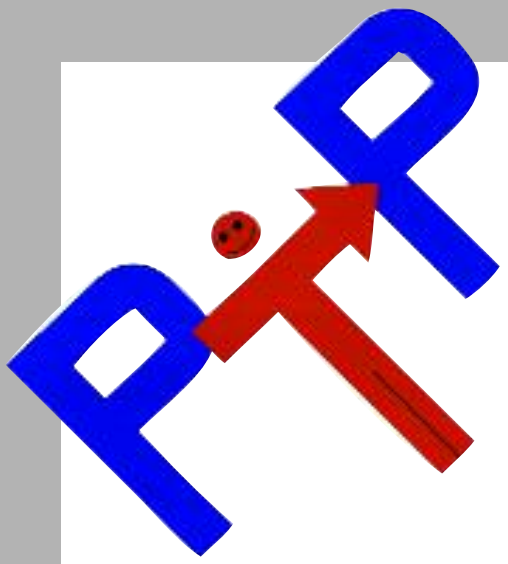
Coast Guard SIP Update

Many Coast Guard inspectors and our customers in the passenger vessel industry are familiar with the Streamlined Inspection Program. (SIP). While many companies have used this program successfully, others have been discouraged by increased demands for paperwork and reporting. A results-oriented SIP workshop was given by a joint team effort of Coast Guard and marine industry personnel at the 2003 Passenger Vessel Association convention. During this workshop, an interactive guide for the maritime community was unveiled. The SIP program has been available to industry for many years. Recently, the SIP was rejuvenated through an enrollment application breakthrough. The first phase was completed and involves a dynamic interactive guide that provides a simple step-by-step process for potential applicants to complete. Upon completion, this program allows a company to print out an entire SIP application and a draft company action plan that can be submitted to the Coast Guard for evaluation. Traditionally, this process was very labor intensive and made some companies shy away from attempting to enroll. The new guide walks company representatives through all the steps needed for enrollment into the program.

The second phase, which is under development, will focus on a similar interactive guide for Coast Guard SIP advisors at Marine Safety Offices. It will help the SIP advisor evaluate the company's SIP application, company action plan and vessel action plans. In keeping with the first developed interactive guide, it will help streamline the evaluation process and should be less labor intensive than the process we now use. This second phase can be expected within the year.

Passenger vessels active in the national SIP include: BB Riverboats, Catalina Express, Fire Island Ferries, New Orleans Steamboat Company, Paradise Cruise, Ltd. and Sayville Ferry Service.

The interactive guide may be downloaded at the Streamlined Inspection Program's Web page: **www.uscg.mil/hq/g-m/sip/siphome.htm**. Coast Guard points of contact for the SIP are Mr. Marc Cruder of the Traveling Inspection Staff, **mcruder@comdt.uscg.mil**, (703) 418-6605 and Lt. Cmdr. Jim Nussbaumer of the Domestic Vessel Compliance Branch, **jnussbaumer@comdt.uscg.mil**, (202) 267-0502.



Washington State Ferries

A Crew Endurance Study

by Lt. Cmdr. Tom Miller
Chief of Operations Readiness, U.S. Coast Guard MSO Puget Sound

Since the inception of the U.S. Coast Guard's Crew Endurance Management (CEM) program in 1999, one of the most notable implementations has been with the Washington State Ferry (WSF) system in Seattle. WSF is a 24-hour-a-day, seven-day-a-week operation that employs 1,800-plus crew on 26 vessels serving 10 different routes to transport more than 11 million vehicles and 26 million passengers annually. To put this in perspective, WSF moves more people than either Amtrak or Seattle-Tacoma Airport each year.

For more than 50 years, WSF has demonstrated a strong history of being an extremely safe and reliable method of transportation. That record is an impressive feat for this critical day-to-day service given the size and complexity of the system. WSF uses 60 work schedules based on very traditional and widely accepted shift work practices, on routes that vary between minutes to hours in length. Narrow channels, significant tidal ranges, strong currents, restricted visibility, and rapidly moving weather systems are the environmental norm. This complex combination of organizational and natural elements posed some concern to the Officer in Charge of Marine Inspection (OCMI) with respect to the structuring of the watch schedules.

The Coast Guard, which regulates the safety of commercial vessel operations and establishes minimum manning levels, has limited authority regarding specific watchkeeping arrangements on passenger vessels on inland routes. While the OCMI felt the complexity of the system combined with the widely varied environmental conditions were factors that impacted crew endurance, there was no solid basis to unilaterally change the watch schedules. Further, WSF had demonstrated a very solid operating history under all these conditions that did not warrant unilaterally changing the watch schedules. As a result, the OCMI approached WSF in the spring of 2000 and requested they participate in a CEM Work Group. This work group, comprised of the OCMI, the Coast Guard Research & Development (R&D) Center and WSF, would evaluate the watch system. In the spirit of continuous improvement, recognizing the system could only become more challenging with the growing number of vessel interactions and increased vessel operating speeds, WSF quickly resolved to proactively work to assess their time-proven watch system. In March 2000, the OCMI Puget Sound, R&D Center and WSF chartered the groundbreaking Crew Endurance Work Group that actively continues to this date.

What Exactly is Crew Endurance, and How Can CEM Help?

Crew endurance is a crew's ability to maintain performance within safety limits while enduring job-related physiological, psychological, and environmental challenges. Crew Endurance Management is a system for managing the risk factors that can lead to human error and performance degradation in maritime work environments. One of the techniques CEM uses is managing the daily period of lowest energy and alertness, commonly called the "red zone," which occurs in most people between 10 p.m. and 7 a.m. This period is often misunderstood in terms of its effects on a person's mental abilities. When this period's effect is not controlled, there can be a significant increase in the risk of an accident or lapse in judgment. But with CEM, crews can maintain a level of alertness to prevent accidents.

How Did We Get Started, and What Was the Process?

How did we get started?

There are many keys to the success of an effort of this magnitude, however, the three most vital to the successful beginning of this particular work group were the following:

1. The OCMI was fully vested in the process, trusted the science, and was willing to accept the idea of managing some of the red zone vice eliminating all the red zone. Many of the watch schedules that came under question (e.g., exhibited this red zone feature) were those most highly sought after by the crews and also fully supported by the labor unions.

2. WSF was fully vested in the process, trusted the science, and was willing to accept that although history may have demonstrated otherwise, there may be red zone watches that would have to be eliminated despite their popularity or ease of fit within the system.

3. Labor unions were fully vested in the process, trusted the science, and were willing to accept that although history may have demonstrated otherwise, there may be red zone watches that would have to be eliminated despite their popularity and replaced with schedules that were not as popular with their constituents. It rapidly became apparent that this effort necessitated the involvement and buy-in of the labor unions in addition to WSF management. Without the union's active participation in the work group and full acceptance of the principles of the program, the CEM process would have failed.

What was the Process?

The CEM process has three phases: development, deployment, and assessment.

<u>Development</u>

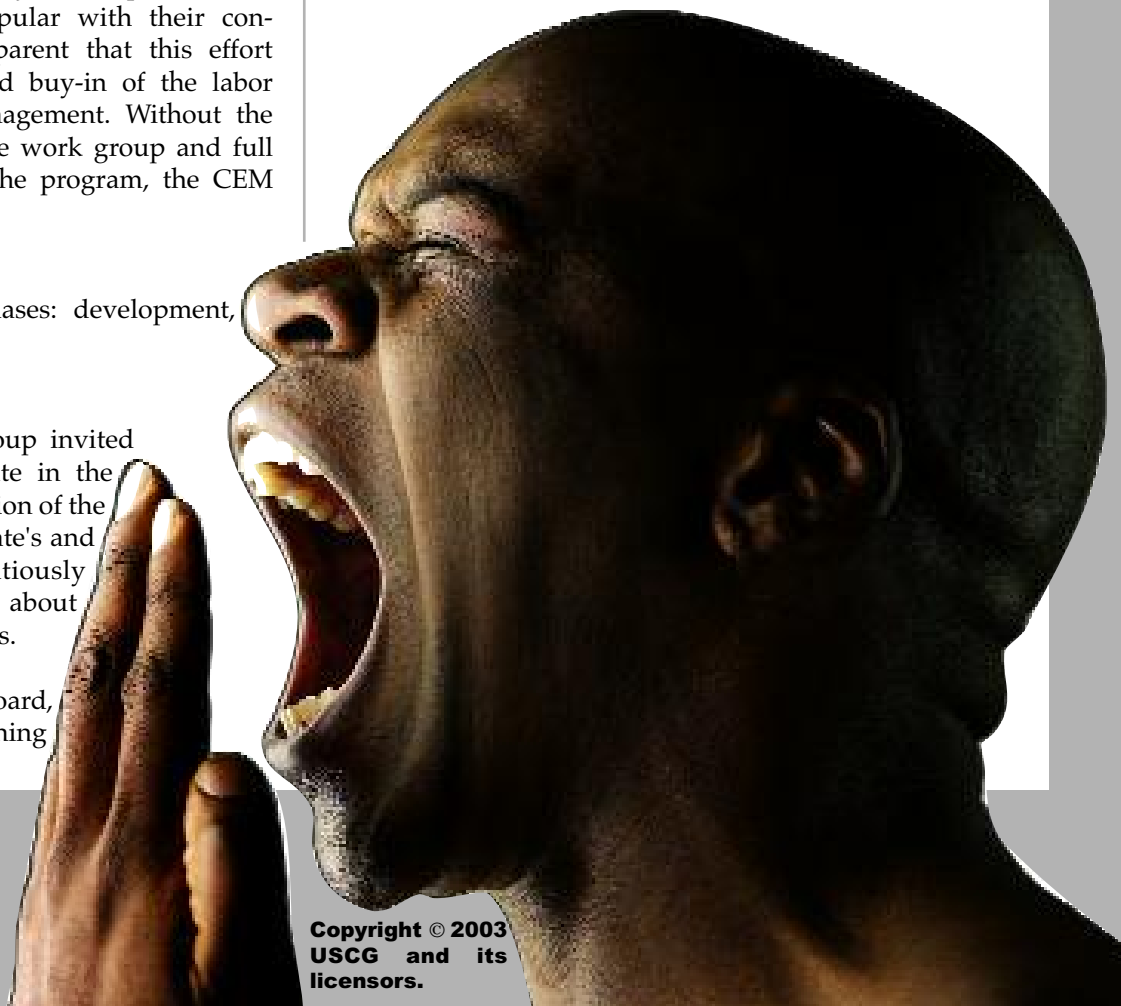
During this phase, the work group invited WSF's labor unions to participate in the process. The Inland Boatmen's Union of the Pacific (IBU) and the Master's, Mate's and Pilot's Union (MMP) were cautiously optimistic, but quite enthusiastic about the potential benefit of this process.

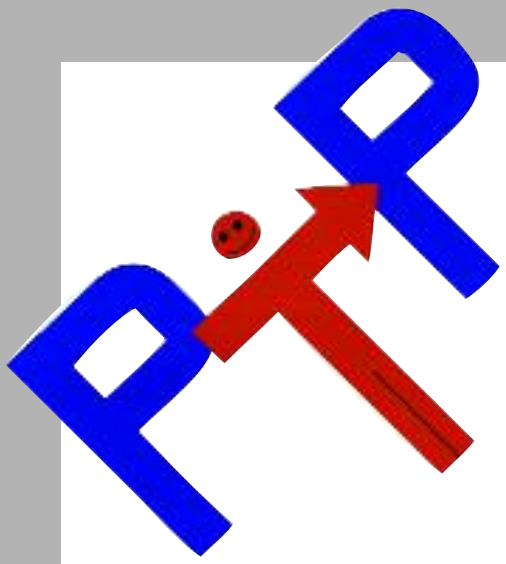
With the appropriate players on board, the work group held several training sessions to ensure all parties understood CEM and to nurture a growing partnership among all charter members.

CEM helps manage the period of lowest energy and alertness, or the "red zone," between 10 p.m. and 7 a.m. When this period's effect is not controlled, there can be a significant increase in the risk of an accident or lapse in judgment.

Once comfortable with the buy-in and understanding of all members of the CEM process, the work group identified several runs for evaluation—those with challenging environments (e.g., highest vehicle volume, highest number of vessel interactions, etc.) and those that offered less challenging environments but that employed similar watch schedules. The evaluation itself was completely voluntary for the crew; however, each of the 100 participants had a set of responsibilities: wear a wrist monitor for 30 to 60 days to assess exposure to light and activity level, complete a daily electronic logbook of work and off-work activities, and fill out a personal questionnaire. The results noted several factors that had a direct impact on crew endurance levels:

- Graveyard shifts through the red zone intermingled with day and swing shifts
- Backward or constant rotation of shifts prevented body clock stability
- Early or late rise times
- Jet-lag symptoms regularly experienced





- Crew sleeping on vessel while officially "off duty" when ferry was operating or tied up but located too far for crew to commute home between shifts

Crew endurance plans were then developed for each of the runs assessed. The plans for each run were then used in the deployment phase; all of the measures were aimed at lessening the factors identified. In addition, crew endurance coaches (respected members of the licensed and unlicensed crew) were identified and trained to facilitate effective delivery and implementation of the endurance plans among the crew.

Deployment

During this phase, the coaches were trained and they trained the crewmembers in the science of CEM, easing the transition to the endurance plan. The crew learned how to manage work-life stress factors in order to better manage the red zone challenges.

The plan included physical changes to the vessels by improving air quality, reducing noise, and managing light to offer a dark, temperature-regulated, quiet place to sleep when off shift. It included significant policy changes encouraging relaxation during vessel down time. Dietary guidance was also provided to help optimize performance and ultimately offset some of the physiological side effects historically experienced by shift workers.

Simultaneously, work shift changes were implemented to work towards institutionalizing a system that provided crewmembers adequate opportunity to get the rest suggested by prior endurance research. Some of these changes included the following:

- Developing a dedicated north and south graveyard watch schedule to eliminate sporadic infusion of this shift into day and swing shift schedules, creating more consistent work schedules for the crew;
- Implementing the requirement that relief crews have at least 14 hours off between shifts, instead of eight, providing sufficient time to get adequate rest, and allowing for a range of commute times from 15 minutes to two hours;
- Creating more dedicated day and swing watch schedules;
- Adjusting service schedules to help minimize backward rotation of watch start times (e.g., one day starting watch at 11 a.m., and starting watch the next day at 8 a.m., etc.);
- Eliminating triple back watches (eight hours on, eight hours off, eight hours on, eight hours off, eight hours on); and
- Eliminating some double back watches (eight hours on, eight hours off, eight hours on) within the red zone that were unmanageable.

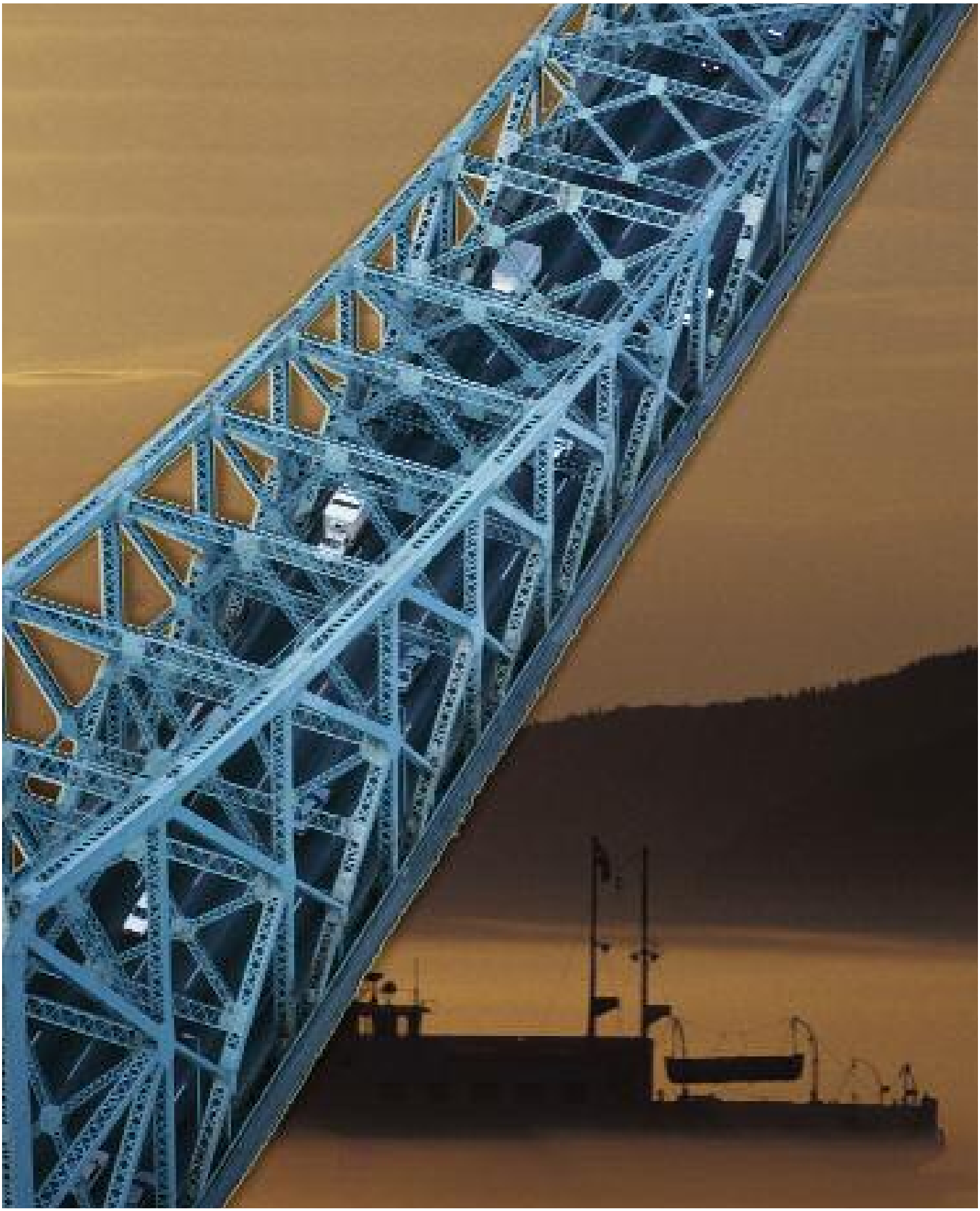
In addition, WSF instituted system-wide training during and after CEM implementation. CEM training modules were incorporated into the employees' annual training requirements and also into the new employees' indoctrination program.

Assessment

The assessment phase is currently ongoing and will continue for the life of the WSF system. Not unlike stability of a vessel, CEM requires constant attention through assessment and adjustment to avoid potentially dangerous situations. However, like other marine transportation systems, WSF is bound by union contracts, funding limitations, and employee and union desires. Consequently, it is extremely difficult for WSF to make unilateral decisions related to watch schedule and system changes. As a result, and in keeping with the spirit of collaboration necessary for successful CEM implementation, it is necessary that all principal elements (Coast Guard, WSF and unions) remain actively engaged in the work group throughout this phase of the CEM process.

While the CEM program could still be considered in its early stages at WSF, it is gradually becoming institutionalized and an integral part of their culture, further improving their already safe and reliable system. It is noteworthy that this effort, although not mandated, continued to receive significant and consistent attention from the Coast Guard, WSF and the unions over the past two years despite the maritime community's focus on security issues. This level of commitment from the maritime industry, specifically WSF and its employees, is commendable and has truly set the standard for the maritime community.

Additional information on CEM is available on **www.uscg.mil/hq/g-m/CEM/CrewEndurance.index.htm**, or by contacting the Coast Guard at (202) 267-2997.



Ferries are commonly used as alternative transportation to congested highways, so their safety, as with all passenger vessels, is imperative. The Washington State Ferry system moves more people annually than either Amtrak or Seattle-Tacoma Airport. USCG illustration; ferry and bridge images are copyright © 2003 USCG and its licensors.

Safety Board, Coast Guard Testify on Staten Island Ferry Accident

On Oct. 15, 2003 around 3 p.m., the ferry *Andrew J. Barberi*, which was carrying about 1,500 passengers from Lower Manhattan to Staten Island, veered off course and struck a pier. Ten passengers died and nearly 70 were injured. The National Transportation Safety Board (NTSB), in accordance with a Memorandum of Understanding (MOU) with the U.S. Coast Guard, is leading this major marine casualty investigation.

On Nov. 4, 2003, NTSB Chairman Ellen G. Engleman and Capt. Craig Bone, Commander of Coast Guard Activities New York, testified on the accident before the House Subcommittee on Coast Guard and Maritime Transportation. Below is the testimony of Capt. Bone. Testimony of Chairman Engleman and the Coast Guard-NTSB MOU may be found at www.XXXXXXXX.

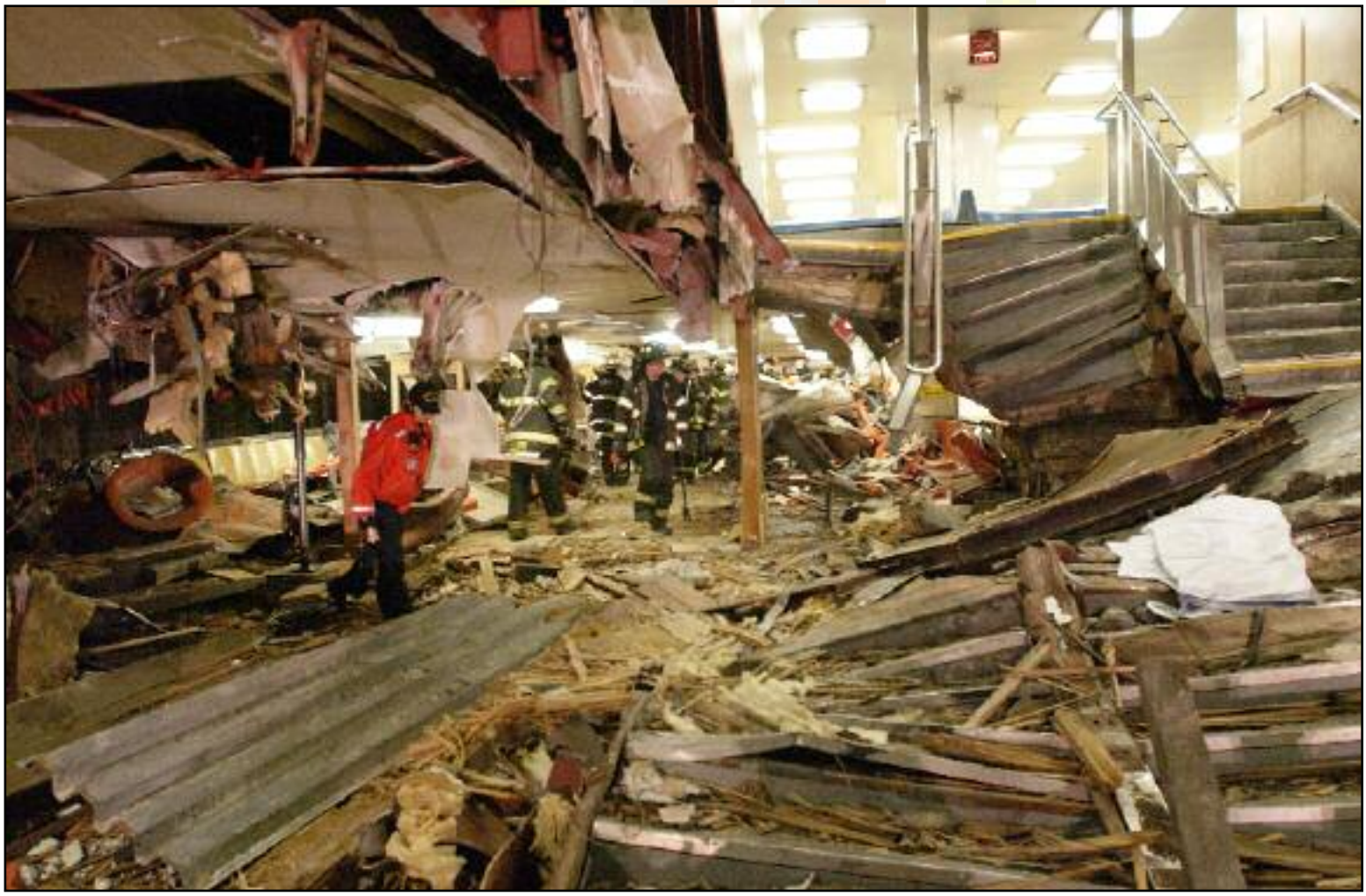
NTSB chairman's statement:
www.ntsb.gov/speeches/engleman/ege031104.htm

All photographs were taken by Public Affairs Officer Mike Hvozda, USCG.

Department of Homeland Security
United States Coast Guard
Statement of Captain Craig Bone
On the Staten Island Ferry Accident Before the Subcommittee on Coast Guard and Maritime Transportation, U.S. House of Representatives at the College of Staten Island
Nov. 4, 2003

Good afternoon Mr. Chairman and distinguished members of the Committee. I am Capt. Craig Bone, Commander of Coast Guard Activities New York. I am thereby appointed Office in Charge of Marine Inspection and Captain of the Port, Port of New York and New Jersey. These two designations place me in charge of Marine Safety and Security including inspection of vessels, licensing and documentation of merchant mariners, port security operations, vessel traffic and waterway management, and marine environmental protection. In addition, I am designated Search and Rescue Mission Coordinator, and I command Coast Guard Search and Rescue Stations and Cutters in the Port.

Mr. Chairman, I regret that we have to meet under these circumstances as ten of our neighbors have died, and many others were injured. We share in the sorrow felt by the families and loved ones of the individuals lost or harmed. As a humanitarian service, one of our primary missions is marine safety. We are dedicated to the task of enforcing marine safety regulations to prevent deaths and injuries, and when casualties do occur we work hard to find answers that will prevent recurrence. It is with this humanitarian spirit and dedication to duty that the Coast Guard is committed to fully supporting this hearing in hopes that it will serve to help prevent future casualties. Therefore the events leading up to and following the October 15th collision of the M/V *AndrewJ. Barberi* with the St. George Terminal of Staten Island Ferry are of the utmost importance to us.



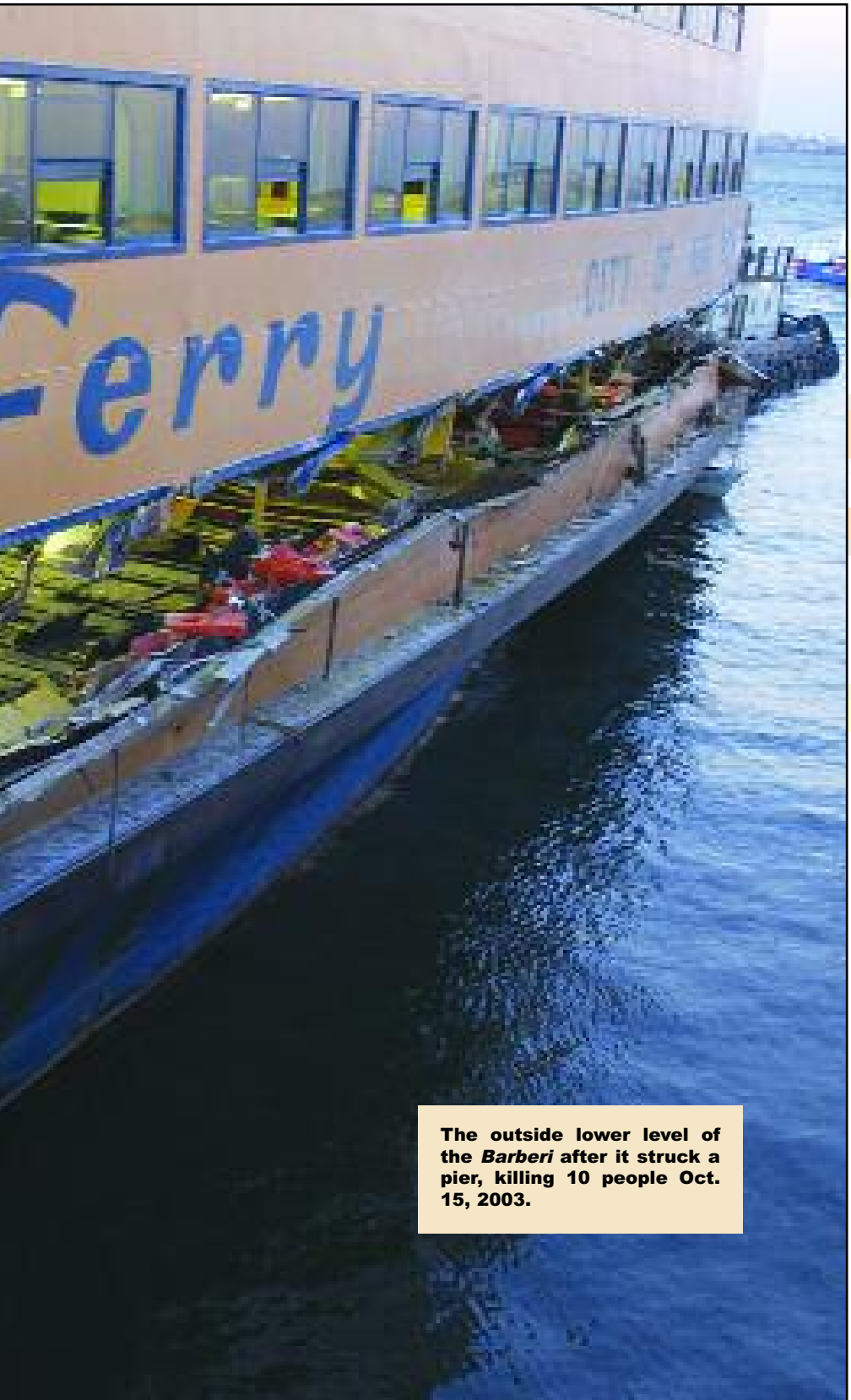
Lt. Carissa Vandermey, Chief of Environmental Response and an investigating officer, surveys the damage to the lower level of the Staten Island ferry *Andrew J. Barberi*.

First, I wish to state, for the record, my admiration for the New York City Police Department, Fire Department, Office of Emergency Management and the Department of Transportation employees for their extremely professional, dedicated, and thorough response to this tragedy. If it were not for both their response, and preventative efforts, this tragedy and the investigation that followed could have affected the lives of even more of our neighbors.

On October 15th at 3:22 p.m. the Coast Guard received the initial notification of the incident involving the M/V *AndrewJ. Barberi* from a USCG Seaman, who happened to be aboard the stricken ferry. Notifications were distributed to the Coast Guard and New York City Police assets who were dispatched to the scene. At 3:34 p.m. the *Barberi* reported the allision.

Soon thereafter, the first CG patrol boat arrived on scene and reported major damage to the *Barberi*. This patrol

craft continued to assess the scene, search for possible persons in the water, and enforce a safety zone of 250 yards from the vessel. At approximately 3:45 p.m. my Marine Safety Operations Division Chief arrived on board, followed closely by a team of six investigating officers and marine inspectors. Assessments of the scope of the tragedy, including the fact that multiple deaths had occurred, were quickly passed back to my command center, and I ordered suspension of all Staten Island Ferry service to further secure the scene. At that point I went to the scene to take over as Coast Guard On Scene Commander. As additional patrol craft from Coast Guard Station New York and the New York Police Department arrived on scene and expanded the search for persons in the water and enforcement of the safety zone, the on board response team began assessing the structural condition of the vessel, and investigating the incident by securing evidence and interviewing crew members.



The outside lower level of the *Barberi* after it struck a pier, killing 10 people Oct. 15, 2003.

As the New York City Police and Fire Departments continued to tend to victims, I commanded my staff to secure evidence, pursue drug and alcohol tests, interview witnesses, and maintain watch over the structural integrity of the hull and superstructure of the vessel. Later that evening, the Chairman of the National Transportation Safety Board arrived. At approximately 11:30 p.m., the NTSB investigator in charge with his team of investigators arrived on scene and my response team briefed him on the incident and all information collected to that point. The NTSB then formally assumed the lead for the federal investigation. Shortly thereafter, search and rescue efforts, which included dive operations secured for the evening, and the safety zone around the vessel was maintained until the vessel was moved to Brooklyn for repairs three days later.

Consistent with the amended Coast Guard and National Transportation Safety Board (NTSB) Memorandum of Understanding (MOU) that was signed in August of 2002, the NTSB elected to lead this major marine casualty investigation. Following the guidelines of the MOU, the Coast Guard is serving as a party under the NTSB investigation process. As a party, a Coast Guard member serves on each of the four teams set up by the NTSB to make inquiries and examine evidence. These teams are: Engineering Operations, Human Factors, Operations, and Deck. In addition I assigned a Coast Guard officer team leader to directly assist the NTSB investigator in charge.

The Coast Guard and NTSB investigation processes have been successful in making improvements to passenger vessel safety

over the years. A tragedy of the magnitude of that aboard the M/V *Andrew J. Barberi* is very unusual in the United States. Data for the years 1992 through 2000 show only eight deaths on board U.S. flag passenger vessels over 100 gross tons. None of these were related to a major vessel accident such as a collision, grounding or sinking.

By statute, the Coast Guard is granted the responsibility and authority to inspect certain vessels for compliance with United States law and regulation. Vessels carrying more than six passengers for hire are required to be inspected, and can only operate within the parameters of the Certificate of Inspection issued upon satisfactory demonstration of compliance. The Staten Island Ferries are technically not required to comply with Coast Guard regulations for passenger ferries, because they do not charge a fare and therefore carry no passengers for hire. However, the City of New York and Coast Guard Activities New York signed a Memorandum of Understanding agreeing in principle that the City would maintain the ferries in full compliance, and confer a Certificate of Inspection if deserved. Under this agreement, the Staten Island Ferries are inspected to the exact same extent as if they were carrying passengers for hire, and the *Barberi* was issued a valid Certificate of Inspection. The MOU provides no concessions that alleviate the Staten Island Ferries from any regulations that apply to passenger for hire ferries. The Certificate of Inspection I issued to the vessel demonstrated compliance at the time of the last inspection, which is fully consistent with a similar ferry that would be required to carry this certificate.

Federal laws also aim to prevent casualties by requiring licensed masters, officers and pilots on board passenger vessels required to be inspected. Each applicant must meet certain professional requirements that the Coast Guard Regional Examination Center must routinely verify. Each applicant must be of a certain age and possess specific levels of experience, character, physical health and knowledge. By verifying that the applicant meets the regulatory requirements we can conclude that the mariner has the minimum training, experience and qualifications to serve in positions of responsibility on a passenger vessel and take action to protect passengers, crew and property.

Above and top: New York Police Department divers search near the maintenance pier struck by the *Barberi*. Below: Capt. Craig E. Bone (right), Commander of Coast Guard Activities New York, discusses emergency operations with other Coast Guard first responders.

The outside lower level of the *Barberi*.

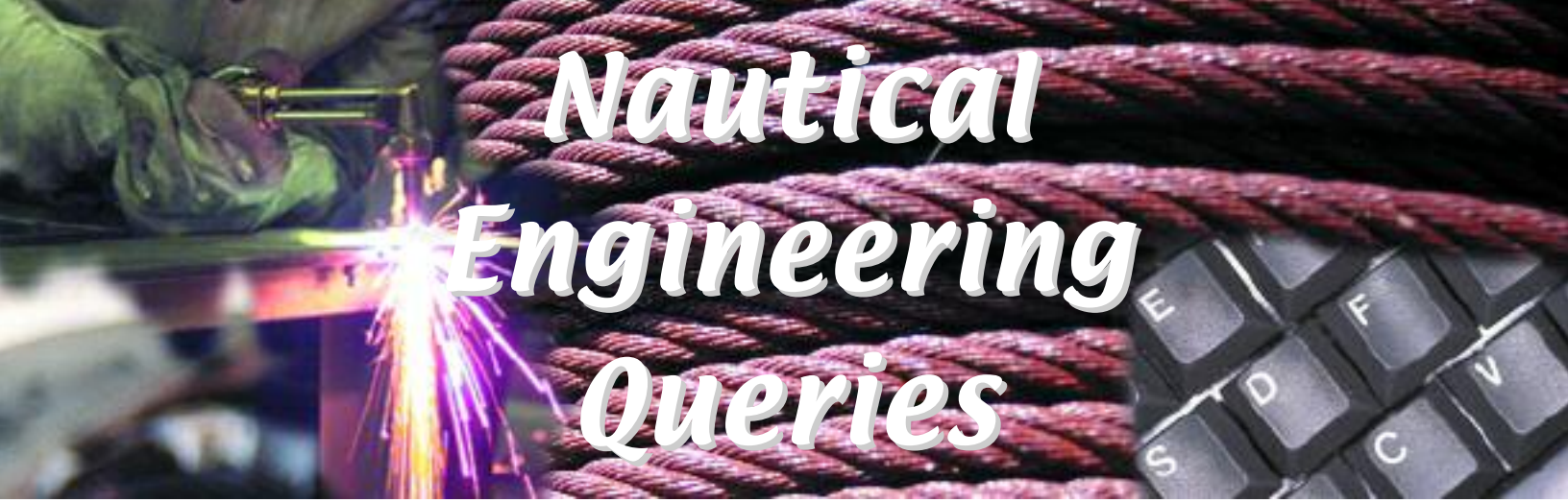
In addition to vessel inspection and mariner licensing, we have other tools to help address safety in the Port of New York. A system of cameras, radars, and communication equipment allows Coast Guard Vessel Traffic Service New York watch standers to serve as an extra set of eyes for mariners. Watch standers monitor vessel movements and pay particular attention that they adhere to safe navigation practices. VTS New York does not control the movement of vessels. Instead, VTS watchstanders alert a vessel to any VTS concern. The operator of the vessel then assesses this information and acts on it accordingly. VTS policy in New York requires every passenger vessel that carries over 50 passengers for hire, to participate in the Vessel Traffic Service and monitor the appropriate VTS frequencies

As the Captain of the Port, I am concerned with the effect weather can have on vessels operating within the Port of New York. I have established specific operating standards based on wind conditions. These standards are published in the *Captain of the Port Hurricane and Severe Weather Plan for the Port of New York and New Jersey (COTPSWP)*. At 4:45 p.m. October 14 (the day before the SI Ferry incident) the wind speed did increase to 22 knots with gusts to 27 knots. We implemented VTS measures for all vessels in the anchorages. These vessels were required to have their propulsion engines on-line and assist tugs alongside as stated in the COTPSWP. These measures remained in effect until the early morning hours of Oct. 17 when the winds subsided. COTPSWP indicates when the winds reach above 34 knots sustained (gale force) "Vessels not certificated for operation above a gale or only certified for river use shall cease operation." The Staten Island Ferries are considered in this category and would be allowed to operate until winds reached sustained gale force.

The Coast Guard is authorized, and compelled, to suspend or revoke a merchant mariner license through administrative proceedings, of any mariner found to have been negligent, or having committed misconduct, under the authority of that license, or who becomes unable to meet the professional requirements of their license. At this time, we have not taken any suspension or revocation action against any of the crew of the M/V *Andrew J. Barberi*. In investigations where NTSB is the lead, we would not take any action until the NTSB completed their on-scene investigation. However, as both the pilot and the master have been thus far unable to appear before the NTSB investigators, I am pursuing their fitness to serve on board vessels in a licensed capacity, and I will take all appropriate measures based on the findings of their current suitability for such duty.

I hope that through a methodical investigation, an understanding of what caused or contributed to the death of 10 people and injury of many more, will help point us to measures that will prevent such an accident from ever occurring again. Once we fully understand the casualty we can decide what actions are necessary to prevent an accident such as this. I can assure you, I will use my authority to that purpose.

I reiterate my personal commitment to the success of this and all federal investigations and hearings to identify the cause of this tragedy, and the formulation of constructive measures to prevent recurrence. I am ready to answer your questions to the very best of my ability.



Nautical Engineering Queries

1. The purpose of the water tube boiler furnace refractory is to _____.

I. protect the water drum from direct flame impingement

II. reinforce and strengthen the casing

A. I only
True: The primary purpose of refractory is to retain heat within the furnace, direct flow of heated gases to tubes and to protect the casing and structural members from direct impingement of burner flame. Hence, one result is to protect the water drum from direct flame impingement.

B. II only
False: While refractory will prevent the inner casing from excessive heat and direct flame impingement, anchor bolts welded to the structurally reinforced inner casing prevent refractory walls from falling into the furnace. The refractory itself does not directly lend to the structural reinforcement of the casing.

C. Both I and II
False: Only Choice I is true.

D. Neither I nor II
False: Only Choice II is false.

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2. A three-inch overboard discharge line, located six feet below the waterline, has ruptured and separated from the hull. What would be the minimum number of strokes per minute required from a 10" x 8" x 11" duplex double acting reciprocating bilge pump, operating at 93 percent efficiency, to keep the bilge level from continuing to rise? (See Illustration SF-0034 at www.uscg.mil/hq/g-m/marpers/examques/illus/safe2.pdf for flow table)

A. 46 strokes per minute
Incorrect: Level will rise. This value represents only half the number of working strokes required.

B. 90 strokes per minute
Incorrect: Level will rise. This value does not take into account the pump efficiency.

C. 98 strokes per minute
Correct: (See solution at right)

D. 181 strokes per minute
Incorrect: This would be nearly twice the number of working strokes required and unnecessarily overwork the pump.

Water Cylinder Diameter = 8 inches; Stroke = 11 inches;
Working Strokes/min = 2 (duplex pump) x Strokes/min

Capacity (gal/min) = (.7854 X Diameter$^{(2)}$) x (Length of Stroke)
x (Working Strokes/Min) x Eff. divided by 231 cubic inches per gallon

$$C = \frac{(.7854 \times 8 \times 8) \times (11) \times [2 \times (\text{Strokes/min})] \times .93}{231 \text{ cubic inches/gal}}$$

$$433 \text{ gal/min} = \frac{1028.43 \times (\text{Strokes/min})}{231}$$

$$\text{Strokes/min} = \frac{433 \times 231}{1028.43}$$

Strokes/min = 97.25
98 Strokes Per Minute

Choice C Solution: From the table in figure SF-0034, a flow rate of 433 gal/min will result through a three-inch hole with a static head of six feet. This would be the minimum pump capacity required.

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3. The term "load on top" used on many crude oil carriers is to provide a method for _____.

A. calculating the ullage in the cargo
Incorrect: Ullage is the measurement of a liquid's surface in a tank to the top of the tank or sounding tube.

B. loading ballast by gravity
Incorrect: "Load on top" is a process only involving the introduction of cargo and is never to incorporate the use of water ballast.

C. the loading of new cargo into the slop tank as a procedure to minimize pollution
Correct: This procedure allows crude oil to be loaded on top of "oily slops" contained in a designated slop oil tank, which previously contained contaminated oil from tank cleaning operations and oily bilge water. This tank is heated to permit the water to settle out during the vessel's unloaded ballast passage and decanted through the oily water separator. The procedure minimizes pollution of slop oil being discharged at sea since the "clean" water is carefully monitored during its discharge overboard. Crude oil may then be loaded on top of the remaining water emulsion and slops of which the tank contents will be discharged as cargo at the next discharge port.

D. calculating the ratio of cargo expansion in a cargo tank
Incorrect: Cargo expansion needs to be considered to avoid "overfilling" a tank but has no relationship to "load on top."

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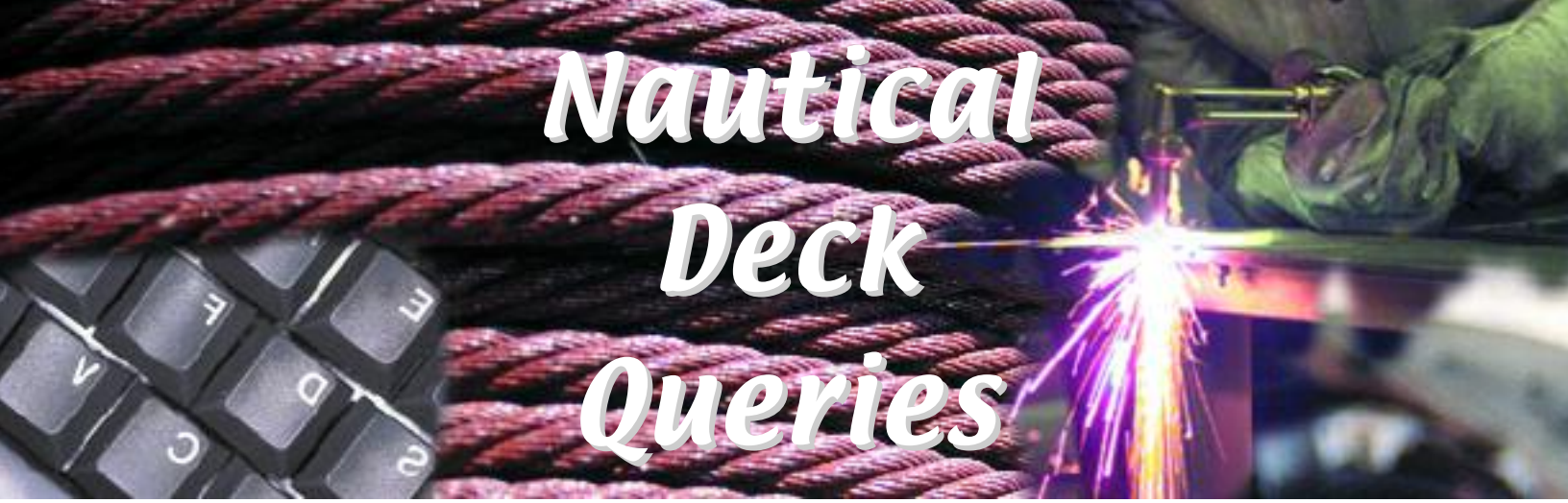
4. Which of the following events shall be conducted during a fire and boat drill?

A. Watertight doors which are in the drill area shall be operated.
Correct: 46 CFR 199.180(f)(2)(v) states checking the operation of watertight doors, fire doors, and fire dampers and main inlets and outlets of ventilation systems in the drill area.

B. All lifeboat equipment shall be examined.
Incorrect: 46 CFR 199.190(e) states that all lifeboat equipment is only required to be checked monthly.

C. Fire pumps shall be started and all exterior outlets open.
Incorrect: 46 CFR 199.180(f)(2)(ii) only requires two jets of water be opened to determine that the system is in proper working order.

D. All of the above.
Incorrect: Only "A" above is correct and not "all" of the answers.



1. Both International and inland: You are underway in low visibility and sounding fog signals. What change would you make to the fog signal immediately upon losing propulsion? *Not Under Command—Rule 3 (f) defines this vessel as follows: "A vessel which through some exceptional circumstance is unable to maneuver as required by these Rules and is therefore unable to keep out of the way of another vessel."*

A. Begin sounding two prolonged blasts at two-minute intervals.
Incorrect: This signal indicates that a power-driven vessel has deliberately stopped its engines and is "making no way through the water." This vessel is able to continue making way, immediately upon an engine order.

B. Begin sounding one prolonged blast followed by three short blasts at two-minute intervals.
Incorrect: This signal is sounded only by a manned vessel being towed.

C. Begin sounding one prolonged blast followed by two short blasts at two-minute intervals.
Correct: The moment that propulsion is lost, the vessel is considered to be "Not Under Command" and the vessel is no longer able to maneuver to avoid a collision.

D. No change should be made to the fog signal.
Incorrect: One prolonged blast at intervals of not more than two minutes is the signal for a power-driven vessel, underway, and making way through the water, under normal conditions.

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2. When entering from seaward, a buoy displaying a composite group (2+1) flashing red light indicates _____.

A. a junction, with the preferred channel to the left
Correct: The light is the same color as the topmost band with the preferred channel to the left, hence the secondary channel to the right. This buoy would be painted with three horizontal bands, such as red on top, green in the middle and red on the bottom in this instance.

B. a sharp turn in the preferred channel, to the right
Incorrect: The characteristic of the light marking a sharp turn in the channel is quick flashing and would not be that of the composite group (2+1) because the latter characteristic is permitted only on junction buoys. A sharp turn to the right, in either the primary or the secondary channel, would be marked with a red buoy on the inside of the turn and, if lighted, would be red.

C. the starboard side of the secondary channel
Incorrect: The starboard sides of the primary and secondary channels are always marked with red buoys. When lighted, the lights will be red, but not with the composite group (2+1) characteristic.

D. a wreck, to be left on the vessel's port side
Incorrect: A sunken wreck near either boundary of a buoyed channel will be marked with a lateral mark. If lighted, the light color will be the same as the buoy color, and it would not have the composite group (2+1) characteristic. Therefore, the marker for a wreck on or near the left hand boundary would be green. As an alternative, this wreck may be marked with an "isolated danger mark."

3. A vessel is heading magnetic northwest and its magnetic compass indicates a heading of 312°. The quadrantal spheres are arranged athwartships. What action should be taken to remove this error during compass adjustment? *Note: Ideally, the compass would indicate 315° on this heading, but indicates 312° because of the deviation caused by the mass of "soft iron" in the vessel's structure. Quadrantal spheres are made of "soft iron" and compensate for this type of deviation. The quadrantal spheres can be arranged either fore-and-aft or athwartships, the latter being much more common. The distance that a sphere can be moved "all the way in" (toward the compass) or "all the way out" (away from the compass) is approximately six inches. The required movement of the athwartship spheres is opposite in direction to their being installed fore-and-aft, and the mass of the spheres proportionally affects the amount of compensated deviation.*

A. If the quadrantal spheres are all the way in, replace them with larger ones.
Incorrect: This would only be true if the spheres were arranged fore-and-aft.

B. If the quadrantal spheres are all the way out, remove one of the spheres.
Incorrect: Removing one of the spheres would make the deviation asymmetrical and more detrimental.

C. If the quadrantal spheres are all the way out, move the spheres in.
Incorrect: This would only be true if the spheres were arranged fore-and-aft.

D. If the quadrantal spheres are all the way out, replace them with smaller spheres.
Correct: The three degrees of easterly deviation exist because the spheres are overcorrecting.

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4. The equipment required to remove an on-deck oil spill on a barge transferring oil must either be carried on board or _____.

A. on a tug standing by
Incorrect: Under normal circumstances a tug is not required to stand by during an oil transfer.

B. available by contract with the shore facility
Correct: Title 33 CFR 155.215 (c) The oil barge owner or operator may rely on equipment available at the transfer facility receiving from or discharging to the barge, provided the barge owner or operator has prearranged for the use of the equipment by contract or other means approved by the U.S. Coast Guard.

C. kept at the shoreside hose connection during transfer
Incorrect: There is no requirement for the equipment to be near the hose connection.

D. kept in a protected shoreside location readily accessible
Incorrect: Although in practice the equipment may be sheltered, the only requirement is that it must be "ready for immediate use."

U.S. Department of Homeland Security

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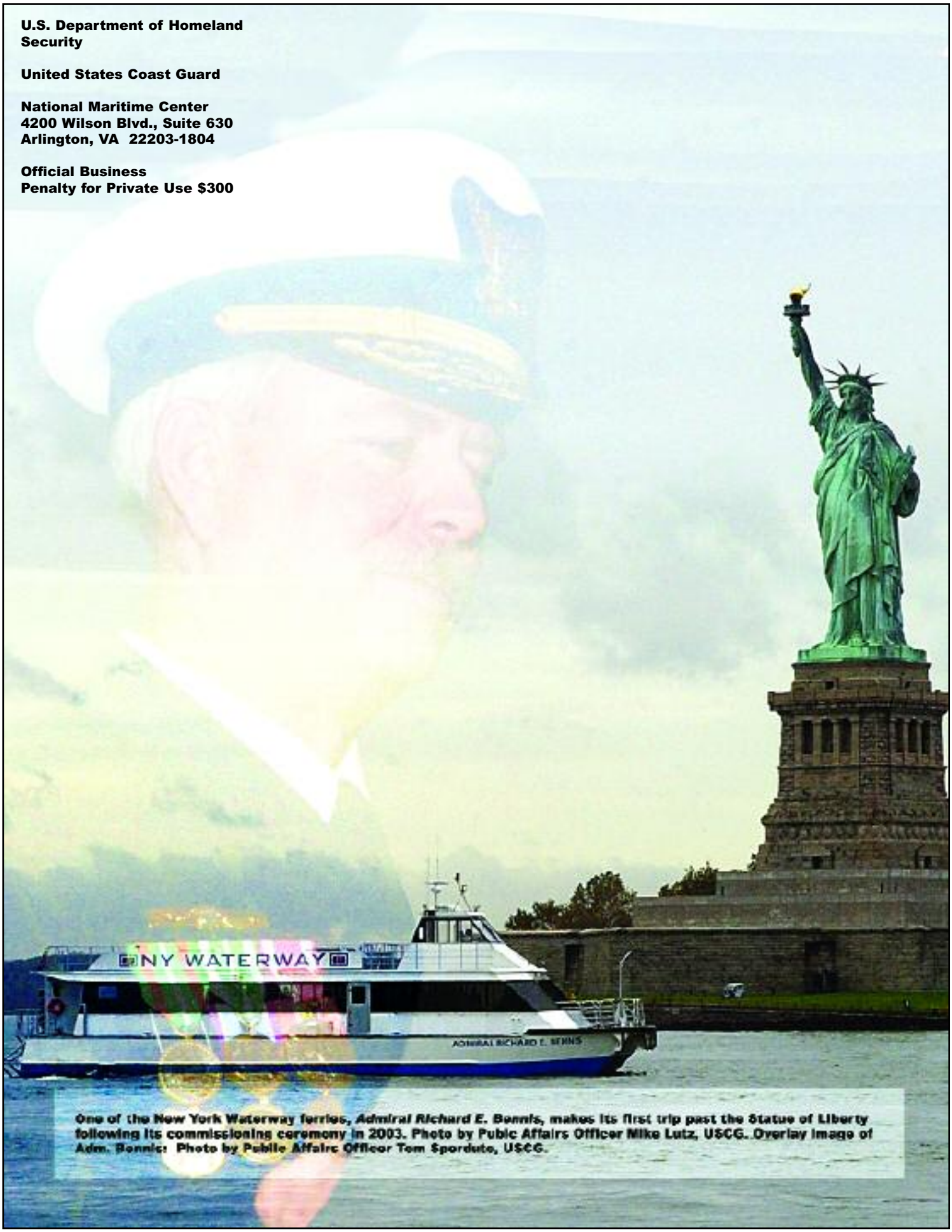

One of the New York Waterway ferries, *Admiral Richard E. Bennis*, makes its first trip past the Statue of Liberty following its commissioning ceremony in 2003. Photo by Public Affairs Officer Mike Lutz, USCG. Overlay image of Adm. Bennis: Photo by Public Affairs Officer Tom Spordato, USCG.