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of the Marine Safety Council

Small Passenger Vessels

— a review —

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FRONT PHOTO: The M/V *Capt. Mike* is owned and captained by Mike Cannon, who uses the vessel for day fishing trips in the Jamaica Bay, NY area. USCG photo by Lt. j.g.

Assistant Commandant's Perspective

by Rear Adm. PAUL PLUTA
Assistant Commandant for Marine Safety, Security & Environmental Protection

An oceanic tragedy 50 years ago propelled the maritime community to improve the safety of the small passenger vessel industry. On Sept. 1, 1951, the day the M/V *Pelican* sank and killed 45 passengers, both the industry and government saw the need for greater regulation and oversight of passenger vessels under 100 gross tons.

In response, we took a series of actions to prevent similar tragedies. Regulations have been enacted requiring small passenger vessels to be certificated and regularly inspected by the U.S. Coast Guard. Within the more recent past, the Coast Guard and the Passenger Vessel Association (PVA) established a partnership, enabling the Coast Guard and industry to take action in a non-regulatory, cooperative environment. Other initiatives, such as Prevention Through People, are reinforcing the message that human error is a major cause of maritime casualties and must be addressed.

By most measures, we—the government and industry—have succeeded in improving the safety of the industry. As shown in this issue of *Proceedings*, vessel-related fatalities on small passenger vessels accounted for only 46 of the 246 passenger deaths reported to the Coast Guard between 1992 and Sept. 30, 2000. The balance of the fatalities were attributed to non-vessel factors, such as diving/swimming accidents and natural causes. Though we should be proud that the safeguards implemented have been instrumental in the improved safety record, we all must remain watchful to ensure the highest level of safety.

Just as the events of 50 years ago caused us to act, the tragic events of September 11 have caused us to redirect our focus. Maritime security is now our Number One priority. In response, the maritime community took several immediate steps. The PVA, for example, developed volunatry security guidelines. Other measures included: a temporary rule amending the advance notice of arrival reporting requirement to require 96 hours in advance, including a requirement for providing crew, passenger, and cargo information; screening and boarding all vessels that pose a security risk; increasing the threat level of passenger vessel terminals to the highest security level; and increasing waterside security patrols around critical infrastructure.

We have also focused on long-term solutions to maritime security that require a commitment from the international community for resolution. In late February an Intersessional Working Group on maritime security was held at the International Maritime Organization (IMO). Numerous details were agreed to at that meeting that will form the foundation of future discussions. In addition to development of a security code that addresses vessel, port facility and other security concerns, there was agreement to accelerate the implementation of Automatic Identification Systems. Other issues that were agreed to will be discussed at future meetings.

The collective resolve to address international maritime security issues reflects positively on the maritime community's ability to develop solutions to multiple facets of maritime security. Our mutual challenge is for all countries to work together through IMO and other forums to identify workable solutions that advance these and other important initiatives to increase the level of security in the maritime environment.

When we look back 50 years hence, I hope that history will reflect as positively on our joint efforts to confront this challenge as it does on our efforts in the passenger vessel industry: that we did all that was humanly possible to contain any possibility of threat to maritime security—and that we were successful.

Champion's Point of View

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

Defining Safety For Owners, Operators, Crews, Coast Guard and the Public with the Regulatory Process

We have featured small passenger vessels in this issue. The Coast Guard regulates more than 6,000 of these vessels that admeasure less than 100 gross tons. These vessels run in size from small 18-foot water taxis to 200-foot-long vessels with overnight passengers that will cruise the New York State Barge Canal, the East Coast, Alaska, and the Caribbean. This issue of *Proceedings* shares with you the research and analysis conducted by the Coast Guard's Compliance Analysis Division (G-MOA-2). We are not through analyzing this data; however, I note the infrequent occurrence of fatal incidents related to a vessel or its systems.

What's the safety strategy used to ensure that the passengers on these small passenger vessels do not die or get injured and the vessel remains afloat and undamaged? Historically, this job fell to the owner and operator, especially in the early history of our country when there were no regulations. Today it's still the job of the owner and operator. It's the owner and operator's number one priority to run their business so that the vessel remains seaworthy.

How do you know what's safe?

Back in 1979, as a new marine inspector in training, on my way to observe how others conduct a vessel inspection, I walked by the Executive Officer/Alternate Officer in Charge of Marine Inspections (OCMI) at Marine Inspection Office Miami, Lt. Cmdr. Don Dobbs. Lt. Cmdr. Dobbs had sailed as a chief mate before joining the Coast Guard under a program that brought licensed chief mates, chief engineers and masters into the Coast Guard. Lt. Cmdr. Dobbs asked me what I was going to be doing that afternoon. I replied that I was going to perform a "safety" inspection of a small passenger vessel. To make a point, he said, "No you're not." I was caught by surprise by my senior officer and said, "I am not, Sir?" "That's correct, you are not going to do a safety inspection today. You are going to inspect a vessel for compliance with regulations." He proceeded to explain the difference.

What's the difference between a safety inspection and conducting an inspection for compliance with the regulations?

It all comes down to defining safety. From an inspector's point of view, you could never finish a "safety" inspection because you could never determine when you were finished. How would you know without any way to keep track of what you should look for or what to require? Under the concept of a regulatory system, we have decided to define "safe" by detailing regulatory requirements. The owner and the Coast Guard inspector can determine if the vessel complies with all the appropriate requirements. If the vessel does comply, then the vessel may carry passengers.

Think about the concept of defining safety. The definition of "safe" will change over time. Small passenger vessel regulations incorporated new requirements since I began inspecting vessels in 1979. Some of these post-1979 regulations now apply to those vessels that were operating back in 1979. Then, those vessels I inspected could operate because they met the regulatory requirements that were in effect in 1979. If I went back in time with the current regulations to inspect those vessels, none of them would be allowed to sail. Looking into the future, I suspect that the regulatory safety standards will continue to change. Perhaps 25 years from now, all passengers on certain vessels will be handed a nametag that contains a miniature personal EPIRB to speed the locating and recovery of individuals in cold water.

The ultimate and final responsibility for ensuring vessels meet current regulations does fall to the owner or the operator. However, because of accidents like the loss of 45 people from the M/V *Pelican*, Congress and the Coast Guard do play key roles in vessel safety and the prevention of accidents. Congress passed laws that require the Coast Guard to make and carry out certain regulatory requirements applicable to small passenger vessels.

The traditional Coast Guard small passenger vessel safety strategies aimed at preventing incidents from occurring include vessel inspection requirements, licensing and manning requirements and investigation requirements. The purpose of these design, construction, equipment and operational requirements is to prevent incidents.

Under the current system, the vessel owner or operator must comply with all applicable laws or regulations. If he does not, the owner or operator is required to notify the OCMI of the shortcomings. The OCMI then decides if the failure to comply with a regulation is of such a magnitude that keeps the vessel at the dock (inoperable fire pump) or one that the owner may be allowed to operate for a short period of time without complying with the requirement (posting a copy of the Certificate of Inspection). The following list of small passenger vessel regulations shows how specific the requirements can be:

- Limit the number of people a vessel may carry to prevent overloading;
- Require a stability letter for certain vessels so the master can follow its instructions to prevent the vessel from capsizing;
- Require certain amounts of freeing ports and scuppers on vessels so that boarding seas will drain from the weather deck before the vessel capsizes;
- Require certain engine exhaust installations to prevent hot exhaust pipes from igniting fires;
- Require hinges, chains or other restraining devices for all weather deck hatches so that the hatches will not be misplaced or blown over the side during a storm, leaving a gaping hole in the deck of the vessel where water could enter the hull and subsequently capsize the vessel.

How are Coast Guard regulations created?

All regulations are created following a procedure that focuses on getting the public's view on issues and proposed regulations during the rulemaking process that the Coast Guard manages. Regulations usually result after the Coast Guard analyzes one or more casualties and feedback from actual search and rescue efforts, the public's comments to the docket and any public hearings, cost-benefit analysis and risk assessments. As is often the case in devising regulations, one solution does not always answer one particular issue. One size does not always fit all. Look at these two examples that were the subject of debate, and a regulatory solution that was found to meet safety needs under varying particulars of a vessel and its operation.

Issue: Provide deck rails on vessels to keep passengers and crew from falling overboard.
Regulations: Look at how deck rail heights may vary from 30 to 42 inches. Why should not one height fit all vessels? The rail heights vary by the type of activity the vessel is designed to provide to its passengers (46 CFR 177.900).

Issue: Provide life jacket lights so that a person in the water, with a life jacket, can use the light to signal rescue craft.
Regulations: This requirement depends upon where the vessel operates. It's possible that a person could be in the water 19.9 miles from a harbor of safe refuge without a light, while a person from another vessel at 20.1 miles would have the benefit of a light. The final rules require the lights to be placed on life jackets onboard small passenger vessels that operate more than 20 miles from a harbor of safe refuge (46 CFR 180.75).

How are mariners licensed?

Federal laws also aim to prevent incidents by requiring licensed masters onboard small passenger vessels. Each applicant must meet certain requirements that the Coast Guard Regional Examination Center employees verify and evaluate.

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 what it takes to command a small passenger vessel in the marine environment to protect the vessel's passengers and crew.

We expect the master to be physically capable to respond to an emergency such as fighting a fire without suffering a heart attack and to recognize the light configuration for a towing vessel towing a barge astern, so that the master will not go between the tow and run into the towline. And we expect an experienced master with character to carry out his duties with vigilance, stepping forward to take action that could prevent any kind of incident onboard the vessel.

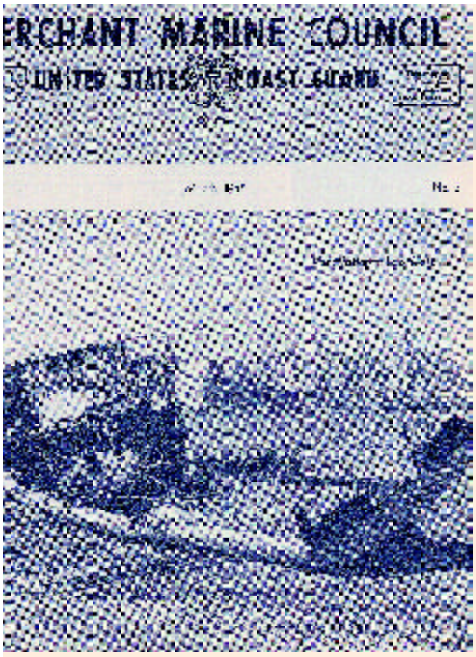
How do we improve the process?

The Coast Guard also evaluates how well this safety process works. This begins when the owners, operators and masters comply with the casualty reporting requirements. We have more than 200 marine investigators assigned throughout the United States and in Japan and the Netherlands. When they investigate a reported accident the investigators review how well the current regulations fulfilled their designed intention. It's these men and women who try to find if the current safety process failed under the accident particulars or if a death, injury, property damage or environmental damage occurred despite all the regulatory safety strategies in place. One of the many things the Coast Guard does with their findings and conclusions is assess whether any portion of the small passenger vessel safety process could be improved to address any perceived shortcomings. This could include proposals to amend the regulations applicable to small passenger vessels.

The Coast Guard marine investigators also oversee the performance of the licensed mariners. When mariners violate laws, do things they should not, negligently perform their duties, use drugs or alcohol or show signs of incompetence, the Coast Guard investigators will investigate and assess whether a mariner is fit to hold a license to carry passengers. These regulatory requirements were written to ensure a high standard for the professionals who will be responsible for seven to 3,000 people onboard an inspected small passenger vessel.

Could we see another small passenger vessel casualty resulting in 45 fatalities? We hope not. Projecting the future based on past casualty occurrences since the small passenger vessel regulations took effect in 1958 shows a very low probability of a catastrophic incident occurring. Accidents just do not happen. There are explanations for them. It may take seven to 58 factors to align themselves before we could see another accident resulting in 45 fatalities. But it could happen. There are still operators who tempt fate by violating the law requiring them to keep up their vessels. In April of this year, an OCMI removed the Certificate of Inspection from a 78-gross ton vessel of more than 100 feet in length because the marine inspectors found serious life-saving, fire-fighting and watertight integrity problems and also discovered the vessel crew was not enrolled in a chemical testing program. We also must recognize that much has changed in the marine environment during the last 50 years since the *Pelican* capsizing. New factors can become part of the accident equation. Small passenger vessels have gotten larger, faster, and operate in locales far from rescue facilities. In addition, we have also seen a large increase in recreational vessel use on the waterways. These factors create potential for different types of accidents that we did not have 50 years ago.

These factors will continue to change the equation as a result of new technology and cultural shifts. What will not change is that the safety of small passenger vessels will remain the ultimate responsibility of the owners and operators. As I learned nearly 25 years ago as a marine inspector, "safety" is constructed from many parts and is effected through compliance by the owners and operators with the regulations, awareness by the public, and continual monitoring by the Coast Guard. Through this partnership, we can expect to realize our joint goal of an improved safety record for small passenger vessels.



DEATH STRUCK 45 Times

A motor vessel *Pelican* was built in 1940 for service as a passenger-carrying vessel in the fishing and recreation business. She was fitted with two gasoline engines for propulsive purposes, and admeasured 14 gross tons. The *Pelican*, admeasuring less than 15 gross tons, was not subject to Federal inspection and certification statutes for seaworthy purposes and could legally operate in the passenger-carrying business with no effective legal supervision with respect to any safety standard for the safety of the public patronizing such vessel.

On the morning of September 1, 1951, the *Pelican* was moored to a pier at Montauk, Long Island, where in addition to the 2 crew members she embarked 62 passengers for a fishing excursion. Existing weather conditions were favorable; however, warnings had been issued indicating expected strong winds and stormy weather. The *Pelican* had on board 64 persons, although a boat of her dimensions and type could not ordinarily be expected to carry more than about 30 persons with safety on coast-wise waters in the service in which she was engaged. Despite the impending bad weather warnings and her overloaded condition, the *Pelican* departed for a fishing excursion. It arrived at a spot known as Frisbie's Bank at about 10 a'clock while the wind had been gradually increasing in intensity and veering around to the east and northeast. After fishing for approximately 1 hour, the *Pelican*, due to the worsening weather conditions, was headed for port. On the return trip, engine difficulties were experienced and only 6 miles were covered in 2 ½ hours. As the *Pelican* rounded Montauk Point she changed course, bringing the wind and sea on the starboard beam and quarter, causing her to roll heavily to port, at times rolling her port gunwale under water. Two successive heavy seas hit the vessel, evidently on her starboard quarter, and caused her to capsize 1 mile north of Montauk lighthouse.

Due to the suddenness of the capsizing and the lack of apprehension on the part of passengers that the vessel was in any particular peril, life preservers were not worn, although there was an adequate number of accessible good, serviceable lifejackets on board. Due to the rough seas and the fact that no life preservers were worn, 45 persons perished, probably from exhaustion, within 30 minutes after the capsizing; 18 survivors were picked up by 2 Coast Guard Auxiliary manned vessels, and 1 by a Coast Guard picketboat. Several bodies were found in the enclosed cabin of the *Pelican* after it was towed into Montauk Harbor.

It was determined that the primary cause of this tragedy was the overloaded condition of the *Pelican*. And here a paradox exists immediately evident to those familiar with Coast Guard inspection regulations: that the number of passengers carried on larger and presumably more capable vessels is restricted whereas there is no restriction on the number that may be carried by smaller and presumably less capable vessels. It follows then, that legislation is required which would subject small motor vessels carrying passengers for hire to annual inspection for the purpose of determining that they may be operated in their proposed service with safety of life. In this connection, legislation has been sponsored requiring the annual inspection and certification of all motor-passenger vessels regardless of size, tonnage, or waters operated, which carry more than 12 passengers for hire.

The wind and sea conditions contributed to the casualty, but probably would have no effect had not the primary cause—overloading—existed. Another contributing condition was the erratic performance of one of the vessel's engines. From the fishing bank to the scene of the capsizing the *Pelican* averaged just a little better than 2 knots, taking 2 ½ hours, while the whole distance from the dock to the banks seldom took over an hour and a half. With the loss of use of one engine, maneuverability of the boat, especially in its overloaded condition, would be lessened if not lost altogether, leaving it to the mercy of the seas. Poor distribution of the passengers, who would, not thinking of the consequences, seek the side away from the sea, resulted in an unbalance making the vessel quite susceptible to the turning moment exerted by the two successive larger waves.

All things considered, there was shown a poor exhibition of seamanship and lack of responsibility in the persons entrusted with the safety of 62 passengers.

MOTORBOAT CASUALTIES OF 1951

This article is reprinted from page 74 of March 1952 **Proceedings** *Volume 9, Number 3: Ventilation — Too Late*

In response to the September 11th attacks, the U.S. Coast Guard, in consultation with the Department of Transportation, took immediate steps to increase U.S. maritime security. The multi-mission nature of the Coast Guard, the broad security and safety authorities of our Captains of the Port, and our unique characteristic as the only federal service with both defense and law enforcement authority and capabilities allowed the Coast Guard to act quickly and decisively to increase the security of U.S. ports and maritime transportation infrastructure.

Domestic Activities

Domestically, Coast Guard port security activities since 11 Sep 2001 include:

Notification Requirements

The Coast Guard issued a temporary rule changing notification requirements for vessels bound for or departing from U.S. ports. This rule:

- Temporarily lengthened the usual notification from 24 to 96 hours prior to entry;
- Required submission to a central national clearinghouse;
- Suspended exemptions for vessels operating in compliance with the Automated Mutual Assistance Vessel Rescue System;
- For some vessel operations on the Great Lakes, added a requirement to provide notification information when departing from Canadian ports to U.S. ports;
- For vessels on voyages less than 96 hours, required notification information prior to departing port but not less than 24 hours before entering U.S. port; and
- Required information about all persons onboard these vessels.

This new centralized reporting enables the United States to scrutinize security information and minimize delays in collecting that information. It allows screening of passengers and crews between U.S. and foreign ports to ensure flow of the good and keep out the bad.

High-Interest Vessels

The CG initiated a screening process to identify high-interest vessels en route to or between U.S. ports. With the advance notice of arrival information, the Coast Guard is identifying "high-interest vessels," which include vessels that may pose a substantial security risk to U.S. ports due to the composition of a vessel's crew, passengers, or cargo.

- Small Boats, Patrol Boats, and other Coast Guard units are escorting other high-risk commercial vessels and high-value Navy combatants to deter and prevent external threats from the vessels;
- Subject to the discretion of the Coast Guard Captain of the Port, the Coast Guard is conducting a security boarding of all high-interest vessels before they enter port to ensure they are safe to enter. The boardings ascertain whether the officers and crew are legitimate mariners conducting legitimate commerce;
- Sea Marshal Concept: On certain high-interest vessels, including some large passenger vessels, armed Coast Guard personnel are boarding the vessel prior to its entry and remaining onboard to ensure the vessel is not hijacked. The intent is to maintain positive control over the vessel's propulsion and steerage.
- Marine Safety and Security Teams (MSST): MSSTs provide enhanced weapons and boat capabilities, and specialized training necessary to protect military loadouts, enforce moving and fixed security zones, defend critical infrastructure, and provide modest shoreside force protection. Possessing CG Maritime Law Enforcement expertise, the MSST provides a multi-mission capability that can also support a broad range of LE activities in ports, harbors and waterways: security for major marine events (Olympics, OPSAIL), alien migrant interdiction operations, and counter drug operations. We will bring four MSSTs online in FY02: Seattle (1 Jul), Chesapeake (1 Aug); Houston/Galveston and LA/LB (1 Sep).
- Port Vulnerability Assessments (PVA): Prior to 11 Sep we had completed PVAs in Baltimore, Guam, Honolulu, Charleston and Savannah using a modified Defense Threat Reduction methodology. These efforts supported receipt of FY02 supplemental funding and will serve as the foundation for contract development (awarded in April) of security guidelines (Model Port Security attributes) and PVA methodology; USCG should start conducting PVAs with contractor teams during 3rd quarter FY02. The PVA teams will consist of highly skilled engineers from various fields that will analyze every aspect of the port infrastructure to identify components that are vulnerable to a terrorist attack. In addition to the formal assessments, the Coast Guard is developing a self-assessment tool that may be used by smaller ports to accomplish similar goals.

Passenger Vessels

The Coast Guard has raised the threat level for passenger vessels and terminals that handle passenger vessels to Level 3, the highest security level currently in the regulations. Level 3 requires, among other things, that all baggage and stores be screened before they can be loaded aboard the vessel. In March 2002, the Coast Guard issued a significant revision to the existing passenger vessel security guidance. The purpose of this revision was to provide greater detail regarding the performance of security activities and to realign these to effectively combat the new terrorist threat.

Safety Patrols

The Coast Guard has initiated waterside security and safety patrols around certain critical infrastructures and certain high-interest vessels while in port. Operators have been required to increase security around their facilities and vessels, including waterborne security patrols, to ensure that the vessels are adequately guarded against terrorists.

Security Levels

Coast Guard and industry security activities and security planning are designed to provide a scaled response that provides adequate security measures for escalating threats. The Coast Guard has defined three maritime-security levels and has identified representative Coast Guard and industry security activities for each level:

- Maritime Security Level (MARSEC) 1: The new maritime-security normalcy. This is the risk level for which protective measures must be maintained for an indefinite period of time; in other words, these are the normal, everyday security measures;
- Maritime Security Level (MARSEC) 2: A heightened threat. The threat of an unlawful act against a port, facility or vessel exists, and intelligence indicates that terrorists are likely to be active within a specific area or against a specific class of target. This risk level indicates that a particular segment of the industry may be in jeopardy but that no specific target has been identified. Additional protective measures may be sustained for substantial periods of time;
- Maritime Security Level (MARSEC) 3: Attack imminent. MARSEC III means the threat of an unlawful act against a port, facility or terminal is probable or imminent. Intelligence may indicate that terrorists have chosen specific targets, though it may not be possible to identify such targets. Additional protective measures are not intended to be sustained for substantial periods of time.

International Activities

Internationally, the Coast Guard has initiated action through the International Maritime Organization (IMO) to improve maritime security and maritime-domain awareness (MDA) worldwide.

Maritime Domestic Awareness

The Coast Guard considers MDA the key to detecting and preventing terrorist activities. MDA is the knowledge of vessels, people, and cargo approaching our shores, which enables the effective understanding of all activities and forces within the maritime region that threaten the security, safety, and sovereignty of the United States. MDA will require multi-agency cooperation at all levels of government, with the private sector, and internationally to allow for the timely collection, processing and dissemination of information.

In November 2001 the IMO Assembly adopted Resolution A.924(22) on the recommendation of the United States and numerous other nations, with the goals of significantly enhancing MDA and maritime security. At the February 2002 meeting of the Special Intersessional Working Group (ISWG) of the IMO Maritime Safety Committee (MSC), the U.S. was very successful in establishing concepts for further development by IMO to improve maritime security. A draft of substantial amendments to the Convention of Safety of Life at Sea (SOLAS) was developed by the ISWG, as well as the framework for a mandatory security code for ships and port facilities. The concepts, regulations, and the Code development by the ISWG will be further considered and developed at the 75th meeting of the IMO Maritime Safety Committee (MSC 75) in May 2002. Final approval of any MSC 75 proposals is expected at a December 2002 IMO conference on maritime security. The United States has submitted several papers to MSC 75 to assist in these efforts.

At the ISWG, the concepts put forward by the United States receiving broad support included requirements for ship security plans, ship and company security officers, means of ship alerting, ship security equipment, port-of-origin container inspections, and cooperation with the World Customs Organization. Concepts proposed by the United States receiving general support but with concern expressed by some countries over various details included accelerated implementation of Automatic Identification Systems (AIS) on ships, seafarer identification verification (working with the International Labor Organization), offshore-facility security plans, and requirements for information about the actual owner of a vessel. The concept of introducing port-facility and port-vulnerability assessments requirements into SOLAS was also met with some concern. The United States' initiatives focus on the four primary elements that need to be addressed to improve MDA and maritime security: the ship, its cargo, the port facility, and people aboard the ship and ashore. Specific initiatives and actions proposed are discussed below.

Automatic Identification Systems (AIS)

MSC 73 adopted amendments to Chapter V of SOLAS to require the installation of AIS on ships. The current amendments provide a phase-in schedule for the installation of AIS

on ships that begins in 2002 and ends in 2008 based on ship type and tonnage. The United States recommended that this chapter be amended to require the installation of AIS on all ships not later than 1 July 2004.

Currently AIS operates in the VHF-FM band; thus, the range is limited to line of sight, although AIS has a built-in interface to long-range communication equipment. The United States recommended that the Subcommittee on Safety of Navigation and the Subcommittee on Radiocommunications and Search and Rescue consider means for making practical use of the long-range interface in AIS equipment, to recommend the most appropriate vehicle to accomplish this extended range, and to recommend an implementation plan.

Ship Security Plans

The United States recommended that a new regulation be added to SOLAS to require all ships of 500 gross tonnage and upwards and passenger ships irrespective of size to have approved security plans. The provisions of the security plan section of MSC Circular 443 were used as a starting point, but they were expanded to update common security protocols.

Port Facility Security Plans

The United States recommended that a new regulation be added to SOLAS to require ports involved in servicing or accepting ships on international voyages as well as offshore platforms and mobile offshore drilling units, while on location, to have approved security plans. The provisions of the port-facility plan section contained in MSC Circular 443 were updated and expanded as necessary for all types of port facilities.

Seafarer Identification Verification and Background Check

The United States recommended that a new regulation be added to SOLAS that would require the Administration to verify whether each crewmember or other persons engaged onboard a ship has been convicted of any serious crime. The United States' proposal to require background checks prior to the issuance of seafarer identity documents was met with significant concern by many of the countries participating in the ISWG. Most of the concerns were legal and constitutional, centering on human rights, privacy and data protection. The ISWG agreed that this proposal should not be taken forward.

The United States' recommendation that a new, easily verifiable method of seafarer identification be developed received broad support. Some delegations, including the United States, supported developing this requirement through SOLAS. A majority, however, felt the work should be done through the International Labor Organization (ILO), specifically through a new protocol to the ILO Seafarers' Identity Documents Convention, ILO 108. The ISWG agreed that the IMO Secretary General should write the ILO Director General requesting ILO 108 be reviewed with an eye toward adopting amendments at the ILO General Conference in June 2002. Should the ILO initiative fail, the ISWG agreed that the matter should be further considered by IMO.

Ship and Company Security Officer

The United States recommended that new regulations be added to SOLAS to require a designated security officer on all applicable ships and shore-side companies and listed the responsibilities and training requirements.

Container Examinations

The United States recommended that the MSC revisit its previous decision to not mandate inspection of freight containers, taking into account technological advances in detection equipment that may be available for shipboard and dockside container inspection, and have an in-depth discussion of the issue with the objective of establishing appropriate measures that would significantly enhance our confidence level in deterring the use of freight containers for terrorist or other illegal activities, including electronic sealing or other acceptable technology.

Port Facility Vulnerability Assessments

Port security risks, security standards and vulnerability assessments vary throughout the world. The United States recommended that a new regulation be added to SOLAS, which would require each port facility to undergo a vulnerability assessment, taking into account guidelines to be adopted by the organization.

Means of Ship Alerting

Currently, a ship being hijacked by terrorists has no simple and unobservable means for activating an alarm to notify authorities and other ships. The United States recommended that the NAV and COMSAR Subcommittees study means to provide a capability for seafarers to surreptitiously activate an alarm to notify authorities and other ships of a hijacking.

For the May 2002 MSC 75 meeting, the United States has proposed extensive security measures based on the above concepts to further develop the Security Code under SOLAS. Details on security measures for ships, port facilities, and port facility vulnerability assessments have been proposed. Discussions and proposals on the requirements governments would have to review, approve, and enforce security on their ships and within their port facilities were also included in the United States' submission. Finally, the U.S. government proposed further guidance on the development of container-security protocols, seafarer identification, and means of alerting.

An Administrative Law Judge assesses the collision of two small passenger vessels

by TIM FARLEY, U.S. Coast Guard Office of Investigations & Analysis

Small Passenger Vessel, Large Responsibility

The word "small" often denotes something insignificant, something inconsequential, something unimportant, nothing to be generally concerned about or fret over. However, operating a "small" passenger vessel entails no "small" responsibility as these types of vessels carry a most valuable and fragile cargo, human life.

As of October 2001 approximately 5,600 small passenger vessels holding a U.S. Coast Guard Certificate of Inspection were operating on the navigable waters of the United States. Only individuals who hold an appropriate U.S. Coast Guard license may operate these vessels. These small passenger vessel operators work on a wide variety of vessels of every size and configuration imaginable. They operate the vessels both night and day, day in and day out, in all types of weather and sea conditions, carrying about 200 million passengers annually. As you can imagine, the U.S. Coast Guard, as the agency charged with marine safety in the United States, takes the carriage of passengers and the operations of these types of vessels very seriously and will pursue administrative action against the U.S. Coast Guard-issued credential (license or merchant mariners document) of any individual who operates a vessel negligently, violates a law or regulation, commits misconduct, is incompetent, is convicted of a dangerous drug law, or uses or is addicted to the use of dangerous drugs.

The following case is offered as an interesting example of what can happen if you operate a small passenger vessel, or any vessel, in an unsafe and negligent manner and/or in violation of a law or regulation.

On a calm, clear evening during the late summer of 2000, two water taxis carrying a total of 140 passengers collided in Baltimore, Md.'s congested Inner Harbor waters. Although both water taxis were operating at a relatively slow speed of less than six knots, the resultant force of the collision caused a boat fender to be thrown into the air, hitting a passenger in the head and causing serious injury. Both water taxis sustained some minor damage. The investigation revealed that no passing signals were sounded, no lookout was posted, no prior passing arrangements were made, nor did the operators sound the proper danger signal when in doubt as to the other vessel's intentions. Witnesses also testified that neither operator seemed to be aware that a hazardous situation was developing as the twovessels approached and closed distance on one another. As it were, only one water taxi eventually took evasive action, although it was taken far too late to be of any value.

Both vessel operators were charged by the U.S. Coast Guard with negligence for failing to maintain a proper lookout, failing to properly evaluate the meeting situation and determine the risk of collision, and failing to avoid a head-on collision and initiate evasive maneuvers in ample time. While one of the operators chose to forgo his right to have his case heard before an Administrative Law Judge and agreed to the charges and sanction leveled against him, the other operator requested a hearing before a Judge. The results of the hearing and the opinions of the Administrative Law Judge, while not overly controversial, reiterate some important and interesting points for all mariners to be aware of.

This 26-passenger vessel ferries people between points near Baltimore's Inner Harbor; it is inspected under Subchapter T. USCG photo by Ken Olsen.

The principal points are that each individual is responsible for his or her own actions regardless of someone else's contribution to the casualty, that a violation of a navigation rule is, of itself, negligence in a suspension and revocation proceeding, and the failure to post a proper lookout is a serious offense.

Negligence is defined in 46 C.F.R.§ 5.29 as "the commission of an act which a reasonable and prudent person of the same station, under the same circumstances, would not commit, or the failure to perform an act which a reasonable and prudent person of the same station, under the same circumstances, would not fail to perform." Therefore, a mariner is negligent if he or she fails to take the precautions that a reasonably prudent mariner would take in the same circumstances, regardless of whether or not his or her conduct or failure to act caused the casualty.

During the hearing before the Administrative Law Judge in this case, the issue of shared responsibility arose. The operator asserted that both operators contributed equally to the casualty, shared equally in the blame and, because of this, any resultant sanction should be reduced or mitigated. The Judge responded that, "… contributory negligence is not a defense in these proceedings, and the possible fault or negligence of another person or vessel in no way mitigates the respondent's negligence or contribution to the collision. ... Although the causal connection is necessary to establish liability for negligence in a civil proceeding for damages, it is not an element of negligence for the purposes of a suspension and revocation action." In summary, mariners cannot shed or lessen blame for their own actions based on the excuse that someone else also should be held accountable. The fact that the two operators equally shared responsibility for causing the casualty does not serve to excuse either one in any way of their own personal negligence. Both had a responsibility to act in a responsible and prudent manner and both failed to do so. Therefore, each individual must be judged on his or her actions alone.

Another interesting point made in this case is that a violation of a navigation rule is, of itself, negligence in a suspension and revocation proceeding. Therefore, a proven breach of the Inland Navigation Rules is evidence of negligence. Each operator failed to avoid a collision with an approaching

power-driven vessel because each failed to initiate the required action for a head-to-head meeting situation. Additionally, the vessel operators failed to sound the prescribed danger signal when there was doubt as to the other vessel's intentions or actions.

With regard to the responsibility to post a lookout, the operator who went before the Judge argued that there was no evidence in the case that suggested he failed to maintain a proper lookout. He asserted that he had two mates on the vessel at the time of the casualty and that, as captain of the vessel he could not be the lookout "within the meaning of maritime law."

to it that a proper lookout is on duty, and under certain conditions, an operator of a vessel may also act as lookout. … However, the adequacy of a lookout onboard a vessel is a question of fact to be resolved under all existing facts and circumstances. … Therefore, each situation must be considered independently."

In this case, the Judge felt the evidence showed that a proper lookout was not maintained under the prevailing circumstances. The mate on the vessel operated by the respondent in this case was found to be preoccupied with collecting money from the passengers at the time of the collision.

... The U.S. Coast Guard, as the agency charged with marine safety in the United States, takes the carriage of passengers and the operations of these types of vessels very seriously and will pursue administrative action against the U.S. Coast Guard-issued credential ... of any individual who operates a vessel negligently, violates a law or regulation, commits misconduct, is incompetent, is convicted of a dangerous drug law, or uses or is addicted to the use of dangerous drugs.

The Administrative Law Judge, in response, offered the following: "The respondent is grossly mistaken in his assessment of the navigational rule requiring that a proper lookout be maintained. The applicable statute, Rule 5 of the Inland Navigation Rules, 33 U.S.C. § 2005, provides:

> *"Every vessel underway must at all times maintain a proper lookout by sight and hearing as well as prevailing circumstances and conditions so as to make a full appraisal of the situation and of the risk of collision."*

Further, the Judge pointed out Congress's intent regarding lookouts found in Senate Report 96-979. It reads:

> *"On vessels where there is an unobstructed all-round view provided at the steering station, as on certain pleasure craft, fishing boats, and towing vessels, or where there is no impairment of night vision or other impediment to keeping a proper lookout, the watch officer or helmsman may safely serve as the lookout. However, it is expected that this practice will only be followed after the situation has been carefully assessed on each occasion, and it has been clearly established that it is prudent to do so. Full account shall be taken of all relevant factors, including but not limited to the state of the weather, conditions of visibility, traffic density, and proximity of navigational hazards. It is not the intent of these rules to require additional personnel forward, if none is required to enhance safety. See S. Rep. No. 979, 96th Cong., 2d Sess. 7-8 (1980).*

The Administrative Law Judge further explained that "it is well-established law that the term maintain means to see

Further, no evidence indicated that the function of "lookout" was assigned as a duty for any crewmember. It was determined that the Captain was responsible both for navigating the vessel and maintaining a proper lookout. The Judge concluded that no proper lookout was maintained due to the fact that the Captain failed to see the other oncoming water taxi given the prevailing unlimited visibility and the fact that others onboard the vessel could clearly see the approaching water taxi.

The Administrative Law Judge further explained that, "when a mariner fails to see a vessel, which proper watchfulness would have disclosed, the unexplained fact that the vessel was not conspicuously seen is conclusive evidence of a defective lookout. ... Since no reason is given why the approaching vessel was not noticed in time to avoid the collision, the Captain's inability to see 'the other water taxi' is inexplicable, except upon the theory that no sufficient lookout was maintained. … Thus, 'the respondent' is found to have violated 33 U.S.C. § 2005 (Rule 5 of the Inland Navigation Rule) by failing to maintain a proper lookout and the first offense under the charge of negligence is found proved by a preponderance of the reliable and credible evidence."

The U.S. Coast Guard licenses of both operators involved in this collision were suspended for two months. So, the lessons we can learn from this case include: (1) we are all fully responsible for our own, individual actions; (2) we must always maintain a proper lookout; (3) we must always be vigilant in determining the risk of collision, especially in a crowded waterway; (4) action to avoid a collision should always be positive and done in ample time; and, (5) if in doubt as to the actions of another vessel, always sound the prescribed danger signal. The responsibility of safely operating a vessel, whatever the size, is no small task!

OTHER RECENT ADMINISTRATIVE CASES OF NOTE INVOLVING SMALL PASSENGER VESSEL OPERATORS

Summary of Offense	Sanction
Following a grounding incident, the operator of the vessel involved knowingly made a false statement to law enforcement officers.	License was suspended for four months.
Operator of a sailing passenger vessel failed to make proper allowances for the effects of weather and sailing conditions that contributed to the vessel's capsizing.	Operator was officially admonished with a Coast Guard Letter of Warning
Operator of a vessel overloaded it by three passengers. Also, operator allowed 20 children onboard when the vessel was only equipped with four child-sized personal flotation devices.	License was suspended for three months with an additional 12 months of probation.
The operator of a dive vessel failed to properly account for all of his passengers and subsequently abandoned two divers at the dive site, approximately five miles offshore. The divers were stranded for about 24 hours before being rescued.	License was suspended for one year with an additional 24-month probationary period.
A passenger fell overboard and passed through the props, resulting in his death. The operator had witnessed the passenger sitting in a dangerous unprotected location for 15-20 minutes prior to the incident, but failed to direct him to move.	License was suspended for 12 months with an additional 12 months of probation.
While blindly operating a vessel during a squall with reduced visibility, a vessel ran over and was impaled on a day marker.	License was suspended for 12 months.
A dive boat operator failed to make proper allowances for the effects of the seas and weather causing his vessel to founder in heavy weather conditions. He also failed to account for the reduced operational capability of his vessel after one of the two outboard engines became inoperable, choosing to continue on a voyage with passengers onboard and only 1/2 of the vessel's propulsion. Post casualty chemical test was also found positive for drug use.	License was revoked.
Vessel master allowed a known mariner with a currently suspended license, for drug use, to operate his vessel. He additionally failed to ensure a safety briefing was provided to the vessel's crew.	License was suspended for four months.
While operating a parasail boat at a high rate of speed, with a customer aloft, and looking at the customer aloft instead of maintaining a proper lookout on his boat, the operator ran over a line between a recreational vessel and a child on a "tube," injuring a line-handling passenger on the recreational vessel, and narrowly missed the other boat by only a few feet. He subsequently left the scene of this accident, went to shore, unloaded his customers, thereby concealing them from the Coast Guard, and only then returned to the scene.	License and Merchant Mariner's Document were suspended for six months with an additional one year of probation. Three months of the suspension were reduced for completing a Rules of the Road course and two months of the suspension were reduced provided the operator agreed not to operate a parasail vessel for a two-year period.

The following four articles contain statistics on small passenger vessel fatalities, multiple fatalities, injuries and vessel fires since 1992.

For more information on the process the Coast Guard used to develop the control charts, contact Cmdr. Lyle Rice, (202) 267-1420, or ***Lrice@comdt.uscg.mil****.*

The information was obtained from the U.S. Coast Guard's Marine Safety Management System (MSMS), which uses the Marine Safety Information System (MSIS) as its source. MSIS has been the Coast Guard's marine casualty data system since January 1992. The MSMS database is updated quarterly. To extract data from the MSMS database for the following four articles, the Coast Guard used a set of common criteria, including:

- The service of the vessel at the time of the casualty was recorded as "PASSENGER;"
- The vessel had a Coast Guard Certificate of Inspection and was less than 100 gross tons in size; and
- Only U.S. flagged vessels were included.

Each article also contains a control chart, which is used to determine normal variation in the data. A process control chart is a way to examine trends over a period of time, such as the annual number of passenger fatalities for a 10-year period. Upper and lower control limits are added to the chart, to show the "normal" variation (statistically, plus or minus two standard deviations from the average) from year to year. Values that cross above or below the limits are considered "out of control," meaning they are very unusual and bear further investigation. When a change in a safety program or initiative is implemented, the revised statistical average, and the subsequent control limits, would give an indication of the success or failure of the program or initiative.

The methodology used here is contained in "Understanding Variation: The Key to Managing Chaos" by Donald J. Wheeler. Mr. Wheeler's methodology for developing process control charts is summarized as follows:

- Use the average of the individual observations (X) for the central line.
- Calculate the average moving range, (mR). This is done by finding the difference in the individual observations, the moving ranges, then averaging the moving ranges.
- Calculate the upper control limit (UCL).:

  UCL = X + (2.66 x mR).
- Calculate the lower control limit (LCL).:

  LCL = X - (2.66 x mR).
- Display the individual values, the central line, the UCL, and the LCL on a line chart.

A Review of Small Passenger Vessel Fatalities from Jan. 1, 1992 to Sept. 30, 2000

by DAVID H. DICKEY, U.S. Coast Guard Compliance Analysis Division

Vessel-related fatalities on small passenger vessels are rare. Only 46 of the 246 passenger deaths reported to the Coast Guard between 1992 and Sept. 30, 2000 involved vessels or vessel systems regulated by the Coast Guard. The other 200 fatalities were attributed to non-vessel factors, including diving/swimming accidents (116), natural causes (75), and several miscellaneous causes (9).

These findings were part of the Coast Guard's recent review of passenger fatalities on commercial vessels under 100 registered gross tons and certificated by the USCG for carrying passengers. The Coast Guard performed this review to:

- determine if, over time, there have been any significant changes in accident trends or causes, which might signal the need for changes in safety policies or procedures; and
- identify lessons learned that might be applied to accident prevention activities by the Coast Guard and the marine industry.

This article summarizes the passenger fatalities on small passenger vessels from 1992 to Sept. 30, 2000 and identifies the most significant factors involved in these casualties.

What Passenger Fatalities Are Reported to the Coast Guard?

The Coast Guard's role in investigating accident on commercial vessels is contained in Title 46 of the Code of Federal Regulations, Part 4 (46 CFR 4). The criteria for reporting casualties is explained in 46 CFR, paragraph 4.05-1, which requires, in part, that all deaths on commercial vessels be reported to the Coast Guard at the earliest opportunity. These reports are simply the first step in a process in which the Coast Guard investigates maritime casualties, primarily to determine their cause. This article will show that some passenger fatalities are the result of factors that are not related to the vessel or its operation, such as swimming accidents or deaths from natural causes (e.g., heart attack or stroke).

OPPOSITE PAGE: USCG photo of survivor in raft with lit flare.

About the Data Source

The data for this review was extracted from the Marine Safety Management System (MSMS). At the time this article was developed, the MSMS database contained marine casualty data from Jan. 1, 1992 through Sept. 30, 2000.

To identify the population of small passenger vessel fatalities, the Coast Guard used the criteria identified on page 14 to extract data from the MSMS system as well as the following:

- At least one passenger was listed as dead or missing;
- Vessels classified as "cruise ship" were excluded; and
- The report of investigation has been completed and closed by the investigating unit.

Review of the Data

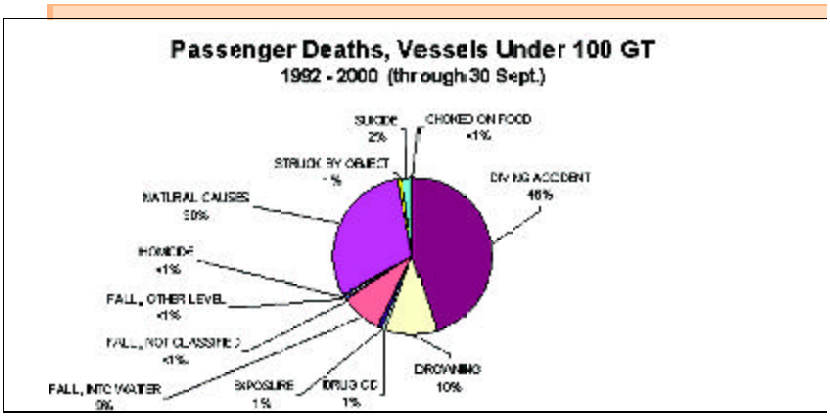
A large percentage of the data fields in the Marine Investigation section of MSIS are optional. In fact, Investigating Officers have the discretion to provide data on only those factors they feel are relevant, depending upon the nature of the incident. Thus, it was necessary to review each case that was extracted from MSIS in order to verify the accuracy and completeness of the items needed for this article. In particular, the investigator's narrative comments often provided the specifics for missing or incomplete data items, including:

- Crewmembers misclassified as passengers;
- Passengers that did not die from their injuries;
- Fatalities that did not involve a vessel;
- Missing records for passenger fatalities; and
- Missing, nonspecific, or misclassified descriptions

of the fatality. For example, a number of fatalities were simply listed as "Not Elsewhere Classified."

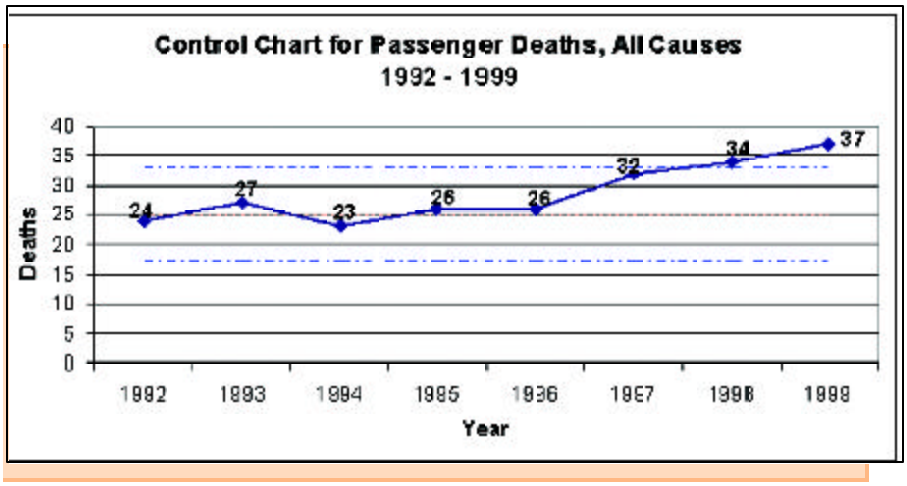
Summary Information

Passenger deaths totaling 246 were identified during the period between Jan. 1, 1992 and Sept. 30, 2000. The fatalities occurred in 226 separate incidents, with only eight of the incidents resulting in multiple fatalities (see related story, page 19).



Trends in Passenger Deaths

The chart below shows the overall trend in the 246 passenger deaths that meet the reporting criteria in 46 CFR 4.05, from 1992 to 1999. We use the control chart to examine trends across different points in time. We have included upper and lower control limits on the chart, based on historical values, to show the normal range of variation. The control limits for this chart are based on the 1992 – 1996 values. This chart shows an upward trend in passenger deaths, starting in 1997, which exceeded the upper limit in 1998, suggesting the trend is "out of control." In other words, this trend indicates a statistically significant change in the death rate that cannot be explained by normal variation. Further examination of the fatality data is needed to explain this change.



Deaths by Accident Type

One item reported by Coast Guard investigators describes the nature or type of accident that resulted in a passenger death. This information may be useful in explaining the increase in fatalities in recent years. The accident types are summarized in the graph in the opposite column.

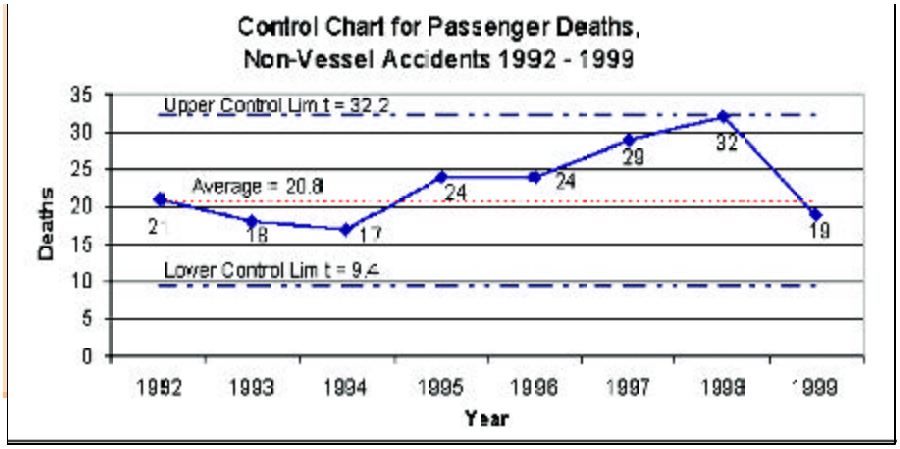
The graph indicates that a large portion of the passenger deaths resulted from causes not directly related to the vessel. For example, deaths from natural causes include heart attacks and strokes, which could have occurred at any time or place. Similarly, diving deaths typically result from errors made by the diver, such as ascending too quickly, entanglement in kelp, getting lost in a wreck, and diving equipment failures. Also, the investigations revealed that many of the diver deaths were linked to pre-existing medical conditions. Finally, an examination of the 25 reported drowning deaths showed that six of the deaths occurred while the passengers engaged in swimming or snorkeling. In fact, 75.2 percent of all passenger fatalities resulted from diving accidents and natural causes. Collectively, all non-vessel accident types account for 81.3 percent, or 200 of the 246 passenger deaths, summarized as follows:

Accident Type	Fatalities
Diving accidents	110
Natural causes	75
Swimming/Snorkeling	6
Suicide	5
Drug overdose	2
Homicide	1
Choked on food	1

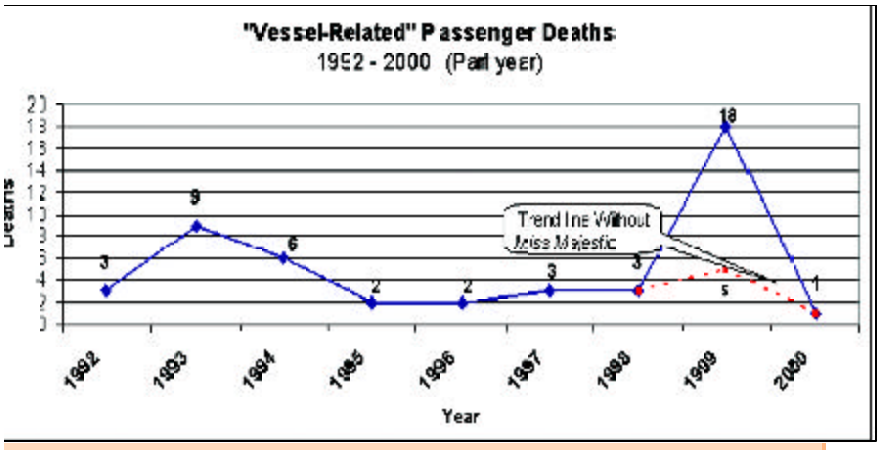
Since the non-vessel accident types represent a very large percentage of the passenger fatalities, a control chart of those cases is shown at the top of page17. The recent upward trend previously noted for all passenger fatalities is apparent for 1997 and 1998, which approached the upper control limit. However, the 1999 fatalities are slightly less than the average value. Thus, some other factor has contributed to the abnormally high value for 1999. A review of the other 46 vessel-related cases may explain the 1999 figure.

Vessel-Related Fatalities

Vessel-related fatalities are the most likely to concern vessel operators and Coast Guard Marine Safety officials. Without the non-vessel cases described above, 46 passenger fatalities



remain from the original data set. The graph below shows a trend line for these vessel-related cases. Except for 1999, the death rate from 1995 to present is quite low, between two and four per year. The 1999 spike is the result of a single casualty—the sinking of the tour boat *Miss Majestic* on Lake Hamilton, Ark. Statistically, the *Miss Majestic* casualty might be considered an "outlier"—a single, very rare or unusual occurrence, which does not fit the overall trend. Without the *Miss Majestic* casualty, the trend line would remain relatively flat, as shown by the dashed line. As noted earlier, the value for the year 2000 represents only part of the year and should be considered preliminary.



The subset of 46 vessel-related fatalities occurred in 29 incidents, which is approximately five deaths or three separate incidents per year. When other factors are considered, such as the specific industry segment of the involved vessels (e.g., party fishing, excursion, diving, etc.), or the nature of the fatality, these cases may be truly rare occurrences. However, as a group, the data may reveal some general themes or patterns.

Vessel-Related Deaths, by Accident Type

A summary of vessel-related fatalities is shown at right. The graph shows that most of the deaths, 40 of 46, or 86.9 percent, resulted from just two accident types, drowning and falls into the water. The figure includes five incidents, which resulted in 19 drowning deaths. The remaining cases include 19 incidents, which resulted in 21 deaths for falls into the water. Given that these deaths occurred during a period of almost nine years, statistical analysis is not practical. Instead, each case was synopsized on the following pages to determine if there are any common factors, areas of concern or lessons learned.

Drowning Deaths

As noted above, five incidents resulted in 19 drowning deaths. The cases are summarized as follows:

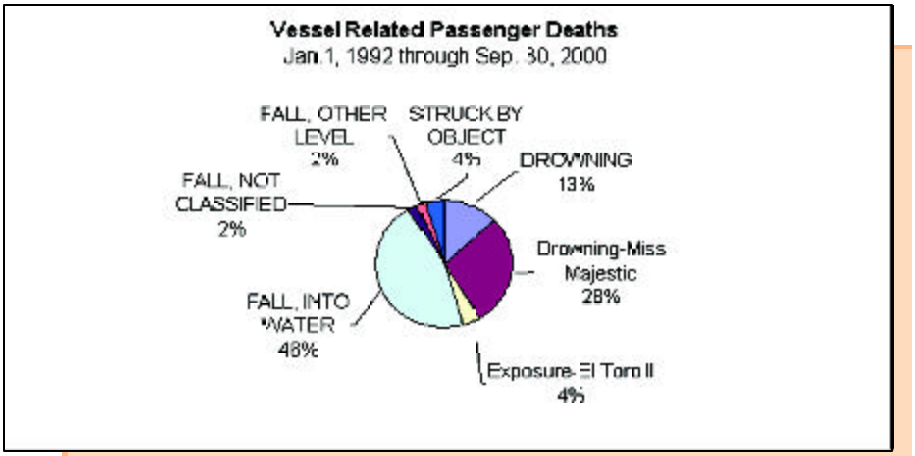
The sinking of the *Miss Majestic*
This incident, which caused 13 fatalities, was the subject of an extensive Marine Board of Investigation, which can be viewed online at: **www.uscg.mil/hq/g-m/moa/sinkings.htm**;

- *Ferry Accidents Involving Vehicles* It was discovered that, in each of the four other incidents, a vehicle was lost from the deck of a ferry, with a total of six fatalities;

  - Two of the incidents were caused solely by errors made by the vehicle operators. In one case the operator was intoxicated. Each case resulted in two fatalities.

  - In another case, a ferry barge capsized and dumped a vehicle into the Missouri River, with one fatality.

  - The most recent case, which occurred on Nov. 11, 1999, was caused by an inexperienced deckhand, who removed a safety barrier and vehicle wheel chocks prematurely. A passenger car rolled into the water as the ferry approached the dock, resulting in one fatality.



At first, the ferry casualties might appear as an area of concern. However, the incidents occurred during a period of 7.5 years. In fact, three of the four cases occurred in 1994 and earlier. Intuitively, one knows that the potential for similar casualties exists, given the number of ferries in service, their size, and the number of vehicles carried. However, the data does not suggest anything other than random occurrences.

The most recent incident would be useful as a lessons-learned case study, because the Coast Guard Investigating Officer noted a number of procedural errors made by a deckhand, which were attributed to lack of experience. The case report also includes an examination of personnel training, emergency procedures and company policy issues that may have contributed to the casualty.

Falls Into Water

Overall, this accident type included 19 incidents, with 21 fatalities. These deaths resulted from a variety of causes, with no apparent pattern or trend. The deaths are summarized in the following table.

Description of Incident	Total fatalities
Capsizing of the *Rain Song* while crossing a hazardous bar	3
Stepped through a door and fell overboard	1
Fell from launch during transfer to another vessel	2
Disappeared while underway, cause unknown	4 * *
Fell over rail/side	2 *
Fell through opening in rail	2 *
Fell from unsafe/unauthorized location	2 *
Fell while jumping from lock wall to vessel	1
Jumped overboard – possible suicide	1
Gangway collapsed, passenger hit head & fell into water	1
Disappeared – foul play possible	2

With the exception of the *Rain Song* capsizing, there was only one death per incident. Also, investigations noted that alcohol consumed by the deceased passenger was a contributing factor in five of the fatalities, as indicated by the number of asterisks (*) adjacent to the number of fatalities in the table.

Data Interpretation/Conclusions

In this review, the Coast Guard searched for the most important factors involved in passenger deaths. The Coast Guard finds and concludes as follows:

- Very few incidents have resulted in more than one fatality (eight of 227), indicating that serious cases have been rare;
- Only five of the 29 vessel-related incidents resulted in more than one fatality;
- When grouped by accident type, we learned that most fatalities, 200 of 246, or 81.3 percent, are from causes not related to the vessel;
- Nearly all non-vessel fatalities are attributed to either diving accidents, swimming, snorkeling or natural causes (191 of 200);
- Fatality Trends – By using a control chart, we observed a significant increase in reported passenger deaths beginning in 1997. We later found that most of the increase was from two factors:
  (1) An increase in non-vessel (i.e., diving and natural cause) deaths in 1997 and 1998, and;
  (2) The *Miss Majestic* sinking in 1999.
- Overall, vessel-related fatalities are statistically insignificant occurrences. In other words, the deaths are few in number with very low frequency (approximately six per year), and are spread across a variety of causes. When grouped by accident type, we found no trends or patterns.
- A single event, such as the *Miss Majestic* sinking, can be statistically significant, in part because of the historically low fatality rates.

Options for Future Analysis

Other casualty types: This article focused on a specific type of casualty — passenger fatalities. It is possible that we may gain additional insight by studying other incidents, including passenger injuries and vessel casualties, such as groundings, collisions and fires. In fact, such incidents, which often accompany or precede fatalities, may help assess the potential for future fatalities. For example, a shipboard fire that was quickly extinguished could have easily resulted in fatalities, if a key firefighting system failed. What are the trends in non-fatal incidents? How many people were at risk

during those incidents?

Exposure data: As of Sept. 30, 2000, the Coast Guard database showed a population of 5,619 inspected passenger vessels under 100 gross tons. Those vessels had a combined capacity of 439,769 persons. However, the population figures do not account for seasonal variation, actual vessel operations while carrying passengers or other factors. It could be useful to know how passenger fatalities compare to the overall risk or exposure, such as the number of trips or the number of passenger-hours per year. This type of exposure information, sometimes known as "denominator data," would provide a common frame of reference. This would allow comparison of passenger fatalities to other transportation modes, such as aviation or automobiles. For example, deaths from airline accidents are often shown as deaths per 100,000 flight hours or deaths per 100,000 departures.

Unfortunately, the type of exposure data described above is not readily available and would, very likely, require new reporting requirements for vessel operators or extensive research. While the Coast Guard recognizes there may be benefits from having good exposure data, it could take a significant amount of time to get a mechanism in place to collect the data. The Coast Guard would have to establish a new data collection requirement and a formal change in regulations.

A Report of Multiple Deaths on Passenger Vessels Under 100 Gross Tons from Jan. 1, 1992 to June 30, 2001

by Lt. Cmdr. MARY KATE JAGER, U.S. Coast Guard Compliance Analysis Division

The leading contributors to multiple deaths involving passenger vessels are people entering the water without adequate flotation equipment and a lack of safety focus of vessel owners/operators. This was the principal conclusion of a Coast Guard study of incidents involving passenger vessels that led to the death of more than one person between Jan. 1, 1992 and June 30, 2001. This article is extracted from that study, which was performed by the Coast Guard's Compliance Analysis Division.

The purpose of the report was to study incidents involving multiple loss of life on small passenger vessels, to identify commonalities in processes, and to suggest areas of concern for future action, all in the context of the Coast Guard's goal of reducing the number of lives lost on passenger vessels.

Data

The data used for this study was extracted from the Coast Guard's Marine Safety Management System (MSMS). The analysts wrote a query to identify all reportable marine casualty cases as defined by 46 CFR 4.05 that included a death and involved a Coast Guard inspected small passenger vessel as defined by 46 CFR Subchapter T Part 175. The data population was refined to only include incidents involving more than one death or missing person.

From 1992 through mid-year 2001, eight reportable casualties involving the death of more than one person were reported. The file for each of these cases was read and information about possible causal elements was entered into a matrix,

displayed below. Two cases were determined to not involve vessel operations and were not considered in the development of conclusions. These involved driver error during loading of ferries. In one case the driver and his passenger were intoxicated and chose to use the ferry as a launch ramp in an unsuccessful attempt to reach the other side. The other case involved an individual who was learning to drive a truck. He apparently couldn't locate the brake and drove off of the ferry at a high rate of speed.

Refinement of the study data yielded six cases that met the study criteria. This is a very small population from which to draw conclusions. To expand the population, cases occurring during the period 1982–1991 were also examined, which increased the study population to 12 cases. Those cases are summarized in the Appendix at the end of this article.

Analysis

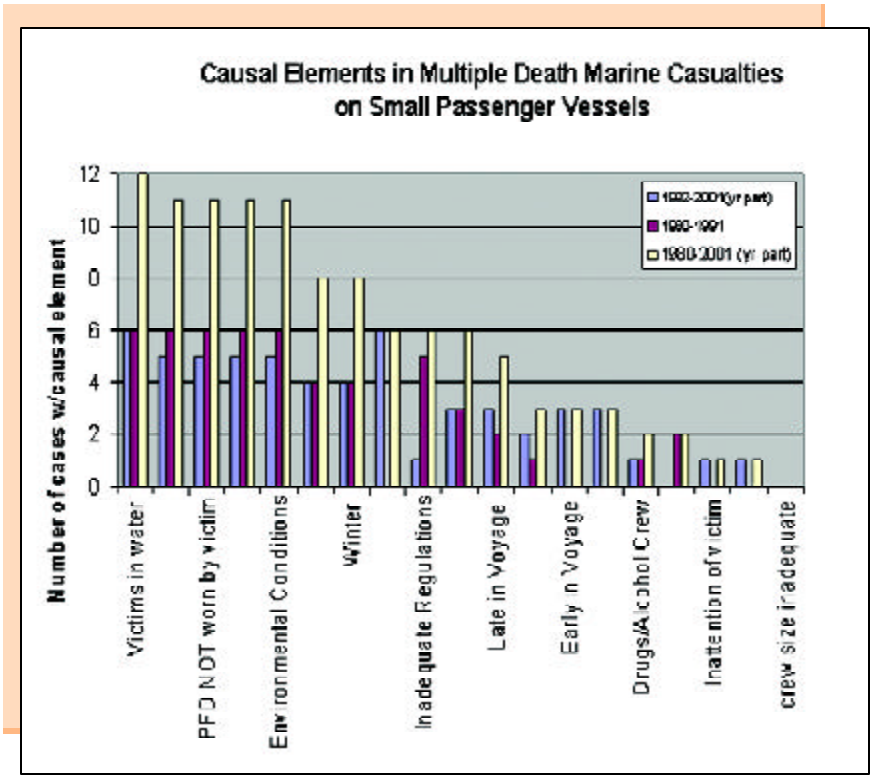
An eight-step process was followed to draw conclusions from the data population. The analysis included hypothesis generation through brainstorming, gathering and listing of data, data analysis methodologies, evaluating data and hypotheses, drawing tentative conclusions, identifying biases, conclusions and identifying conditions that would change the conclusions.

The chart immediately right displays the hypotheses the Coast Guard generated and the frequency of the occurrences. The hypotheses were generated in response to the question, "What are possible causal factors in marine casualties on small passenger vessels that could lead to one or more deaths?"

Tentative conclusions: The data indicates that keeping people out of the water will save lives. Second to providing out-of-water havens, the owners and operators must understand that they are responsible for safe operations, including seriously planning for catastrophe mitigation.

Biases of data or hypotheses: Prevention Through People and human factors awareness became policy for CG investigators and inspectors in the mid- to late 1990s. Safety awareness increased in both the industry and CG with the implementation of the International Safety Management Code

Vessel(s)	Incident Date	Death(s)	Missing	Events	Cause
Virginia C Ferry	April 20, 1992	2 passengers	None	Vehicle drove on to ferry at high rate of speed, broke through safety net, entered water and sank.	Drunk driver misjudged car's ability to jump river from ferry.
Canton Ferry	Dec. 5, 1993	1 passenger; 1 crewmember	None	Barge ferry took on water; vehicles shifted on ferry crushing crewman; ferry capsized.	Ferry was severely overloaded carrying twice as much weight as recommended.-+
Rain Song	April 15, 1993	1 passenger	2 passengers	Swamped by large wave while crossing the bar, vessel capsized.	Crossing the bar during strong ebb tide, vessel unexpectedly was caught by 15-20 ft wave.
Daniel Metheny Ferry	Sept. 17, 1993	2 passengers	None	Vehicle drove on to ferry at high rate of speed, broke through safety net, entered water and sank.	Inexperienced driver drove onto the ferry too fast and didn't stop.
El Torro II	Dec. 5, 1993	3 passengers	None	Flooding, vessel abandoned and sank	Wood hull failure caused flooding; passengers and crew entered cold water.
Jack London Commodore	Feb. 15, 1997	1 passenger; 1 security personnel	None	Passenger jumped overboard followed by security guard; both drowned.	Drugs & alcohol were found in both victims, lack of judgment due to impairment.
Geerd Tide/ Mallard	Jan. 14, 1998	5 passengers; 1 guide	None	*Mallard* crossed channel in front of OSV *Geerd Tide* and caused collision; *Mallard* sank.	Situational awareness on both vessels was a factor.
Miss Majestic	May 1, 1999	13 passengers	None	Vessel flooded and sank rapidly; passengers were trapped under canopy.	Boat seal failed, bilge alarm failed to sound.



Causal Elements	Number of Occurrences In New Study (x/6)	Number of Occurrences In Earlier Year (x/6)	Number of Occurrences in Both Studies (x/12)
Total # cases	29	37	66
Total # cases w/ drowning	26	34	60
Total # people in water	71	85	156
Total # passengers aboard	510	99	609
Victims in water	6	6	12
Victims drowned	5	6	11
PFD not worn by victim	5	6	11
Operator lacking safety focus	5	6	11
Environmental conditions	5	6	11
Negligent Operations	4	4	8
Winter	4	4	8
Trapped in Cabin	5	0	5
Inadequate Regulations	1	5	6
Vessel Sinking	3	3	6
Late in Voyage	3	2	5
Drug/alcohol victim	2	1	3
Early in voyage	3	0	3
Spring	3	0	3
Drug/alcohol crew	1	1	2
Autumn	0	2	2
Inattention of victim	1	0	1
Summer	1	0	1
Crew size inadequate	0	0	0

and International Convention on the Standards of Training, Certification and Watchkeeping for Seafarers for international voyages. Domestic safety programs similar to these are developing within the membership of industry groups such as the Passenger Vessel Association.

Conclusions

As previously stated, the purpose of the report was to study incidents involving multiple loss of life on small passenger vessels, to identify commonalities in processes, and to suggest areas of concern for future action, all in the context of the Coast Guard's goal of reducing the number of lives lost on passenger vessels. The commonalities revealed through inspection of the statistical data are that people entering the water (especially cold water) without adequate (out of water and easy to use) flotation equipment are the most significant direct contributors to multiple deaths involving small passenger vessels. As significant a contributing factor, but less direct is the lack of safety focus of the owner/operator. This was expressed in a number of ways and generally led the investigator to conclude that negligent operations contributed to the deaths.

Not as obvious from the data but worthy of further evaluation is the contribution of crew experience and training. In the cases studied for this report, two deaths were attributed by the investigator to poor crew training (M/V *Jack London Commodore*) and perhaps as many as 12 lives were saved by the experience and training of a fellow passenger (M/V *Rain Song*). Crew training in at least two other cases may have saved 19 lives (M/V *Miss Majestic* & M/V *Geerd Tide*). Perhaps six lives would have been saved if the owners and operators of the M/V *Mallard* had followed the federal safety regulations for small passenger vessels and had been operating with a licensed Master who was familiar with the "Rules of the Road." In two cases, which resulted in 16 deaths, the vessel owners repeatedly asked for waivers, or showed lack of basic knowledge, of regulated safety measures. In hindsight, if the Coast Guard inspectors recognized this as a pattern, which seemingly shows lack of safety focus, they would have been less likely to consider the waivers or would have looked more closely at the operation of the vessels.

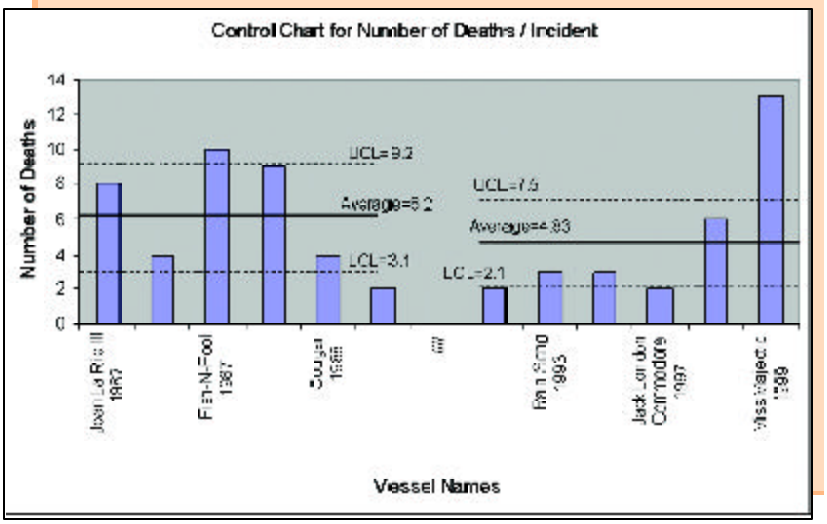
Things that would change these conclusions: Better information on why operators made the decisions they did; the causal chain developed by the investigators is based mainly on the sequence of events leading to the casualty. An investigator rarely asked, "Why?" in the 12 cases reviewed. Perhaps with the answers to multiple "why" questions safety focus suppositions would become safety process improvement recommendations.

Comments

Although not part of the stated purpose of this study, control charting of the deaths during the two periods points to change, a lowering, of control limits during the second period. This change may indicate process improvements that may be due to changes made to the regulations during the later period. The Coast Guard published a Notice of Proposed Rulemaking (NPRM) in 1989 to address many of the issues raised by the

investigators of the early study. The final rule was published in 1996. The period of the two studies corresponds to the periods before and after the 1989 NPRM.

The results of control chart calculations based on attribute-data with variable sample size for the two periods show a change in control limits. This indicates a process change, which in this case resulted in lower limits, and may signify success in lowering risk of death on small passenger vessels. The average number of deaths (in multiple death cases) during the period 1982 – 1991 was 6.2, with control limits of (9.2, 3.1). For the period 1992 – 2001 the average was 4.83, with control limits of (7.5, 2.1). This indicates a shift towards fewer deaths.



Another interesting observation between the periods is that investigators cited negligent operations in four of six cases during each period, but cited inadequate regulations in five out of six cases in the early period and only one out of six in the later period, pointing to the success of the regulations published during the later period.

APPENDIX

Multiple Passenger Deaths on Vessels Under 100 Gross Tons between Jan. 1, 1982 to Dec. 31, 1991

The following pages contain case summaries on multiple passenger deaths on vessels under 100 gross tons from Jan. 1, 1982 – Dec. 31, 1991

Vessel(s)	Incident Date	Deaths	Missing	Events	Causes
Joan La Rie III	Oct. 24, 1982	4 passengers, 2 crewmembers	2 passengers	Struck by wave, capsized, and sank.	Loss of stability from cockpit flooding.
Marie Elise/ Miss Bridget	Jan. 31, 1983	4 passengers	None	*Marie Elise* struck the port side of *Miss Bridget* and came to rest on that vessel's cabin	*Marie Elise* was being operated at an unsafe speed and without a license; both vessels failed to sound fog horns.
Merry Jane	Feb. 8, 1986	8 passengers	1 passenger	Broached by large wave, 19 passengers were knocked or fell into water.	Failure to accurately fix vessel's position; failure to monitor vessel's position relative to wave action.
Fish N Fool	Feb. 2, 1987	2 passengers	6 passengers, 2 crew-members	Broached by large breaking swell in vicinity of charted obstruction, most passengers and crew were knocked into water and drowned.	Operator positioned vessel too close to charted hazard for fishing operations.
Cougar	Sep. 15, 1988	2 passengers, 2 crewmembers	None	After flooding from an unknown source, the vessel was abandoned, then sank.	Unknown. Apparent cause: leaking through propeller shaft packing, not controlled by pumps.
Bronx Queen	Dec. 2, 1989	2 passengers	None	"Thump" was heard while underway; rapid flooding; vessel was abandoned, then sank.	Structural failure of hull in lazarette, most probably from a sprung plank.

Capsizing of the M/V *Joan La Rie III*

The charter fishing vessel *Joan La Rie III* capsized at about 11 a.m., Eastern Daylight Time, on Oct. 24, 1982 in the Atlantic Ocean, approximately nine miles east of Manasquan Inlet, NJ. The vessel floated for approximately 45 minutes before she sank to the bottom in 80 feet of water. Of the two crewmen and 20 passengers onboard, both crewmen and four passengers drowned. Two passengers are missing and presumed dead.

Investigators concluded that the most probable cause of the casualty was the loss of positive stability as a result of cockpit flooding, caused by a large wave breaking over the starboard quarter of the vessel.

Other factors:

- Personal flotation devices were not worn by anyone onboard.
- No safety orientation was performed before the trip.
- The vessel did not have 100 percent primary life-saving equipment onboard.
- Rescuers had no way to determine how many persons were on the vessel.
- A buoyant apparatus and lifefloat aboard the vessel were lashed together and to the vessel.

Mitigating factors included:

- A passing merchant vessel, the M/V *Itape*, which was approximately 10 miles away, observed the casualty and reported it to the Coast Guard. The *Itape* immediately changed course to assist and, upon arrival, launched a boat and began recovering persons from the water.

Agency actions:
In response to the conclusions and recommendations of the investigators, the Coast Guard's Marine Safety program initiated a project to change the small passenger regulations, as follows:

- To require 100 percent primary lifesaving equipment on vessels operating in coastal waters.
- To require a safety orientation prior to every trip. Such announcements were optional when safety placards were posted on the vessel.
- To require class "C" emergency position indicating radio beacons (EPIRB), which operate on a marine very high frequency (VHF), on all vessels operating in coastal waters.
- To require vessel operators to have passenger lists or counts.

Collision of M/V *Marie Elise* and M/V *Miss Bridget*

On Jan. 31, 1983 the inspected passenger vessel *Marie Elise* departed a Chevron Oil dock in Venice, La. bound for a tank battery along the southwest pass of the Mississippi River, which was approximately 20 miles away. The vessel's operator relied on his radar and marine VHF radio to navigate, because of dense fog along the route. Approximately 10 minutes into the trip, the *Marie Elise* collided with the inspected passenger vessel *Miss Bridget*, striking her on the port side. Subsequently, the *Marie Elise* passed over the *Miss Bridget*, knocking off the pilothouse and cabin top, coming to rest on top of the cabin area. Four passengers on the *Miss Bridget* died.

The investigating officer concluded that the proximate cause of the casualty was the failure of the operator of the *Marie Elise* to operate his vessel at a safe speed in an area of restricted visibility.

Other factors:

- Both vessels failed to sound fog signals.
- The operator of the *Marie Elise* did not have a Coast Guard license, as required by the vessel's Certificate of Inspection.

Separate civil penalty and license, suspension and revocation actions were pursued as a result of the investigation.

Broaching of M/V *Merry Jane*

At approximately 4:11 p.m. Pacific Coast Time on Feb. 8, 1986, the *Merry Jane*, broached while approaching Bodega Bay. The vessel was returning from a day of fishing at the Cordell Bank area with 48 passengers, two crewmembers and one operator onboard. As the vessel was approaching the passage between Bodega Head and Bodega Rock the vessel was broached and heeled sharply to starboard. Nineteen persons were thrown or fell from the vessel. A "mayday" call was broadcast and responded to by two boats from Coast Guard Station Bodega Bay, two charter-fishing boats from Bodega Harbor and several smaller crafts. Ten survivors were rescued, five bodies were recovered and four persons were listed as missing. Three bodies were later recovered 10 and 15 days later. One person is still missing. The Marine Board's investigation report can be viewed at **www.uscg.mil/hq/g-m/moa/reportindexcas.htm**.

Investigators concluded that the cause of the casualty was the vessel operator's failure to accurately ascertain the vessel's position during approach to the channel. This resulted in the vessel being positioned outside the area of calmest water, commonly referred to as the "slot." This in turn allowed a surf-generated wave to broach the vessel.

Other contributing factors included:

- Failure of the operator to monitor the position of his vessel, relative to the incoming waves.
- The search and rescue operation was hampered by the lack of an accurate passenger list for the vessel.
- Fishing poles along the rail impeded the launching of the vessel's buoyant apparatus and the throwing of life rings and personal flotation devices.

The severity of the casualty was mitigated by the quick response of two nearby vessels, the *Sea Dog III* and the *Crystal C*.

Agency action:
In response to the conclusions and recommendations of the investigators, the Coast Guard's Marine Safety program initiated a project to change the small passenger regulations, as follows:

- To require a safety orientation prior to every trip. Such announcements were optional when safety placards were posted on the vessel.
- To require vessel operators to have passenger lists or counts.
- To minimize the height of structures around primary lifesaving equipment.

In addition, the Marine Safety program sent copies of the Marine Board's report to representatives of the charter fishing industry and to Coast Guard Marine Safety Offices, in order to raise awareness about the obstructions from fishing poles mounted to handrails.

Capsizing of the M/V *Fish N Fool*

The small passenger vessel *Fish N Fool* capsized at approximately 1 p.m. Pacific Standard Time on Feb. 5, 1987 in Mexican territorial waters of the Pacific Ocean. The stricken vessel subsequently drifted for at least eight hours before sinking in 180 feet of water. Of the three crewmembers and nine passengers onboard, two survived, two drowned and eight are missing and presumed dead.

Investigators concluded that the proximate cause of the casualty was the operator's positioning of the vessel too close to a charted hazard in order to engage in fishing operations. This action placed the vessel in such a position that a breaking swell struck the vessel nearly broadside, capsizing it. The report of this casualty is available at **www.uscg.mil/hq/g-m/moa/reportindexcas.htm**.

Other factors:

- After the vessel capsized, all but two of the persons in the water attempted to swim approximately 2.6 miles to a nearby island. Of those, only one survived. Investigators concluded that the chances of survival would have been higher if those persons had remained with the vessel.
- The remote location of the casualty, approximately 150 miles from the nearest CG Search and Rescue facility, hampered a timely response.
- CG search and rescue (SAR) controllers experienced difficulty in establishing communication with Mexican SAR authorities. Thus, the entire SAR operation was conducted with USCG resources.
- The search and rescue operation was hampered by the lack of an accurate passenger list for the vessel.
- The vessel's EPIRB deployed and began transmitting approximately one hour after the *Fish N Fool* capsized. A Coast Guard HU-25 Falcon Jet on another mission received the distress signal. The investigators described, at length, the decision-making process used by the SAR controllers in assigning resources to the search. It was noted that EPIRBs of that time used the same frequency as aircraft Emergency Locator Transmitters (ELTs), and that well over 90 percent of all signals are false alarms. Ultimately, it was concluded that none of the decisions relating to the SAR operation affected the outcome of the casualty.

Agency actions:
In response to the conclusions and recommendations of the investigators, the Coast Guard's Marine Safety program noted that an ongoing project to change the small passenger regulations would include:

- A requirement for a safety orientation prior to every trip. Such announcements were optional when safety placards were posted on the vessel.
- A requirement that vessel operators prepare passenger lists or counts for every voyage.

It was also agreed that, as part of the regular consultations with Mexican officials, SAR procedures and treaties would be reviewed and updated whenever possible.

Finally, it was noted that an effort was underway to improve EPIRB technology. Since that time, the older Class A EPIRBs have been replaced with those operating on 406 MHz, which include vessel identification capabilities.

Sinking of the M/V *Cougar*

On Sept. 15, 1988 the inspected small passenger vessel *Cougar* was returning to Depoe Bay, Ore., after a day of tuna fishing approximately 55 miles off the Oregon coast. The vessel was carrying a crew of three with six passengers onboard, and was being operated as an uninspected vessel. The vessel departed the fishing grounds at 2 p.m. Pacific Daylight Time, and about one and one-half hours into the return trip a large amount of water was noted on the afterdeck. The operator found the lazarette flooded, with some flooding in the engine compartment. The vessel's engine-driven bilge system and bailing by the crew and passengers could not control the flooding. At approximately 5 p.m. the *Cougar* sank approximately 48 nautical miles west of Depoe Bay. Two crewmembers and two passengers died from hypothermia-related drownings. The surviving crewmember and four passengers were rescued by the Coast Guard at approximately 11 a.m. the next day

The cause of the casualty is unknown. However, it was concluded that the most probable cause of the casualty was flooding through the propeller shaft packing.

Other factors:

- The vessel's operator failed to confirm the source and severity of the flooding, which was known to exist early in the voyage.
- The severity of the casualty was aggravated by the apparent lack of a functioning VHF radio.
- The vessel's operator delayed preparations to abandon, while continuing efforts to control the flooding and to call for assistance by VHF radio.
- Given the distance from shore, the presence of an EPIRB would have mitigated the severity of the casualty.
- There were no rescue lights on the personal flotation devices as required for such a voyage.
- The freeing port area was inadequate.

Agency actions:
The investigating and reviewing officers of this casualty recommended a variety of changes to the regulations for small passenger vessels, primarily in the areas of watertight integrity and bilge pumping systems. In most cases there was concurrence with the recommendations at the headquarters level. In fact, it was decided that the *Cougar* casualty would be considered as part of an ongoing project to update the small passenger vessel regulations.

The investigative report also included a discussion of the *Cougar*'s use as an uninspected vessel at the time of the casualty. A number of issues about the interpretation of the applicable laws and regulations were noted, primarily in the areas of manning and lifesaving equipment. Since the time of this casualty, the small passenger regulations have been revised to include specific conditions under which an inspected vessel can operate as a "six pack."

Sinking of the M/V *Bronx Queen*

On Dec. 2, 1989 at about 3:20 p.m., while returning from fishing, the small passenger vessel *Bronx Queen*, suddenly began taking on water in the after portion of the vessel and sank just north of Ambrose Channel in the New York Harbor, with 19 persons onboard. They entered the water as rescue resources arrived on scene. At approximately 3:47 the vessel sank north of Ambrose Channel in the vicinity of buoy No. 2A (LLNO 32130) in position N 40-30.4, W 073-55.9. All 19 persons were recovered; however, two were pronounced dead at area medical facilities.

The investigator concluded that the cause of this casualty was the structural failure of the hull of the vessel in the area of the lazarette. The exact cause to the structural failure could not be determined; however, the most probable cause was the failure of the frames at the turn of the bilge on the starboard side and the lazarette. As a result, the lazarette flooded and lowered the transom of the vessel to a level, which would allow following seas to flood onto the after deck.

Other factors:

- A decision by the vessel's operator to keep the vessel positioned with the stern exposed to a following sea, which added stress to the area that failed and, also, allowed water onto the deck, triggering progressive flooding into other compartments.
- In order to be rescued the passengers had to first enter the water. Many of them suffered from hypothermia.
- Coast Guard rescue boats experienced difficulty removing the passengers from the water because of the rescue boat freeboard and the passengers' inability to help themselves, while suffering the effects of hypothermia.
- Several repairs were made to the vessel without notifying the local OCMI, as required.
- Loss of life was minimized by the quick arrival of rescue vessels, including three Coast Guard boats and the launch from a nearby pilot vessel.
- The use of alcohol by one crewmember may have contributed to the severity of the casualty.

Agency action:

- One of 14 recommendations by the investigating officer was that all small passenger vessels be required to carry out-of-water lifesaving equipment for 100 percent of the persons onboard. Prior to the sinking of the *Bronx Queen* the risk of hypothermia fatalities had already been recognized, and a proposed change in the regulations was ongoing.
- In an effort to improve recovery methods, the National Motor Lifeboat School and the UTB system center were tasked with investigating alternative methods for recovering personnel from the water. Newer vessels, such as the 47-foot motor life boat, were designed with personnel recovery stations.
- Since the time of this casualty, drug and alcohol testing is required for marine incidents considered "serious" in nature, which would have included the *Bronx Queen* casualty.

A Look at the Recent History of Passenger Injuries on U.S. Flagged, U.S. Coast Guard Inspected Passenger Vessels Less than 100 Gross Tons

by Cmdr. LYLE RICE, Chief, U.S. Coast Guard Compliance Analysis Division

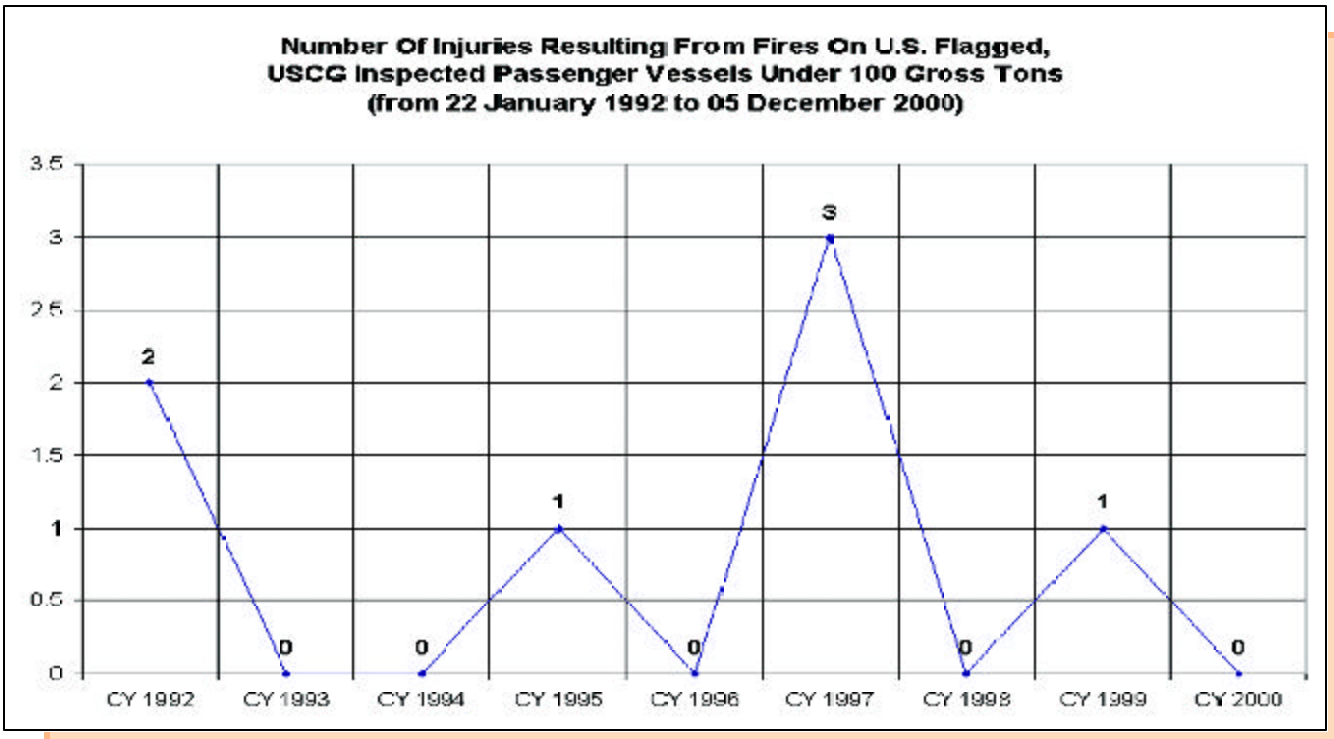
Only 20 percent of the 871 passenger injuries that occurred between 1992 and 2001 on U.S. Coast Guard inspected passenger vessels resulted from vessel casualties, such as allisions, collisions, groundings, and fires. The vast majority of the injuries – 80 percent – did not result from a vessel casualty. This is one of many findings in a review that was conducted by the Coast Guard's Compliance Analysis Division. The study examined the 871 injuries that occurred from Jan. 1, 1992 to July 1, 2001 on U.S. flagged, U.S. Coast Guard inspected passenger vessels operated under the regulations found in 46 CFR Subchapter T.

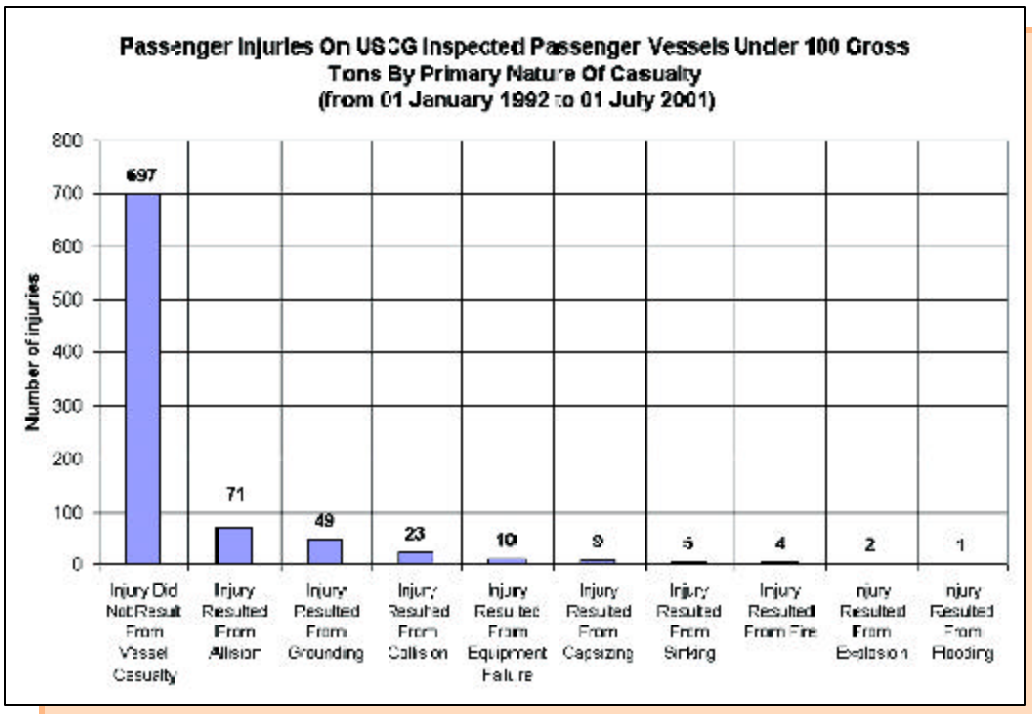
Regulations in 46 CFR Subpart 4.05 require the owner or operator of a U.S. flagged, USCG inspected passenger vessel to report any marine casualty or accident that occurs upon the navigable waters of the United States, its territories or possessions if the casualty involves one or more deaths, or an injury to a passenger requires professional medical treatment beyond first aid.

To perform this study, the Coast Guard extracted data from the Marine Safety Management System (MSMS) to identify the injuries to personnel on U.S. flagged, USCG inspected passenger vessels under 100 gross tons. All 179 injuries resulting from diving activities were excluded from this study. Specifically, the Coast Guard reviewed data on passenger injuries that occurred on vessels that met criteria on page 14, and that included an "X" in the INJURY INDICATED data field in the Personnel Casualty Table.

Staff members from the Compliance Analysis Division reviewed each case. They verified the accuracy of the MSMS data by reviewing each individual casualty case in the Marine Safety Information System (MSIS). This individual attention to each MSIS case included reviewing data fields and gathering other information from the MSIS narrative description of the accident.

Examination of the MSIS data revealed that there were 871 passengers injured as a result of 629 casualty incidents on USCG inspected, U.S. flagged passenger vessels under 100 gross tons between Jan. 1, 1992 and July 1, 2001. These passenger injuries represent all reportable passenger injuries (excluding 179 injuries resulting from diving activities) investigated by the Coast Guard under the regulations described in 46 CFR 4. Using data from MSMS, the Coast Guard developed the control chart, below. (See page 14 for an explanation of the control chart methodology.)



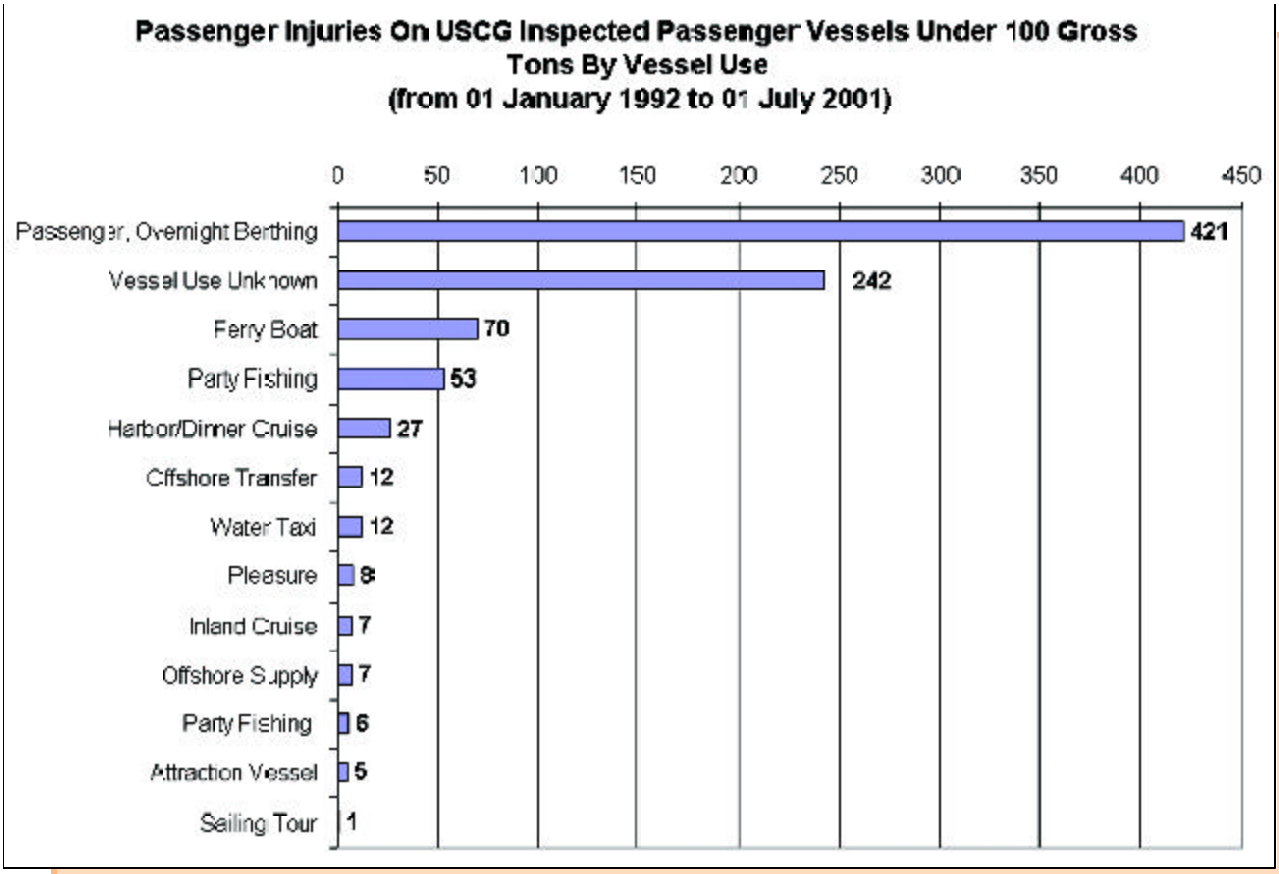


INJURIES BY LOCATION ON VESSEL WHERE CASUALTY OCCURRED

Passenger Seating Area	155
Main Deck	132
Unknown	120
Bow Area	62
Fishing Station; Stairway	45 each
Upper Deck	37
Gangway	29
Passenger Cabin Area	20
Whale Watching Station	18
Stern	16
Doorway	13
In Water; Inflatable Boat	12 each
Galley; Lounge Area	11 each
Head	10
Deck Rail Area; Inside Wheelhouse	9 each
Mooring Station	8
Boarding Rope	7
Dining Area; Passenger Berthing Area	6 each
Forward Area	5
Casino Area; Dance Floor; Lower Deck; Luggage Storage Area; Mast Area; Swim Step	4 each
Aloft; Bed; Rescue Vessel; Shower	3 each
Bait Preparation Area; Below Deck; Cargo Deck; Engine Room; Fish Cleaning Area; Passenger Dining Area; Passenger Float; Pulpit; Roof of Wheelhouse; Wheelchair Lift Area	2 each
Accommodation Ladder; Companionway; Concession Area; Crew Quarters; Deck Netting; Elevator; Flying Bridge; Food Preparation Area; On Dock; Open Hatch; Pacific Ocean; Parasail Platform; Passenger Skiff; Second Deck; Sonar Area; Trampoline; Vehicle Parking Area	1 each

INJURIES BY STATE WHERE CASUALTY OCCURRED

California	113
Hawaii	101
Florida	73
Louisiana; New York	59 each
Massachusetts	58
Oregon	38
Maine	37
New Jersey	34
Alaska	33
Maryland	28
Ohio	26
Washington	23
Texas	22
Alabama; North Carolina	19 each
Iowa	15
Illinois; South Carolina	14 each
Rhode Island	11
Virgin Islands	9
Guam	8
Nevada; Puerto Rico	7 each
Michigan; Virginia	6 each
New Hampshire; Wisconsin	4 each
Connecticut; Georgia; Missouri; Pennsylvania	3 each
Arkansas; Washington, DC; Kentucky	2 each
Delaware; Minnesota; Mississippi; Not Specified; Tennessee; Utah	1 each



Observations

- Although there was a high of 132 injuries in 1996, the injury control chart shows the fluctuation in the number of injuries from year to year is within the upper and lower control limits and can be attributed to normal yearly variation.
- Eighty percent (697) of the injuries did not result from a vessel casualty. Only 20 percent (174) of the injuries resulted from vessel casualties such as allisions, collisions, groundings, or fires with most of those injuries resulting from allisions.
- Forty-three percent (377) of the injuries resulted from falls to the same level followed by 16 percent of the injuries resulting from objects striking passengers.
- Twenty-four percent (210) of the injuries resulted in fractures. Seventeen percent (146) of the injuries resulted in cuts.
- Sixteen percent (138) of the injuries resulted in injuries to the head.
- Thirty-three percent (287) of the injuries occurred to passengers in the passenger seating area or the main deck areas.
- Thirteen percent of the injuries occurred in California, followed by 12 percent of the injuries occurring in Hawaii, followed by 9 percent of the injuries occurring in Florida.
- Eighty percent (702) of the injuries occurred on vessels propelled by diesel reduction drives.
- Twenty percent of the injuries resulted from vessel casualties such as collisions, allisions, groundings, or fires that rendered the vessel not seaworthy.
- Most of the injuries were distributed evenly among vessel gross tonnage with the exception of vessels in the 90-99 gross ton range. Thirty-five percent of the injuries occurred on that category of vessels.
- Eighty-one percent (708) of the injuries occurred on vessels that were underway, followed by 12 percent of the injuries occurring on vessels that were moored, and 6 percent of the injuries occurring on vessels that were anchored.
- Twenty-seven percent of the injuries occurred on vessels with a Limited Coastwise route followed by 26 percent of the injuries occurring on vessels with an Oceans route.
- Forty-eight percent (421) of the injuries occurred on vessels with overnight berthing. Eight percent (70) of the injuries occurred on ferries followed by 6 percent (53) of the injuries occurring on party fishing boats.

After reading narrative summaries of all 871 injuries, the following lessons may be learned:

- Passengers should be alerted when the vessel is approaching or departing mooring areas as passengers were injured when they were thrown to the deck during allisions or docking maneuvers.
- Passengers should be alerted that ascending or descending a stairway on a vessel could be especially hazardous as passengers were injured when they fell on stairways, some when the vessel was still moored at the dock.
- Special care should be taken to supervise passengers when moving through the vessel gangway area.
- Passengers should be alerted to use special care to maintain their balance and maintain their spatial awareness when being distracted when observing or photographing objects near the vessel such as whales or other vessels.
- Passengers should be alerted to use special care when walking through doorways and over areas with raised deck coamings.
- Passengers should be alerted to be aware of passengers in adjoining fishing stations when casting fishing lines or using fishing equipment.
- Passengers should be told to be especially vigilant when swimming adjacent to the vessel or when moving around swim steps.

Study of Fires on U.S. Flagged, U.S. Coast Guard Inspected Passenger Vessels Less than 100 Gross Tons

by Cmdr. LYLE RICE, Chief, U.S. Coast Guard Compliance Analysis Division

The marine industry can expect as many as 26 fires to occur every year on small passenger vessels, and the majority of those fires likely will occur on vessels that are underway. These trends and many others were identified in an analysis that was recently conducted by the U.S. Coast Guard.

The Coast Guard Compliance Analysis Division examined fires on U.S. flagged, U.S. Coast Guard inspected passenger vessels less than 100 gross tons that are operated under regulations found in 46 CFR Subchapter T. The Coast Guard examined data that were reported between Jan. 22, 1992 and Dec. 5, 2000 to determine if any trends exist in the fires on those vessels to prevent fires and future accidents from occurring.

Fires on U.S. flagged, U.S. Coast Guard inspected passenger vessels less than 100 gross tons must be reported to the Coast Guard in accordance with 46 CFR Part 4. The regulations require the owner or operator of the vessel to report any marine casualty or accident that occurs upon the navigable waters of the United States, its territories or possessions if the casualty involves one or more deaths, or it results in an injury to a passenger that requires professional medical treatment beyond first aid.

The data for this study was extracted from the U.S. Coast Guard's Marine Safety Management System (MSMS). This data covers the period of Jan. 22, 1992 to Dec. 5, 2000.

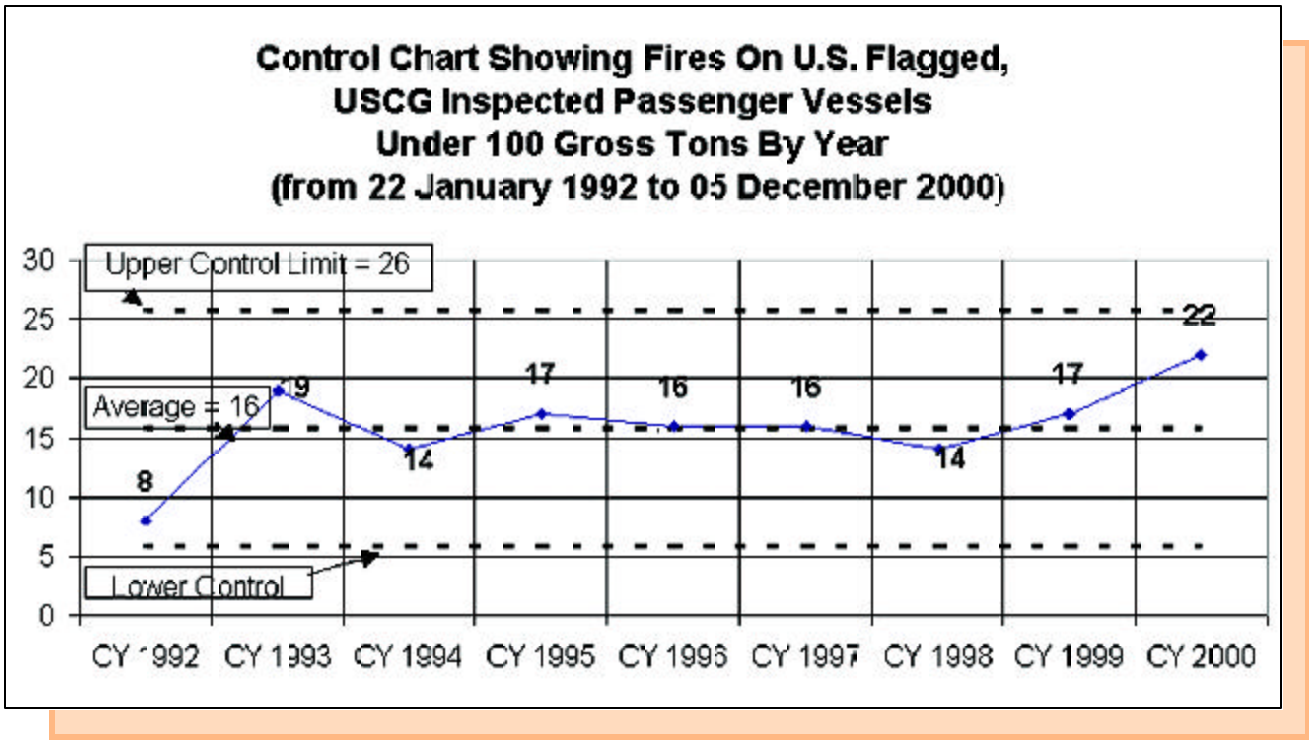
Vessel Name	Incident Date	Injuries	Location of Fire	Description of Injury	Type of Fire
pis	Oct. 19, 1997	2	Galley, laundry	Crewmembers burned while fighting galley stove fire	Kerosene stove
ida Fisherman II	Aug. 4, 1995	1	Engine room	Crewmember fractured foot while fighting galley stove fire	Shorted electrical wirir
Fever	Oct. 21, 1999	1	Unclassified area	Crewmember burned by exploding gas grill	Gas barbecue grill
Wanderer	July 5, 1992	1	Engine Room	Crewmember burned foot when fighting fire	Overheated turbocharger
annah River een	Aug. 20, 1992	1	Engine room	Passenger overexerted during vessel evacuation	Main generator
II	July 17, 1997	1	Accommodation spaces	Crewmember inhaled smoke while fighting fire	Chafed electrical wiring

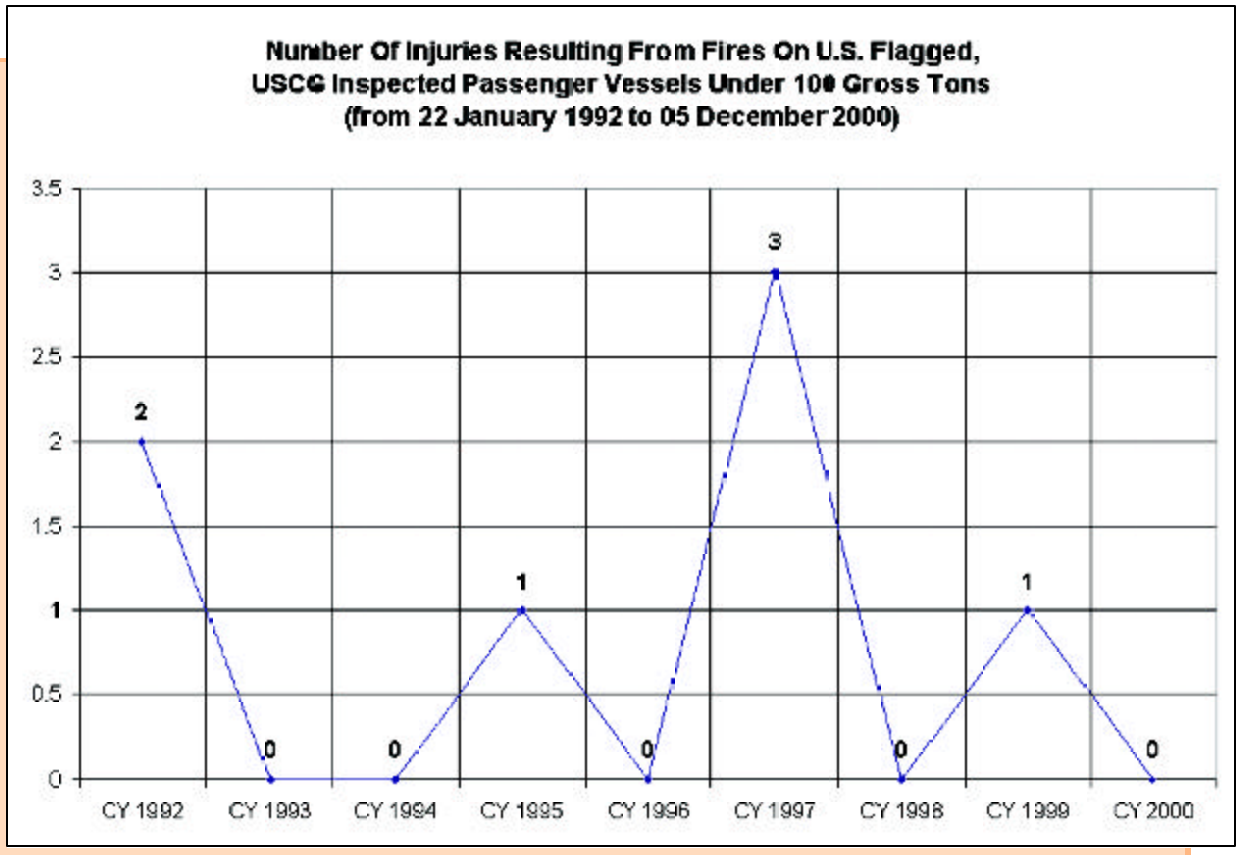
To identify the small passenger vessels that experienced fires, the Coast Guard extracted data from MSMS that met the criteria identified on page 14, in which the primary and secondary nature of the casualty was recorded as "FIRE."

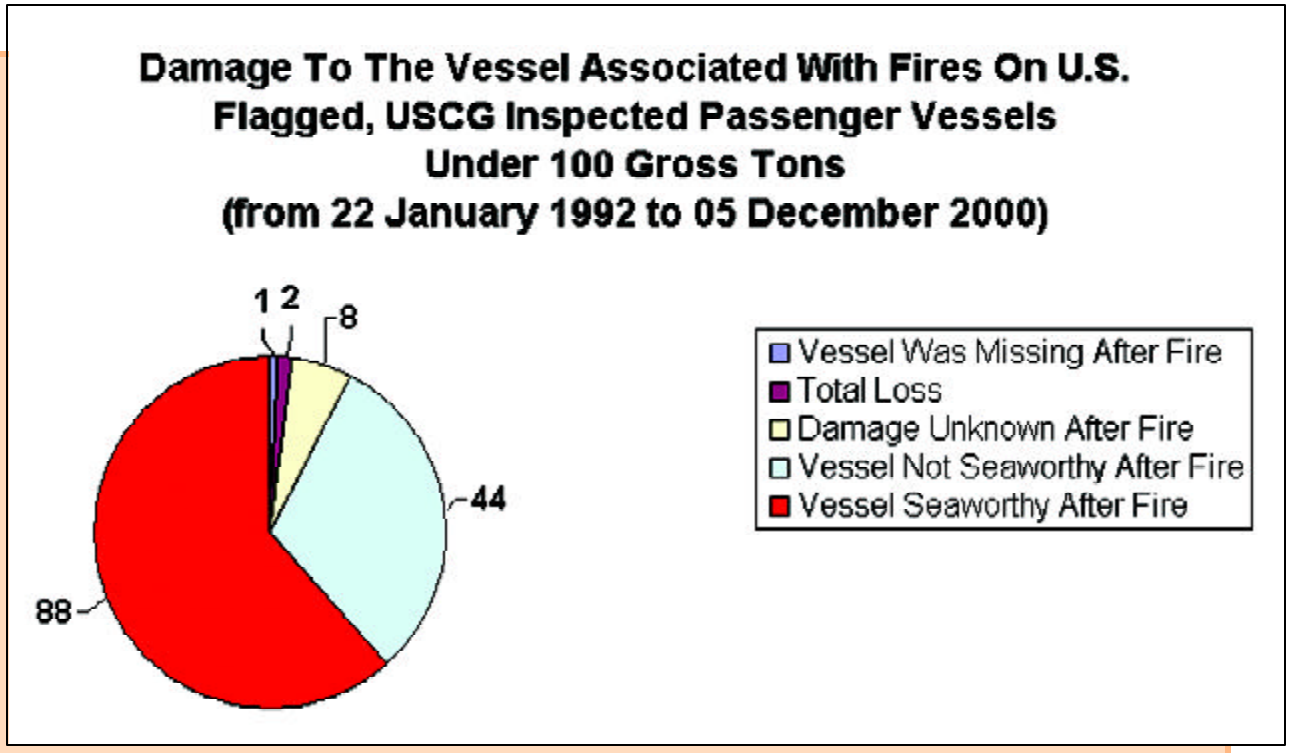
Using MSMS, the Coast Guard reviewed each case that was extracted from MSIS in order to verify the accuracy and completeness of the items needed to prepare this report. The analysis reviewed the summary of each casualty, including the year of casualty, actual gross tonnage of the vessel, accident type, vessel inspection status, vessel use, and description of accident for each case.

Examination of the data revealed that there were 143 fires on U.S. flagged, U.S. Coast Guard inspected passenger vessels under 100 gross tons between Jan. 22, 1992 and Dec. 5, 2000. These fires included six incidents that resulted in seven injuries. There were no deaths resulting from any of the 143 fires. Pertinent factors in the casualties are included in the following pages. The table at the top of the page summarizes the seven injuries.

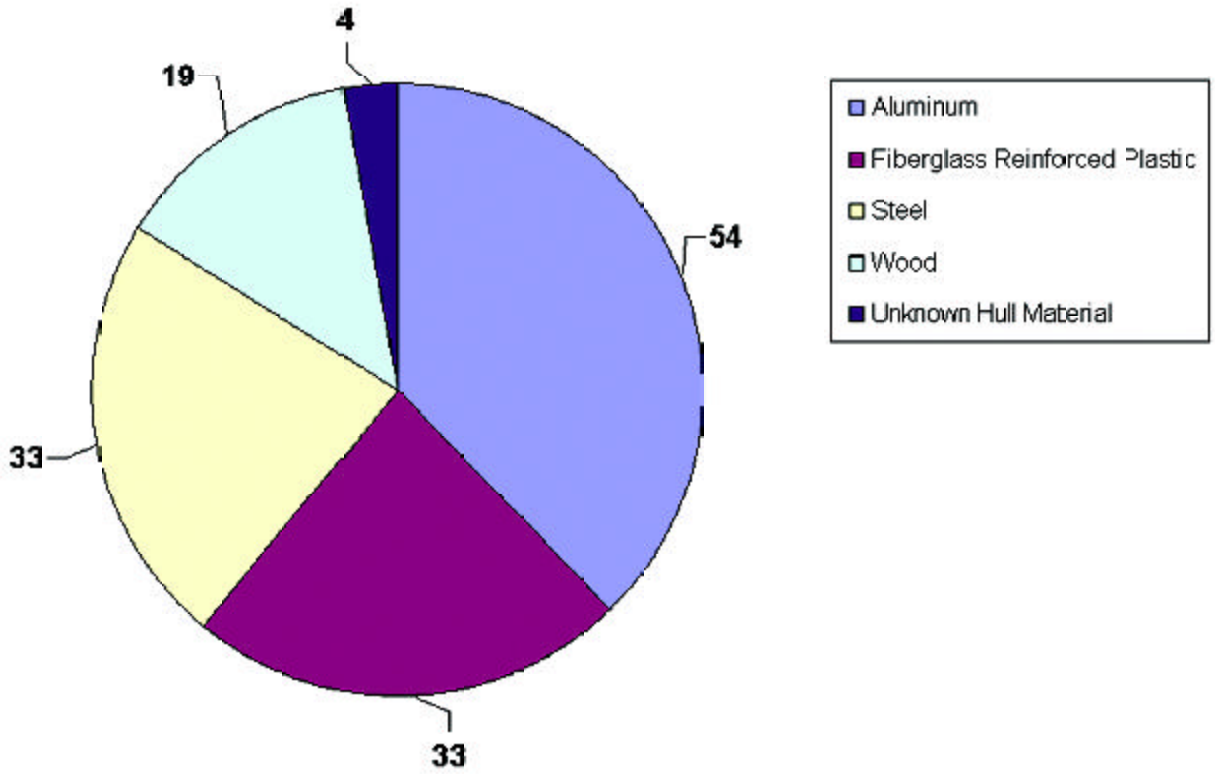
Using data from MSMS, the Coast Guard developed the control chart, below. The Coast Guard's methodology for developing control charts is explained on page 14.



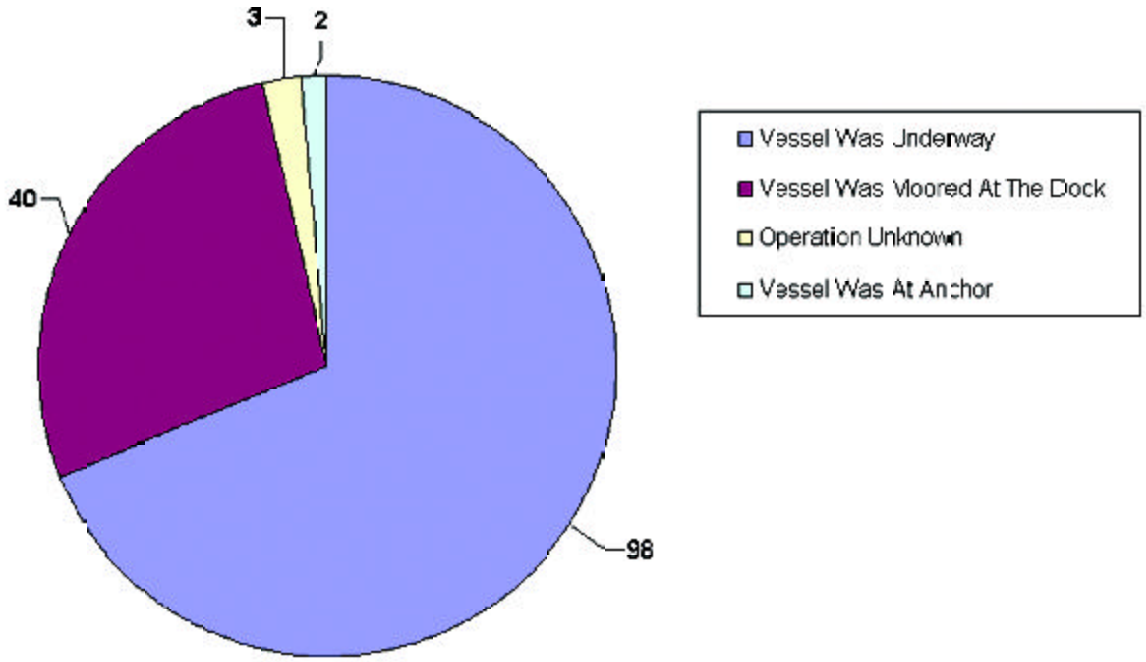

Number Of Injuries Resulting From Fires On U.S. Flagged,
USCG Inspected Passenger Vessels Under 100 Gross Tons
(from 22 January 1992 to 05 December 2000)
3.5
3
2.5
2
1.5
1
0.5
0
2
0
0
1
0
3
0
1
0
CY 1992
CY 1993
CY 1994
CY 1995
CY 1996
CY 1997
CY 1998
CY 1999
CY 2000

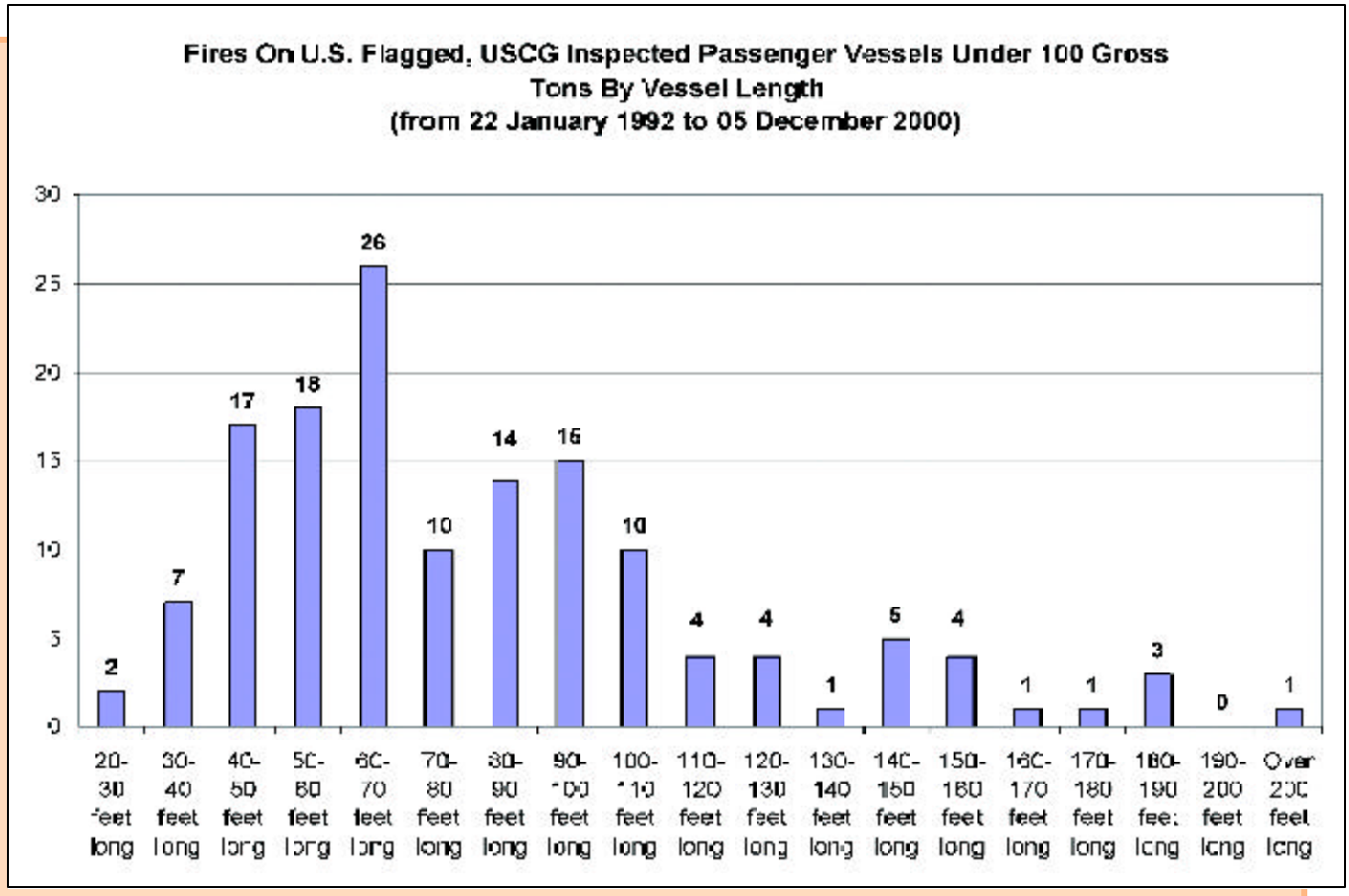

Damage To The Vessel Associated With Fires On U.S.
Flagged, USCG Inspected Passenger Vessels
Under 100 Gross Tons
(from 22 January 1992 to 05 December 2000)
1
2
8
44
88
Vessel Was Missing After Fire
Total Loss
Damage Unknown After Fire
Vessel Not Seaworthy After Fire
Vessel Seaworthy After Fire

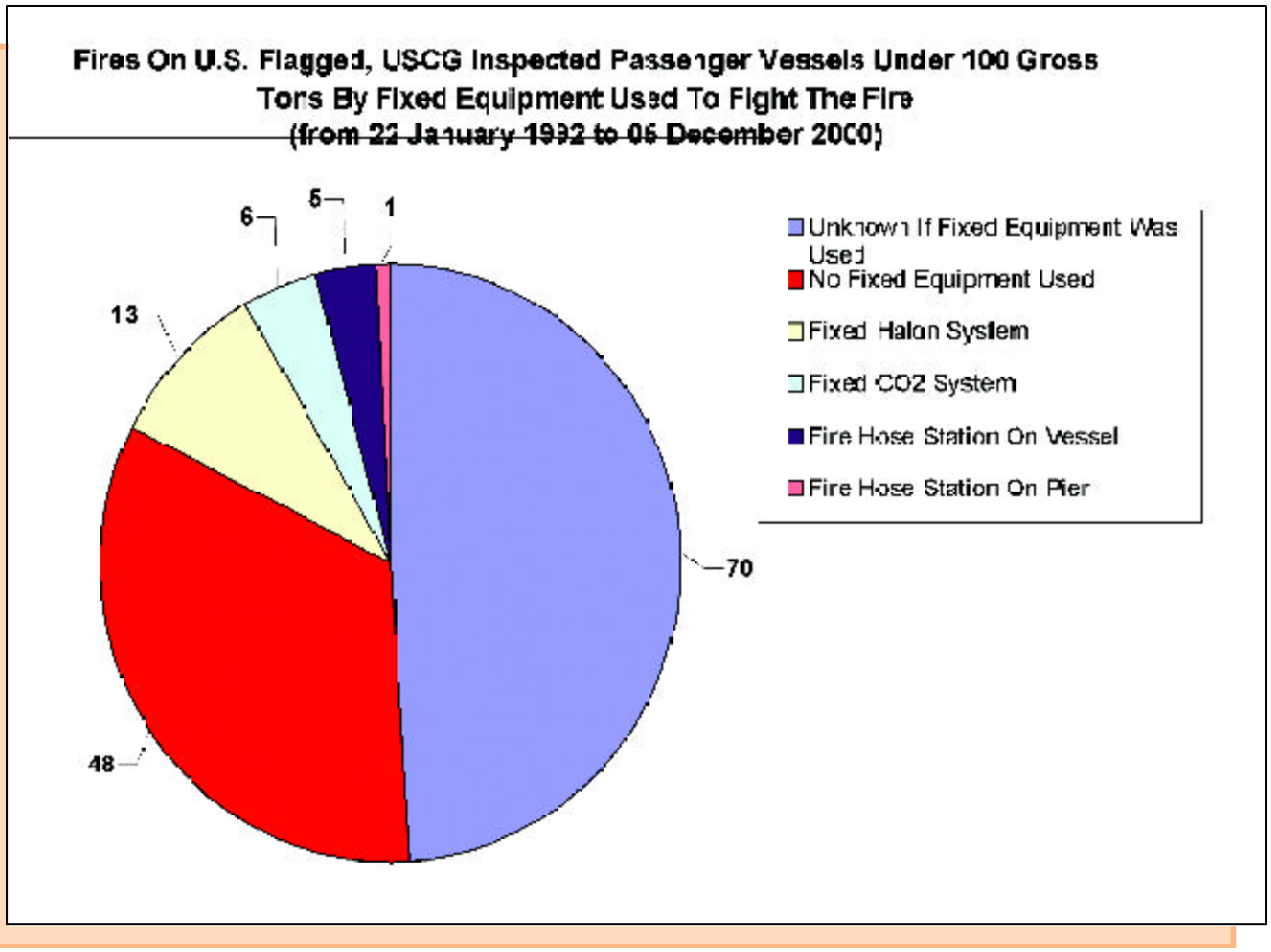
Fires On U.S. Flagged, USCG Inspected Passenger Vessels Under 100 Gross Tons By Vessel Hull Material
(from 22 January 1992 to 05 December 2000)

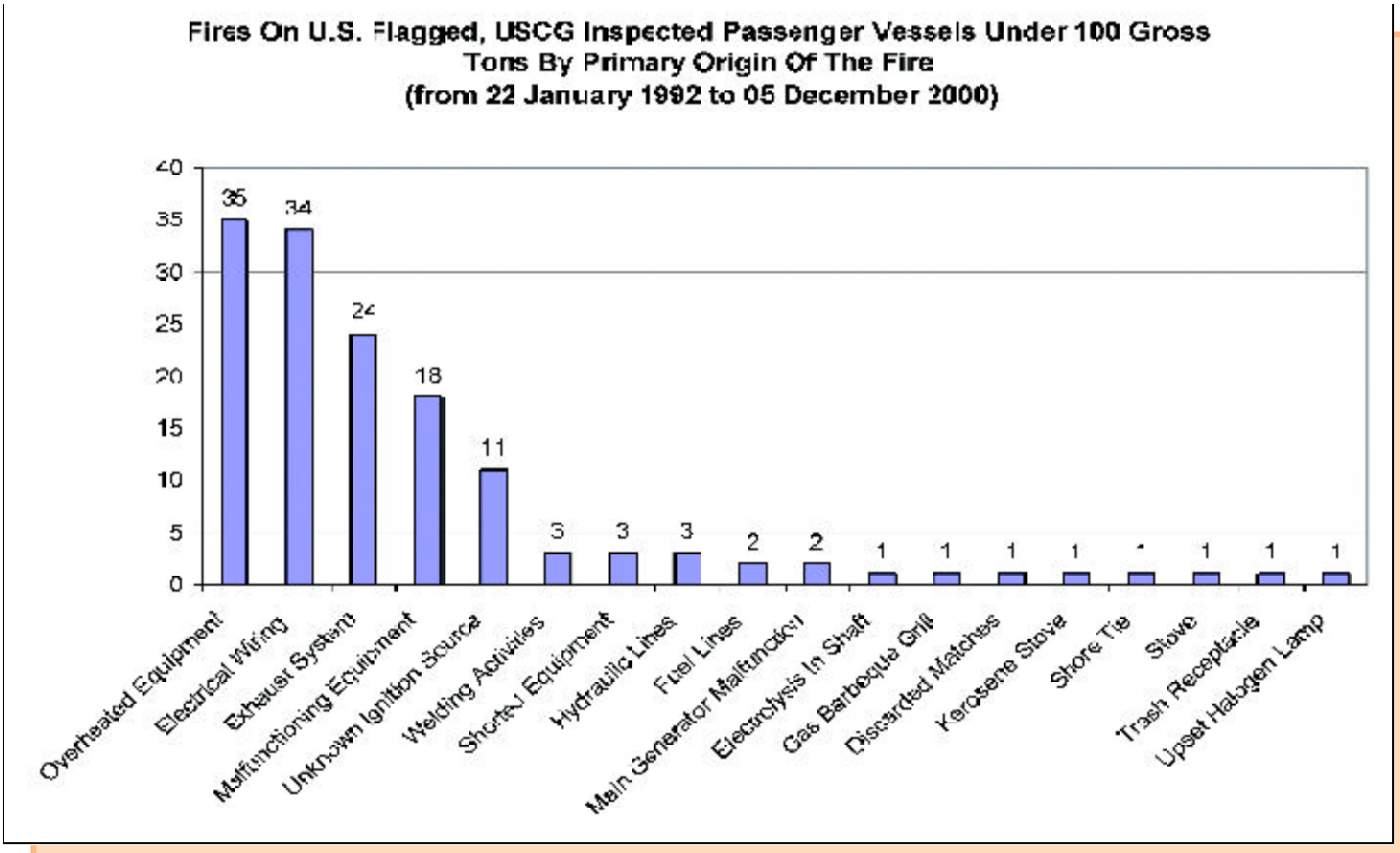


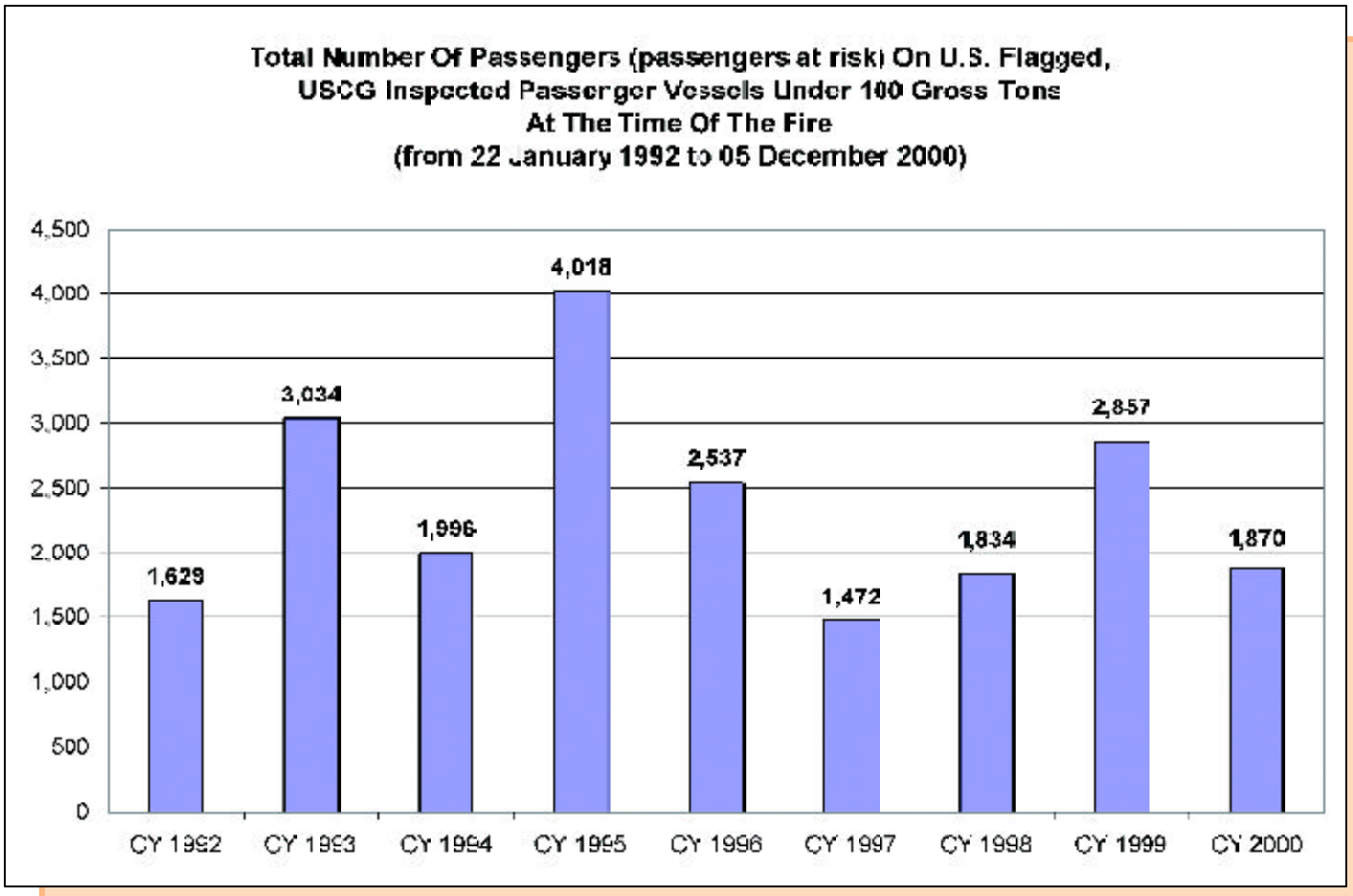
Fires On U.S. Flagged, USCG Inspected Passenger Vessels Under 100 Gross Tons By Vessel Operation At The Time Of The Casualty
(from 22 January 1992 to 05 December 2000)




Fires On U.S. Flagged, USCG Inspected Passenger Vessels Under 100 Gross Tons By Vessel Length
(from 22 January 1992 to 05 December 2000)
30
25
20
15
10
5
0
2
7
17
18
26
10
14
15
10
4
4
1
5
4
1
1
3
0
1
20-30 feet long
30-40 feet long
40-50 feet long
50-60 feet long
60-70 feet long
70-80 feet long
80-90 feet long
90-100 feet long
100-110 feet long
110-120 feet long
120-130 feet long
130-140 feet long
140-150 feet long
150-160 feet long
160-170 feet long
170-180 feet long
180-190 feet long
190-200 feet long
Over 200 feet long


Fires On U.S. Flagged, USCG Inspected Passenger Vessels Under 100 Gross Tons By Fixed Equipment Used To Fight The Fire
(from 22 January 1992 to 05 December 2000)
6
5
1
13
48
70
Unknown If Fixed Equipment Was Used
No Fixed Equipment Used
Fixed Halon System
Fixed CO2 System
Fire Hose Station On Vessel
Fire Hose Station On Pier





The table on the next six pages contains those narrative summaries found in the MSMS data tables.

GT	VESSEL USE	DESCRIPTION OF FIRE	LOCATION OF FIRE
9	Passenger	mproperly installed wiring shorted and ignited insulation and fuel in bilges	Engine Room
10	Party Fishing	Starter motor failed to disengage, overheated and ignited wood hull structure	Engine Room
11	Party Fishing	Burning motorboat drifted into vessel igniting wooden deck structure	Open Deck
14	Party Fishing	Lube oil leaked on hot exhaust manifold and ignited	Engine Room
14	Passenger	Leaking diesel fuel sprayed on hot turbocharger and ignited surrounding combustibles	Engine Room
14	Passenger	Electrical short ignited oily rags and other combustibles	Multiple Area
15	Passenger	Leaking water shorted out the starter solenoid igniting writing insulation	Engine Room
15	Party Fishing	Electrical wiring shorted and ignited insulation	Engine Room
15	Party Fishing	Overheated wiring ignited insulation	Engine Room
15	Passenger	500-watt halogen lamp fell onto seat cushion and ignited surrounding combustibles	Living Space
16	Party Fishing	Electrical short in wheelhouse ignited insulation and surrcunding combustibles	Wheelhouse
17	Party Fishing	Kerosene stove malfunctioned and ignited surrounding combustibles	Galley
18	Attraction Vessel	Overheated turbocharger ignited surrounding FRP vessel structure	Engine Room
18	Party Fishing	Short in electrical wiring ignited paint thinner stored in engine room	Engine Room
19	Passenger	Hot exhaust piping ignited surrounding wood structure	Engine Room
20	Party Fishing	Electrical wiring resting on hot engine block overheated and ignited combustibles	Engine Room
20	Party Fishing	Electrical wiring overheated igniting cardboard box and other combustibles	Midbody area
21	Passenger	Overheated battery cable ignited fuel line that fell onto battery	Engine Room
21	Party Fishing	Fire in trash can ignited surrounding combustibles	Aft Area
22	Crew Boat	Worn wiring ignited wiring insulation	Engine Room
22	Passenger	Leaking fuel oil sprayed on hot turbocharger and exhaust manifold	Engine Room
23	Passenger	Leaking lube oil contacted hot exhaust system and ignitec surrounding combustibles	Engine Room
23	Passenger	Lube oil leaked on hot turbocharger and ignited other combustibles	Engine Room
23	Passenger	Leaking fuel from burst fuel hose sprayed on hot turbocharger	Engine Room
25	Passenger	Overheated oven ignited wooden deck sheathing in galley	Galley
27	Passenger	Lube oil leaked on hot exhaust manifold and ignited surrounding combustibles	Engine Room
27	Party Fishing	Pump overheated due to stuck impellor and ignited surrounding wooden structure	Engine Room
27	Passenger	Worn cable on generator starter battery connection arced and ignited wiring and insulation	Engine Room
28	Passenger	Leaking diesel fuel sprayed on turbocharger booster and ignited surrounding combustibles	Engine Room

	USE		OF FIRE
31	Passenger	Hot exhaust gases escaping from leak in manifold ignited surrounding wooden structure	Engine Room
32	Passenger	Space heater in engine room malfunctioned and ignited surrounding combustibles	Engine Room
32	Passenger	Alternator shorted and ignited wiring insulation	Engine Room
32	Party Fishing	Worn electrical wiring ignited combustibles in wheelhouse	Wheelhouse
32	Passenger	Hot exhaust gases escaping from leak in manifold ignited surrounding wooden structure	Engine Room
34	Passenger	Heater used by Master to dry FRP hull ignited hull material and destroyed vessel	Midbody Area
36	Passenger	Alternator failed igniting wiring insulation and overhead structure	Engine Room
37	Passenger	Overheated exhaust piping ignited lagging material and surrouncing combustibles	Engine Room
37	Passenger	Leaking hydraulic fluid sprayed on hot exhaust system	Engine Room
38	Ferry	Engine air intake filter sleeve ignited and burned surrouncing combustibles	Engine Room
39	Passenger	Shorted battery grounding straps arced and ignited fuel in bilges	Engineer Stores
40	Passenger	Shorted electrical wiring ignited oil in bilges	Engine Room
40	Passenger	Overheated wiring ignited surrounding combustible material	Wheelhouse
41	Passenger	Overheated electrical wiring ignited surrounding wooden bulkhead structure	Engine Room
41	Passenger	Shorted wiring in engine overheated and ignited engine and surrounding combustibles	Engine Room
43	Passenger	Engine room lighting wiring shorted and ignited bilge and fuel in Raycor filter and fuel lines	Engine Room
43	Passenger	Overheated electrical fan ignited metal polish and varnish and surrounding combustibles	Living Space
43	Party Fishing	Overheated electrical wiring ignited wooden vessel structure and combustible equipment	Engine Room
44	Party Fishing	Leaking lube oil contacted hot exhaust system and ignited surrounding combustibles	Engine Room
45	Passenger	Carelessly discarded matches ignited paper in trash can	Galley
45	Passenger	Starter motor wiring shorted and ignited insulation and other combustibles	Engine Room
46	Party Fishing	Shorted electrical wiring ignited survival suits and other combustible personal gear	Engine Room
47	Party Fishing	Electric light fixture ignited surrounding combustibles	Machinery Space
47	Party Fishing	Hydraulic oil leaked on hot turbocharger and ignited	Engine Room
48	Passenger	Lube oil from burst return line sprayed on hot turbocharger and ignited combustibles	Engine Room
48	Passenger	Improperly deployed barbecue grill ignited surrouncing combustibles	Engine Room
51	Passenger	Electrical wiring arced and ignited insulation	Engine Room
51	Passenger	Overheated wiring ignited insulation and other combustibles	Engineer Stores
51	Party Fishing	Leaking salt water shorted and ignited 220-volt electrical power panel	Engine Room
52	Passenger	Short circuit in power panel ignited wiring and insulation	Engine Room

	USE		OF FIRE
56	Passenger	Starter motor wiring shorted and ignited insulation and other combustibles	Engine Room
56	Passenger	Worn wiring arced and ignited insulation and oil-soaked material stored in engine room	Engine Room
56	Passenger	Electrical lines in overhead shorted and fell into bilges and ignited oil floating in bilge	Engine Room
56	Passenger	Electrical lamp fell over and ignited carpet, wood, bedding, and cleaning fluid	Living Space
57	Passenger	12-volt alternator system shorted and ignited wiring and insulation	Engine Room
57	Crew Boat	Chafed electrical wiring arced and ignited wiring insulation, bilge oil, and fuel lines	Engine Room
58	Passenger	Electrical sparks from generator ignited wooden vessel and wooden dock structures	Machinery Space
58	Party Fishing	Spontaneous combustion of improperly stored linseed oil and latex	Accommo-dation Space
58	Passenger	Distress flare ignited and came in contact with combustible materials	Multiple Area
59	Passenger	Fuel fitting fractured and sprayed fuel on hot turbocharger igniting combustibles	Engine Room
60	Passenger	Electrical wiring shorted and ignited insulation	Engine Room
60	Passenger	Worn wiring ignited wood stanchion and overhead material	Engine Room
61	Passenger	Overheating turbochargers ignited surrounding FRP engine support structures	Engine Room
62	Party Fishing	Excessive oil and soot in stack was ignited by hot exhaust gases	Midbody Area
64	Passenger	Electrical failure in generator ignited generator and surrounding combustibles	Engine Room
65	Passenger	Battery cable overheated and ignited wiring and insulation	Engine Room
67	Party Fishing	Electrical wiring shorted and ignited combustibles stored in engine room and fuel lines	Engine Room
69	Party Fishing	Diesel fuel leaking from fuel line ignited on hot engine	Machinery Space
69	Harbor Dinner Cruise	Ruptured fuel hose sprayed fuel on hot turbocharger and ignited surrounding combustibles	Engine Room
70	Passenger	Overheated electrical panel ignited wiring and surrounding wooden vessel structure	Living Space
71	Party Fishing	Malfunctioning electric motor ignited insulation and surrounding combustibles	Engine Room
72	Passenger	Heat from engine parts ignited wiring and insulation	Engine Room
72	Passenger	Leaking fuel oil sprayed on hot turbocharger and ignited surrounding combustibles	Engine Room
74	Passenger	Electrical connection to shore tie overhead and ignited wooden vessel structure	Multiple Area
75	Passenger	Hole in exhaust piping ignited lagging and insulation on muffler system	Midbody Area
75	Passenger	Leaking transmission fluid contacted voltage regulator and ignited	Engine Room
76	Passenger	Leaking lube oil sprayed on hot turbocharger and ignited surrounding combustibles	Engine Room
76	Ferry	Fuel oil leaked on hot exhaust manifold	Machinery Space
76	Harbor Dinner	Shorted electrical track lighting ignited combustibles	Aft Area

	USE		OF FIRE
77	Passenger	Leaking lube oil sprayed on hot turbocharger and ignited surrounding combustibles	Engine Room
80	Passenger	Wiring to starter arced and ignited the wooden battery box cover and wiring insulation	Engine Room
81	Passenger	Fire started in stack igniting lagging and other combustibles	Machinery Space
82	Passenger	Excessive exhaust heat ignited lagging and insulation	Machinery Space
83	Party Fishing	Leaking fuel sprayed on hot turbocharger and ignited surrounding combustibles	Engine Room
83	Passenger	Improperly deployed space heater ignited and destroyed generator	Machinery Space
86	Passenger	Shorted electrical wiring ignited paint and oil stored in engine room	Engine Room
86	Ferry	Slag from welding fell down into void space and ignited insulation and combustibles	Void Space
86	Ferry	Overheated turbocharger shaft ignited lube oil	Engine Room
86	Passenger	Hot exhaust gas from side exhaust opening ignited wooden dock and tire fenders	Open Deck
86	Harbor Dinner Cruise	Excessive oil and soot in stack was ignited by hot exhaust gases	Engine Room
87	Passenger	Leaking hydraulic fluid sprayed on hot exhaust system and ignited combustibles	Engine Room
87	Passenger	Malfunctioning sump pump shorted and ignited wiring and insulation	Engine Room
88	Passenger	Loose wiring arced and ignited wiring insulation and surrounding combustibles	Engine Room
90	Ferry	Leaking diesel fuel was ignited by hot exhaust system	Engine Room
90	Passenger	Leaking fuel oil sprayed onto hot exhaust manifold	Engine Room
90	Passenger	Worker left deep fryer on and cooking oil overheated igniting surrounding combustibles	Galley
91	Harbor Dinner Cruise	Electrical wiring shorted and ignited winch motor components and wiring insulation	Open Deck
91	Ferry	Starter solenoid on engine overheated and ignited wiring and insulation	Engine Room
91	Passenger	Overheated wiring ignited insulation and surrounding wood structure	Engine Room
91	Passenger	Electrolysis in port shaft ignited oil accumulating in bilges	Engine Room
91	Passenger	Leaking hydraulic fluid sprayed into ventilation fan and ignited wiring and insulation	Machinery Space
92	Passenger	Condensation in circuit breaker caused arcing and ignition of wiring and insulation	Engine Room
92	Passenger	Arcing solenoid contacts ignited wiring and starter motor components	Engine Room
92	Passenger	Welding sparks ignited wood trim and other combustibles	Accommo-dation Space
92	Crew Boat	Port engine overheated and ignited combustible engine components	Engine Room
92	Passenger	Improperly wired ventilation blower switch arced and ignited surrounding combustibles	Deck Stores
92	Crew Boat	Leaking fuel and lube oil sprayed on hot turbocharger and exhaust manifold	Engine Room

GT	VESSEL USE	DESCRIPTION OF FIRE	LOCATION OF FIRE
92	Passenger	Hot exhaust gas escaped from improperly installed flange and ignited combustibles	Machinery Space
93	Passenger	Leaking diesel fuel contacted hot turbocharger	Engine Room
93	Passenger	Leaking fuel sprayed on turbocharger and hot exhaust manifold and ignited	Engine Room
93	Passenger	Hot gases from turbocharger leak ignited surrounding engine components	Engine Room
93	Ferry	Leaking lube oil sprayed on hot turbocharger and ignited surrounding combustibles	Engine Room
93	Passenger	Overheating engine equipment ignited surrounding wooden vessel structure	Engine Room
93	Passenger	Uninsulated exhaust ignited surrounding wooden deck beams and combustibles	Engine Room
94	Passenger	Excessive oil and soot in stack was ignited by hot exhaust gases	Engine Room
94	Passenger	Wiring shorted and ignited insulation	Engine Room
94	Harbor Dinner Cruise	Chafed wiring from 12-volt alternator arced and ignited wiring and other combustibles	Engine Room
94	Passenger	Leaking hydraulic oil sprayed on power panel and ignited surrounding combustibles	Engine Room
95	Passenger	Worn wiring overheated and ignited wiring and insulation	Wheelhouse
95	Passenger	Overheated wiring ignited wiring insulation	Engine Room
95	Crew Boat	Leaking lube oil sprayed on hot turbocharger and ignited surrounding combustibles	Engine Room
95	Passenger	Hot exhaust gases escaping from leak in manifold ignited surrounding FRP structure	Engine Room
96	Passenger	Shorted battery cable ignited insulation	Engine Room
96	Passenger	Overloaded electrical motor ignited wiring and insulation and motor components	Midbody Area
96	Passenger	Hose burst and sprayed oily bilge water on electric switchboard	Engine Room
96	Passenger	Leaking clutch hydraulic fluid sprayed on hot engine parts and ignited combustibles	Engine Room
97	Passenger	Leaking fuel from cracked fuel filter sprayed on hot engine and ignited combustibles	Engine Room
97	Passenger	Hot welding slag ignited surrounding combustibles	Living Space
97	Passenger	Oil from leaking pressure gauges sprayed on hot generator and ignited combustibles	Engine Room
97	Passenger	Kerosene heater overheated and ignited kerosene and other combustibles	Multiple Area
98	Passenger	Leaking fuel oil hose burst and sprayed diesel fuel on hot turbocharger where it ignited	Engine Room
98	Passenger	Fuel filter broke at hose connection and sprayed fuel on hot turbocharger	Engine Room
98	Passenger	Chafed electrical wiring arced and ignited paneling, curtains and lifejackets stored in area	Accommodation Space
98	Passenger	Leaking lube oil contacted hot turbocharger and ignited surrounding combustibles	Engine Room
98	Passenger	Chafed wiring ignited combustibles	Engine Room
[illegible]	[illegible]	[illegible]	[illegible]

GT	VESSEL USE	DESCRIPTION OF FIRE	LOCATION OF FIRE
98	Passenger	Turbocharger malfunctioned and ignited fuel lines and other combustibles	Engine Room
98	Passenger	Leaking diesel fuel sprayed on uninsulated exhaust elbow and ignited combustible material	Engine Room
98	Passenger	Loose breaker connection from generator arced and ignited wiring insulation	Machinery Space
98	Passenger	Leaking fuel and lube oil sprayed on hot turbocharger and exhaust manifold	Engine Room
98	Crew Boat	Leaking fuel sprayed on turbocharger lagging and ignited surrounding combustibles	Engine Room
99	Ferry	Vehicle starter motor overheated and ignited combustibles on vehicle	Vehicle Space
99	Passenger	Shorted electrical wiring ignited insulation	Engine Room
99	Passenger	Shorting in electrical wiring ignited oil in bilges	Machinery Space
99	Passenger	Shorted stator windings on generator ignited accumulated oil and grease	Engine Room
99	Ferry	Fine oil spray from lube oil leak ignited on hot exhaust manifold	Engine Room
99	Passenger	Leaking hydraulic oil from steering pump sprayed onto hot engine and ignited	Engine Room
99	Passenger	Leaking lube oil contacted hot exhaust system and ignited surrounding combustibles	Engine Room
99	Passenger	Shorted electrical wiring ignited cork insulation and surrounding wooden structure	Midbody Area
99	Ferry	Oil spray from lube oil leak contacted hot turbocharger and ignited	Engine Room
99	Crew Boat	Excessive lint accumulation on heating coils ignited and burned paneling and insulation	Multiple Area
99	Ferry	Leaking fuel oil sprayed on hot turbocharger and ignited surrounding combustibles	Engine Room
99	Passenger	Slag from welding ignited surrounding combustibles	Accommo-dation Space
99	Ferry	Heat from turbocharger ignited degreasing solvent used on engine parts	Engine Room

Lessons Learned

- Vessel masters and operators should ensure that fire watch rounds of the engine room and machinery spaces are made when the vessel first gets underway and subsequent rounds made during the voyage. Vessel owners should consider installation of a closed-circuit television monitoring system as these systems have increased in sophistication and decreased in price.
- Vessel masters and operators should inspect all vessel equipment for conditions that would lead to overheating.
- Vessel masters and operators should inspect wiring for chafing and excessive wear and replace damaged wiring immediately.
- Vessel masters and operators should inspect all fuel lines, hydraulic lines, and lube oil lines for chafing and wear and replace any damaged hoses immediately.
- Although 55 percent of the fires were detected by vessel crewmembers, only 5 percent of the fires were detected by electronic fire or smoke detection systems in spaces not already protected by such systems. The installation of electronic fire and smoke detection systems in spaces not already protected by such systems may provide more early warning of the existence of a fire.
- Vessel owners should consider the installation of fixed firefighting systems in those spaces not already protected by such. A benefit of fixed systems is the ability to rapidly extinguish a fire without sending personnel into the space.

Observations

- Although there were 21,247 passengers (average 148 passengers per event) exposed to risk during these fires, only one passenger and six crewmembers were injured as a result of these fires. No passengers suffered burns, and there were no deaths or persons missing as a result of these fires.
- Sixty-one percent (88) of the vessels remained seaworthy after the casualty. Thirty percent (44) of the vessels became unseaworthy. Only 1.5 percent (2) of the vessels were a total loss resulting from the fire. These two vessels were fully engulfed in flames at the time of the discovery. Firefighting efforts could not save the vessels.
- There was an equal distribution of fires among the vessels when sorted by gross tonnage up to 90 gross tons. Forty-two percent (60) of the vessel fires occurred on vessels between 90 and 99 gross tons.
- Forty-one percent of the vessel fires (59) occurred on vessels built between 1980 and 1990. Vessels built between 1970 and 1980 are the next highest category at 24 percent (35).
- Fires were evenly distributed by hull material – aluminum at 38 percent (54), fiberglass-reinforced plastic at 23 percent (33), steel at 23 percent (33), and wood at 13 percent (19).
- At the time of the fire, 68 percent (98) of the vessels were underway, and 28 percent (40) of the vessels were moored at the dock when the fire occurred. Only 1 percent (2) of the vessels were anchored when the fire occurred.
- At the time of the fire, 38 percent (55) of the vessels had an oceans route, 24 percent (34) of the vessels had a limited coastwise route, and 20 percent (28) of the vessels had a lakes route.
- Twenty percent (35) of the fires originated in overheated electrical or mechanical components. Twenty-four percent (34) of the fires originated in the electrical wiring. Eighteen percent (24) of the fires originated in the vessel exhaust system, and 12 percent (18) of the fires were started by malfunctioning equipment.
- Sixty-seven percent (96) of the fires originated in the engine room and 7 percent (13) of the fires originated in machinery spaces such as fan rooms or generator spaces.
- Fifty-five percent (78) of the fires were detected by vessel crewmembers. Eighteen percent (26) of the fires were detected by the master. Only 5 percent (8) of the fires were detected by a fire or smoke detection system.
- Of the fires where firefighting equipment was identified, 25 of the fires were fought using fixed firefighting equipment.
- Of the fires where firefighting equipment was identified, 123 fires were fought using portable firefighting extinguishers. Fifty-five fires were fought using portable CO_2 extinguishers. Twenty-five fires were fought using portable dry chemical extinguishers.
- Fifty-two percent (74) of the firefighters reported that their firefighting efforts were hampered by excessive smoke, although there was only one reportable injury attributed to smoke inhalation during firefighting efforts.
- Most of the fires occurred between 3-4 p.m. (14), 8-9 a.m. (12), 9-10 a.m. (11), 4-5 p.m. (10), and 8-9 p.m. (10) respectively.

Grappling hooks grab onto burning debris aboard the burning M/V *Agios Giorgis* after it caught fire. USCG photo.

Getting a Copy of the Regulations

If you decide to have your vessel Coast Guard-certified for carrying passengers, we suggest you obtain a copy of the regulations.

Ensure you have a copy dated Oct. 1, 1997 or later. Be aware that there were some changes to the regulations on Dec. 5, 1998. Printed copies can be obtained from a U.S. government bookstore or you may submit your order to the Government Printing Office via the Internet, phone, fax, postal mail, or teletype. Payment must accompany your order.

Internet: U.S. government online bookstore http://bookstore.gpo.gov/index.html
Phone: (202) 512-1800
Between 7:30 a.m. and 4:30 p.m., Eastern Time
Fax: (202) 512-2250
Mail: Superintendent of Documents
P.O. Box 371954
Pittsburgh, PA 15250-7954
Teletype: (710) 822-9413; ANSWERBACK USGPO WSH

Orders may also be submitted to one of the 24 U.S. government bookstores located throughout the United States. Phone and fax numbers, as well as postal addresses, for these bookstores are available from the U.S. government bookstores page. http://bookstore.gpo.gov/locations/index.html

The bookstore accepts Visa or Mastercard and will mail you a copy.
Ask for 46 CFR Parts 166 to 199.

Using The Regulations This guide is divided into sections A through H (via the above menu) relating to specific topics covered by the regulations.

Within each section are numbered pages that are devoted to specific sub-topics that may cover one or several pages.

We recommend you use the Index to guide you to the topics you have questions about.

New Sener Award Presented for Work on Three Investigations

The first recipients of the newly established Congressman James Sener Award recently were announced in recognition of three outstanding marine investigations. Winners of the 2001 award are Capt. Glenn W. Anderson, Cmdr. Richard M. Kaser, and Lt. j.g. Brian G. Knapp for the M/V Miss Majestic Marine Board of Investigation convened by the Commandant; MSO Milwaukee for the F/V Linda E formal investigation; and Cmdr. Thomas D. Beistle from MSO Port Arthur for the formal investigation of the Cliffs Drilling Rig Number 12 commercial diving accident. MSO Philadelphia won an honorable mention for the F/V Beth Dee Bob formal investigation and MSO Hampton Roads for the M/V Haru Verdy-F/V Frisco formal investigation.

The Congressman James Sener award, established in February 2000, recognizes units, investigative teams, and individuals that have demonstrated exceptional investigative skill and have most positively influenced marine safety. The recipients of the award were selected by an independent selection board based on the following criteria: professionalism of the investigative effort; timeliness and workload; salience of marine safety issues present in the incident; quality of the findings of fact; quality of the cause analysis; quality of the human error analysis; impact and quality of safety recommendations; impact and quality of public awareness information; and appropriateness of the enforcement action initiated.

The award is named after Congressman James Sener of Virginia, who sponsored the legislation that created the marine investigations program on June 20, 1874. His bill put in place the world's most effective system for identifying and eliminating unsafe conditions in the marine transportation system. The Sener award honors and recalls the Congressman's contribution to the safety of the public, mariners, vessels, and the marine environment through marine investigations.

TOP: **Capt. Michael B. Karr presents the Sener Award to Cmdr. Richard M. Kaser. Kaser is awarded, along with Capt. Glenn W. Anderson and Lt. j.g. Brian G. Knapp (not shown) for the M/V *Miss Majestic* Marine Board of Investigation.** CENTER: **Rear Adm. Paul Pluta presents the Sener Award to Cmdr. Thomas Beistle of MSO Port Arthur. Cmdr. Beistle is awarded for the formal investigation of the Cliffs Drilling Rig Number 12 commercial driving accident.** BOTTOM RIGHT: **Vice Adm. Ray Riutta presents the Sener Award to Capt. Glenn W. Anderson. All are USCG photos.**

High and Dry?

by Lt. Cmdr. MARTIN WALKER, U.S. Coast Guard Domestic Compliance Division

All photographs within this piece are courtesy Lt. j.g. John Miller and Lt. j.g. Keith Hanley of U.S. Coast Guard Activities New York. They were taken during a drydock inspection of the M/V *Elaine B II* at Lockwood Boatworks. *Elaine B II*, which is owned and operated by Stan Zagleski, is a day fishing vessel that operates in Lower New York Harbor and Ruritan Bay, and is moored in New Jersey.

How does a vessel owner comply with the normally scheduled drydock interval within the required timeframe when the nearest drydock is several hundred miles away, with fixed bridges in between? A number of passenger vessels on inland rivers and lakes face unique operational conditions with limited or non-existent drydocking facilities. The majority of these vessels are operated in "benign" environments. An example of such an environment is one in which the vessel operates in fresh water (less corrosion risk), near-shore and/or shallow water, mud-bottom rivers, limited routes, and limited time underway. Many of these passenger vessels could transit more than 1,000 river miles to find a drydock facility to accommodate them. Others, because they are land-locked or bridge-locked, would have to construct a drydock on-site to satisfy underwater hull examination requirements.

In the spring of 1998, the Coast Guard issued Office of Compliance (G-MOC) Policy Letter #3-98 titled, "Drydock Extensions for Certain Passenger Vessels" to allow specific passenger vessels that operate in benign environments to complete in-water surveys in order to obtain an extension to their normally scheduled credit drydock interval. This policy letter modifies the credit drydock

extension policy for passenger vessels that operate exclusively in benign environments. Passenger vessels may obtain a drydock extension of up to 30 months upon completion of a comprehensive hull survey. The Coast Guard is currently involved in a rulemaking project to codify many of the elements contained in the policy letter. The policy was designed to be a short-term fix to satisfy the needs of this segment of the passenger vessel industry while ensuring their safe operation until regulations could be published.

This policy letter allows operators of a passenger vessel inspected under Subchapter H, K, or T of Title 46, Code of Federal Regulations, to request a drydock extension beyond the one year that normally is allowed. To qualify, the passenger vessel must be constructed of steel or aluminum, and operate exclusively in fresh water rivers or protected lakes, and in shallow water or within one-half mile from shore. Shallow water in this case is defined as "the depth at which, if the vessel sinks, the uppermost deck(s) could safely accommodate all of the allowed passengers and crew above water."

The Officer in Charge, Marine Inspection (OCMI) will be the ultimate judge of this requirement, since local knowledge of the vessel and the operating conditions are essential. The cognizant OCMI must also evaluate the overall eligibility of the vessel to participate in the program. Other factors that will be considered are the material condition of the vessel, its operating history, and other hull-related deficiencies. Age is not a primary factor, but may be taken into consideration if it impacts the condition of the vessel. The OCMI may grant permission for a passenger vessel to participate in the program based on a satisfactory review of these aspects.

An example of a benign environment is one in which the vessel operates in fresh water (less corrosion risk), near-shore and/or shallow water, mud-bottom rivers, limited routes, and limited time underway.

The extension process consists of two main elements: **(1)** the initial survey, and **(2)** follow-up assessments to ensure the satisfactory condition of the vessel. The survey portion consists of an underwater exam, including the hull plating and all appurtenances (rudders, shafts, bearings, etc.) similar to the underwater in lieu of drydock (UWILD) exams that have been performed on other classes of vessels for many years. A major difference between the two is that the UWILD program allows participating vessels to forego every other scheduled drydock, while this policy is a drydock extension program. The survey consists of an examination of essentially every item that is considered during a traditional drydock exam, including the vessel's sea chests, sea valves, rudder and shaft seals. This underwater exam is normally performed by a diver, but may be done with a Remotely Operated Vehicle (ROV) if approved by the OCMI. A thorough internal hull exam is also completed, just as it would be during a regular drydock exam. This includes tanks and all compartments below the waterline, in way of the underwater hull. After completion of the survey, the examiner writes a report, which is kept on file in the local Coast Guard office.

A marine inspector points out the port aft corner of the *Elaine B II*, which indicates the obvious cross-planked (dead rise) construction of the vessel.

Marine inspectors enter lazarette to examine steering equipment, through hull fittings and planks. *Elaine B II*'s exterior hatch covers were required to be properly secured to the vessel.

The annual assessments required by the policy letter help determine the condition of the hull each year after the initial survey. These assessments are conducted in the presence of a Third Party Examiner, who may be any experienced surveyor hired by the vessel's owner and approved by the OCMI. The assessment will include an evaluation of the vessel's hull, including appurtenances and hull coating. A report to the OCMI is required after each assessment.

Approximately 20 vessels nationwide have taken advantage of this program to date. On the surface, this number seems relatively low; however, if not for the flexibility that an in-water hull survey provides, many of these vessels would have had to be taken out of service. The experience gained from these initial exams will help shape the future of the program. The regulatory development project will first be published as a Notice of Proposed Rulemaking (NPRM) in the Federal Register, requesting comments from the marine industry, the public and interested parties. Once this occurs, the Coast Guard will make a public announcement of the NPRM's publication and post it electronically for current regulatory development projects at **www.uscg.mil/hq/g-m/regs/current.html**. The NPRM can be read and downloaded from that site, or through the Department of Transportation's Document Management Service (DMS) homepage at **www.dms.dot.gov/search/**.

New technologies, combined with honed techniques for underwater surveys, are making logistical nightmares easier to contend with for passenger vessels operating in benign environments.

Lt. j.g. John Miller and Lt. j.g. Kim Chapman speak with owner Stan Zagleski in the vessel's accommodations area upon completion of the drydock inspection.

So it finally happened!
After several years of successful inspections
you received a Coast Guard discrepancy report based on a requirement (CG-835)
that seems to come out of nowhere.
The inspector explains the rationale behind the discrepancy but it just doesn't seem to be
appropriate. What do you do? Do you have
recourse? Of course you do, but too often operators of small passenger vessels
refuse to use it.

Appeal the discrepancy report;

it's your right.

by Lt. DEAN L. FIRING, Small Passenger Vessel Program Manager
U.S. Coast Guard Domestic Compliance Division

an appeal may save you from

I have heard many baseless reasons why operators refuse to appeal a Coast Guard-issued discrepancy report. "I'll be labeled a trouble-maker … the inspector will retaliate against my vessel at the next inspection … it's too much effort for so little gain …" Let me give some better reasons why you should appeal. We are all professionals trying to provide the public with safe transportation and quality service. Coast Guard inspectors are human and make mistakes. Regulations are general in nature and may not be appropriate for a specific type of vessel. Greater technical and historical reasoning may reside at a higher authority within the Coast Guard's chain of command. Review is a good thing because we all learn from it, and an appeal may save you from downtime and loss of revenue.

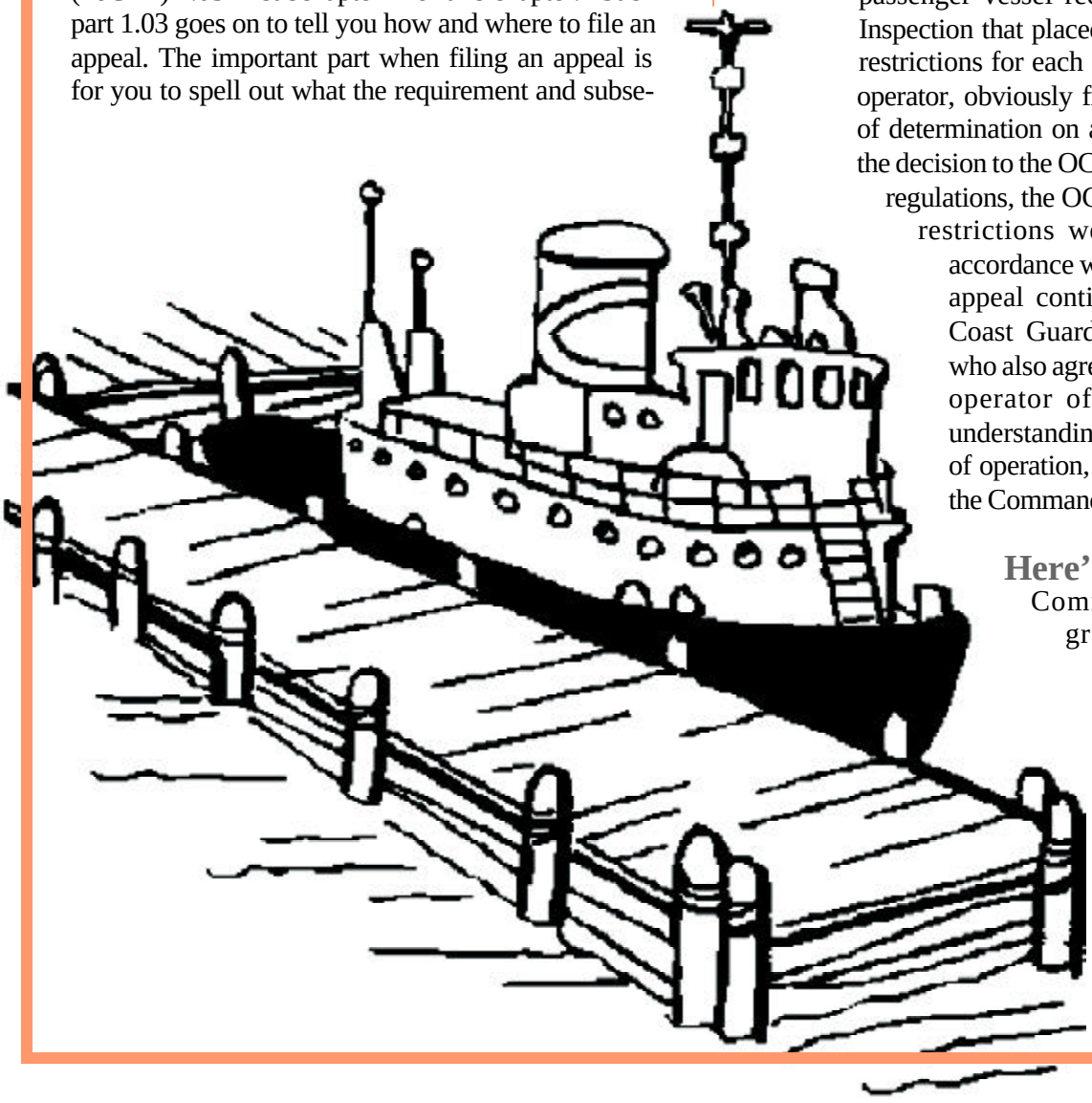
Your rights of appeal are spelled out in the regulations. Title 46, Code of Federal Regulations §175.560, Appeals: "Any person directly affected by a decision or action taken under this subchapter, by or on behalf of the Coast Guard, may appeal therefrom in accordance with (46CFR) 1.03 in subchapter A of this chapter." Subpart 1.03 goes on to tell you how and where to file an appeal. The important part when filing an appeal is for you to spell out what the requirement and subsequent discrepancy is and why it should not be applied to your vessel.

The process is simple and only requires a little research on your part and the writing of a letter. If you are not satisfied with the Officer in Charge, Marine Inspection's (OCMI) response to your appeal, it can continue to the District Commander and if necessary, to the Commandant. During this process the effects of the discrepancy may be stayed pending the determination of the appeal.

So does it work? Sure it does. Sometimes the final decision is in favor of the operator, and sometimes not; each case stands on its own merits. Let me give you an actual example that we all can learn from:

After several years of successful operation in the same port, an operator of a multi-deck dinner cruise small passenger vessel received a Certificate of Inspection that placed passenger distribution restrictions for each deck of the vessel. The operator, obviously frustrated by the change of determination on a requirement, appealed the decision to the OCMI. After reviewing the regulations, the OCMI determined that the restrictions were warranted and in accordance with the regulations. The appeal continued to the cognizant Coast Guard District Commander, who also agreed with the OCMI. The operator of the vessel, still not understanding the change after years of operation, continued the appeal to the Commandant of the Coast Guard.

Here's the text of the Commandant's response granting the appeal in favor of the operator:



downtime and loss of revenue

The provision contained in Title 46, Code of Federal Regulations (CFR) § 115.113, used to determine permitted passengers, appears to have been incorrectly interpreted. 46 CFR § 115.113(c) states, in the later part, that "The length of rail criterion may not be combined with either the deck area criterion or the fixed seating criterion when determining the maximum number of passengers permitted on an individual deck." The words "permitted on" appear to have been interpreted as a deck-limiting constraint. This section discusses a method to calculate a vessel's total permitted passengers and was not intended to limit the number of passengers on a given deck. Substitution of the words "calculated from" in place of "permitted on" should reduce confusion.

The issue of total passenger capacity was addressed during the revision of Subchapter T and formation of Subchapter K. 46 CFR § 115.113 is a mirror of 46 CFR § 176.113 which itself is rooted in 46 CFR 176.01-25 (Old T). The intent during the revision of these regulations was only to clarify which areas would be specifically prohibited from being used in determining passenger capacity.

The remainder of the section was to remain the same. The question of limitations on passenger capacity of individual decks was addressed in the Proposed Rules published in the Federal Register (59 FR 2011) of Jan. 13, 1994. The Coast Guard stated that 46 CFR § 176.113 was intended to be used to determine the total vessel capacity but that stability calculations could further restrict the number of passengers on the vessel or on an individual deck. For this vessel the individual deck restrictions are stated in the stability letter issued by Marine Safety Center.

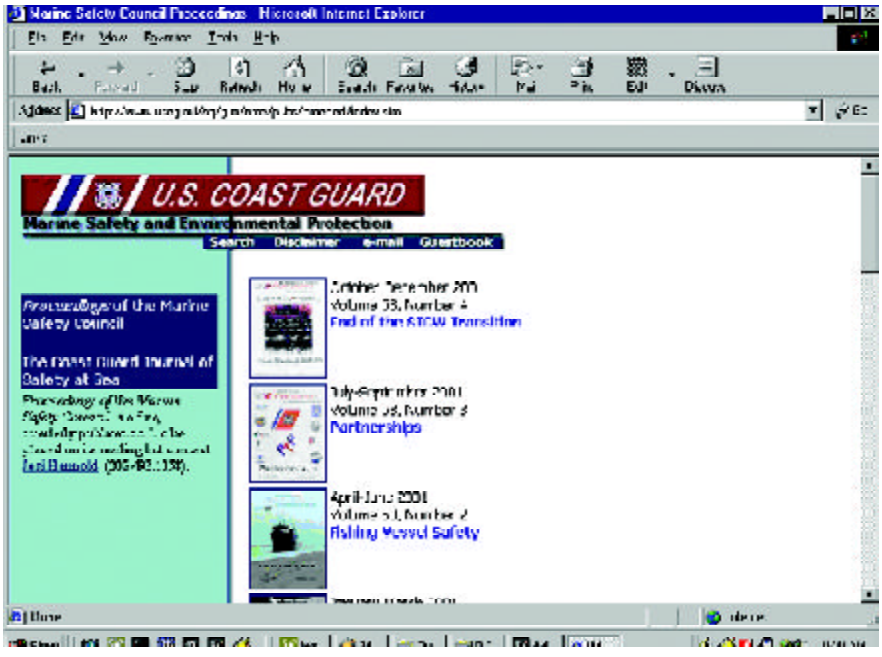
By copy of this letter the OCMI is directed to re-examine the passenger capacity and restrictions based on the above clarification and adjust the Certificate of Inspection accordingly.

Appealing a questionable discrepancy report does not always go your way but it is your right … exercise it! In closing, I would like to leave you with the words of Mr. Roger Baldwin, founder of the American Civil Liberties Union, "So long as we have enough people in this country willing to fight for their rights, we'll be called a democracy."

DID YOU KNOW …

YOU CAN ACCESS PAST ISSUES OF PROCEEDINGS MAGAZINE ON THE WEB!

www.uscg.mil/hq/g-m/nmc/pubs/proceed/index.htm



INTERNET

GOVERNMENT AGENCIES

FirstGov
www.firstgov.gov

U.S. Department of Transportation
www.dot.gov

United States Coast Guard
www.uscg.mil

U.S. Army Corps of Engineers
www.usace.army.mil

National Oceanic and Atmospheric Administration (NOAA)
www.noaa.gov

U.S. Small Business Administration (SBA)
www.sba.gov

TRADE ASSOCIATIONS

National Association of Charterboat Operators (NACO)
www.charterboat.org

Passenger Vessel Association (PVA)
www.passengervessel.com

RESOURCES

LEGAL

United States Code
www4.law.cornell.edu/uscode/

Code of Federal Regulations
www.gpo.gov/nara/cfr/cfr-table-search.html#page1

Federal Register
www.access.gpo.gov/su_docs/aces/aces140.html

PUBLICATIONS & RESOURCES

U.S. Coast Guard Publications
www.uscg.mil/hq/g-m/nmc/genpub.htm
Contains: Proceedings Magazine, Vessel Documentation Forms, Investigation Forms (CG-2692), Drug & Alcohol Testing Data, Personnel Forms (MMD), Technical Publications (NVIC, Marine Safety Manual, Policy Letters, Marine Technical Notes, Navigation Rules

U.S. Coast Guard Investigations & Analysis
www.uscg.mil/hq/g-m/moa/casualty.htm
Contains: Safety Alerts, Lessons Learned, Safety Reports, Casualty Reports

National Vessel Documentation Center
www.uscg.mil/hq/g-m/vdoc/nvdc.htm

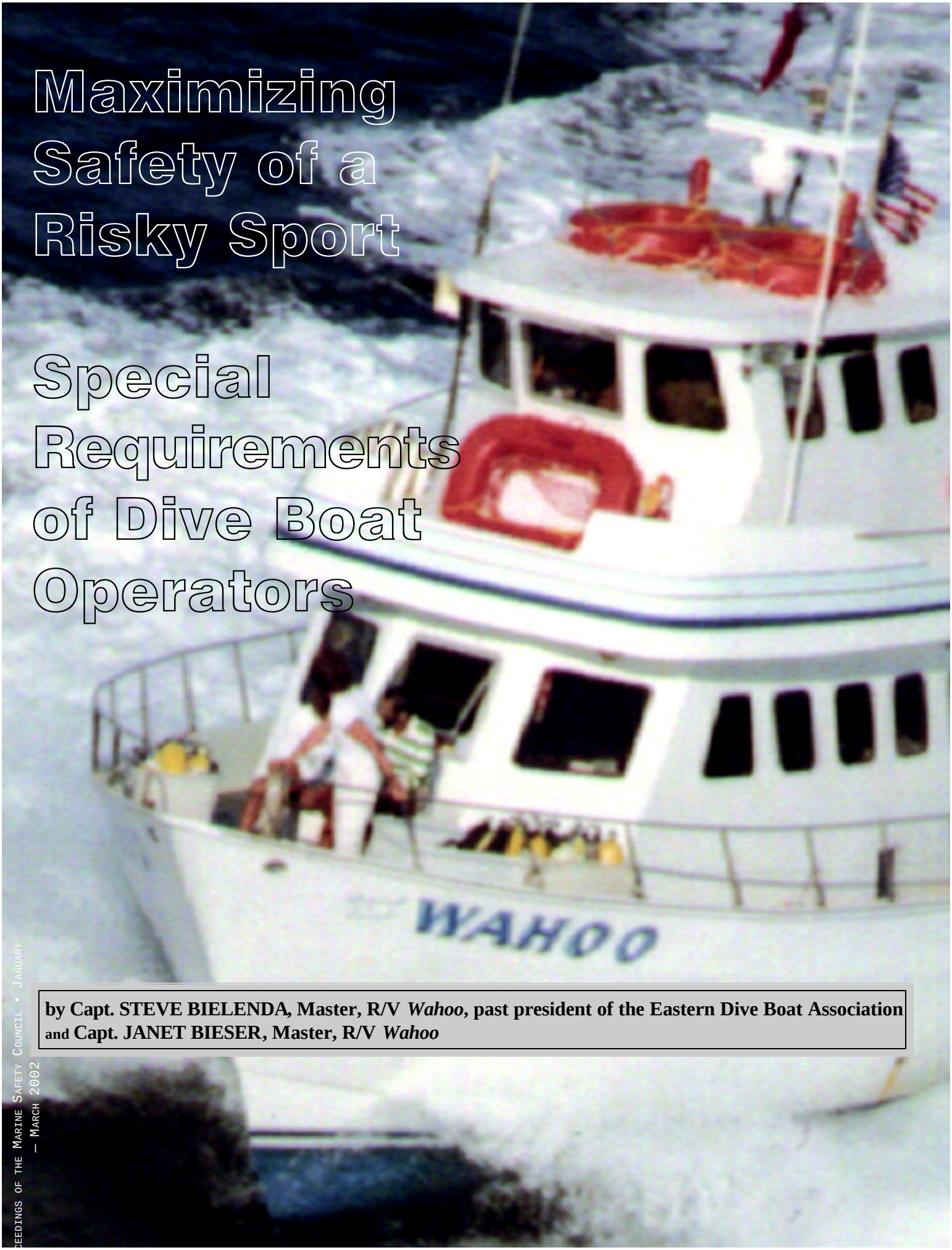
USCG Marine Safety, Security & Environmental Protection Phonebook
www.uscg.mil/hq/g-m/nmc/gendoc/phone.htm

U.S. Coast Guard Licensing Information
www.uscg.mil/STCW/m-pers.htm

U.S. Coast Guard Plan Review Guidance
www.uscg.mil/hq/msc/Default1.htm

Maximizing Safety of a Risky Sport

Special Requirements of Dive Boat Operators



by Capt. STEVE BIELENDA, Master, R/V *Wahoo*, past president of the Eastern Dive Boat Association and Capt. JANET BIESER, Master, R/V *Wahoo*

PROCEEDINGS OF THE MARINE SAFETY COUNCIL • JANUARY – MARCH 2002

Chartering for dive boating differs from conventional chartering and fishing. Boat operators must prescreen divers to ensure they are qualified to join the trip, and while scuba certification is not essential, boat operators must have some knowledge of diving and related medical issues.

Prescreening Divers

Prescreening divers is just one of the many special requirements of dive boat operators. Because of the inherent risk in the sport, dive boat operators of both commercial and private boats should take the special precautions to maximize the safety of their passengers.

Screening divers for qualifications is not an easy process. Individual reservations, or charters, can be made in many ways, including Email, telephone, mail or by a third party. All the information that's needed to determine a diver's qualifications often isn't available; by speaking directly with a diver, a boat operator can uncover enough information to determine whether the diver has the basic qualifications to join the dive trip, since dive sites vary in degree of difficulty and amount of experience and fitness required to participate. A snorkeling trip on a coral reef in 85-degree water at 15 feet is a world away from a cave-dive, or Trimix dive, on a deep shipwreck dive in cold turbid water.

Diver Certification

Relying on certification cards and logbooks as proof of training (c-cards) may be problematic. The diver may have been trained several years prior with little subsequent review and practice, and logbooks can be an exercise in creative writing. In addition, we do not know the level of quality control used by national or internationally recognized training agencies. These training agencies have published standards, but the use of these standards is only as good as the instructor or business who will use the standards to train divers. More reliable methods of determining a diver's qualifications include examining diver logbook entries, which contain authentic verification stamps, decals and signatures from other diving facilities, and interviewing the diver about previous dives to the same environment and observing his/her demeanor.

Diving Equipment

All trips should include required equipment appropriate for the type of diving and the location. The minimum equipment that is generally agreed upon within the industry includes the scuba unit (Self Contained Underwater Breathing Apparatus), tank, regulator with octopus and pressure gauge, depth gauge, timing device, mask, fins, snorkel, knife or other cutting device, buoyancy control system and weights. Additional gear may be added to your required gear list depending on the environment in which you operate your dive boat, including redundant air supply such as a pony tank or spare air, a second cutting device, such as emergency medical technician (EMT) shears or parachute line cutter, dive computers, dive reels lift-bags or safety sausages, lights and chemical light sticks. Some deep, cold, turbid or overhead environments may require more equipment than a space walk, including multiple gasses and bottles, suit heaters, and diver propulsion vehicles.

Diver Roster

At sign-in, each trip should include an assumption-of-risk sheet, which can serve as both a roster of all persons and check-off sheet before departing the dive site. It is essential that you have a complete list of all persons aboard, including each person's name, age, address, and emergency phone number. This information will be requested by rescue agencies in the event of an accident. Before leaving the dive site for the day, check in each person individually by name, not merely by counting heads, to minimize the possibility of leaving anyone behind.

Divers who dive from certified vessels can choose many different destinations. This table lists some of the wrecks visited by the RV Wahoo; divers dive down to and swim around and inside these wrecks.

Vessel Name & Description	Specifics of Sinking	Depth of Water	Geographic Location
USS *San Diego* •armored cruiser	sunk July 19, 1918 by mine laid by German submarine U-156	105 feet to bottom of wreck, 70 feet to top	Atlantic Ocean 13 miles east of Fire Island, NY
Andrea Doria •697-foot passenger liner	sunk July 25, 1956 after collision with S/S *Stockholm* in fog	250 feet to bottom of wreck, 170 feet to top	Atlantic Ocean 200 miles east of New York City; 100 miles east of Montauk, NY
Lizzie D •122-gross ton, 84-foot tug boat	sunk Oct. 22, 1922 for reasons unknown	80 feet to bottom of wreck, 70 feet to the deck	Atlantic Ocean 8 miles south of Jones Inlet, NY
Stolt Dagali •19,150-ton Norwegian oil tanker	sunk Nov. 26, 1964 after being cut in half during a port side collision in fog with S/S *Shalom*	130 feet to bottom of wreck, 85 feet to top	Atlantic Ocean 25 miles south of Rockaway Inlet, NY
U-853 •German submarine	sunk May 5, 1945 by part of a U.S. Navy task force	125 feet to bottom of wreck, 110 feet to the deck	Atlantic Ocean 6 miles east of Block Island, RI
Black Warrior •225-foot wooden side wheeler; 1,556 gross tons/ passenger ship	sunk Feb. 20, 1859 after grounding in the New York harbor during fog, high tide and storms subsequently sank her	Max depth 30 feet	Atlantic Ocean 2 miles east of Rockaway Inlet, NY

Float Plan

Have a float plan and leave it with a responsible person before setting out for the day. The information should include a description of the boat, how many persons are aboard, the location of the trip and proposed itinerary, including when you expect to return.

Vessel Orientation

Give an orientation for the vessel. In addition to the standard Coast Guard-required discussion regarding lifesaving equipment and firefighting, the orientation for diving should include where to stow equipment safely, entry and egress from the water, and proper stowage of tanks and weight belts. Unsecured tanks, gearboxes/bags and weightbelts falling, sliding or rolling can cause injuries, and a major shift in the load onboard the vessel can jeopardize the vessel's stability.

Equipment Inspection

Try to recognize deficiencies in training or equipment as divers are assembling and donning their gear. To avoid the need for rescue measures later, professional divemasters and boat crews should identify equipment that is less than fully operable or unacceptable due to deterioration or breakage. Prohibit diving with leaking, mislabeled, broken or malfunctioning scuba equipment. Extra sets of rental equipment brought along on the charter can be used to solve last-minute problems.

Ineptness or error on the part of the diver during pre-dive preparations can signal a potential victim, whether it stems from inadequate skills or knowledge, or from anxiety or nervousness. Potential victims may exhibit errors in basic skills, such as identifying the location of the regulator on the tank valv, assembling the buoyancy compensator, and using dive tables. Anxious divers may exhibit an increase in the pitch of their voice, chatter incessantly, have shrill nervous laughter, or at the opposite extreme, withdraw prior to a dive, sitting quietly away from everyone and speaking only when spoken to. Hanging back during dive preparations, not being ready or nearly ready when their dive buddy is, allowing themselves to be left out during pre-dive buddy pairing, making several false starts during their entry and returning to their gear bag for additional equipment, and stepping back to make adjustments repeatedly are signals that a diver is not eager to enter the water. Improper technique during entry, high treading, clinging and clambering, mask and regulator removal, buoyancy problems, and difficulty in clearing are also indicative that the individual may need assistance. A diver who is treading water with sufficient vigor to lift a large part of their body and equipment out of the water is clearly communicating their distress. Removal or rejection of mask and or regulator may accompany high treading; rejection of equipment designed to facilitate underwater activity is a clear sign that the individual does not belong underwater nor wish to be there.

Dive Boat Operators Should Take Special Precautions to Maximize the Safety of Their Passengers. Before Setting Out ...

- Prescreen divers for qualifications to join the trip
- Require appropriate dive gear for the environment
- Prepare a complete roster of all persons aboard
- Leave a float plan with someone on land
- Give a vessel orientation to all passengers
- Try to recognize deficiencies in training or equipment as divers are getting ready
- Give a dive site orientation
- Ask the divers for their individual dive plans
- Require the divers to return with a safe margin of air remaining
- Never leave the vessel unattended
- Have a plan for recovering exhausted or injured divers from the water, as well as those who surface down current or far from the boat
- Prohibit alcoholic beverage consumption before diving
- Prohibit recreational drugs aboard
- Have available dive boat-specific first aid supplies and training
- Know where closest recompression chambers are
- Have phone numbers handy to several rescue agencies
- Obtain training for a helicopter airlift

Dive Site Orientation

Give a dive site orientation. Water depth, compass bearing and alignment of underwater structures such as shipwreck, coral reef, and rock formations are cues to underwater navigation. Also point out underwater conditions such as current, water temperature and visibility, and hazards such as fishing line, nets, kelp, overhead environments, and dangerous marine animals. Have a plan to recover divers who surface down current or far away from the boat and explain the procedure. When the dive boat is anchored, the plan may include throw-bags, trail lines, chase boats, and rescue swimmers towing a float and line. Be aware that fog, rain, and wave action may drastically reduce visibility; divers and the vessel should have devices to signal by sound. Products such as air-powered whistles, inflatable safety sausages, strobe lights, waterproof smoke and flares are available for divers to carry in addition to the standard whistle attached to the diver's buoyancy compensator.

Diver Plan

Ask divers for their dive plan. The plan will let you know when to expect the diver to return and to recognize a possible problem when the time is expired. It also lets you know that the diver is capable of planning a dive, or that he should ask for assistance in planning and using dive tables.

Margin of Gas

Require the divers to return with a safe margin of gas in their tank. The traditional figure is returning with 500 PSG remaining in the scuba cylinder(s) for normal sport diving limits (0-120 feet) no-required decompression diving. Other diving environments can require a more conservative limit using the rule of thirds of the total supply: consuming one-third outbound, one-third returning and one-third as a safety reserve.

Never Leave the Vessel Unattended

Always have onboard someone with the proper qualifications who is capable of operating the boat and communication equipment and keeping watch for trouble. Empty dive boats have gone adrift or sunk, leaving divers stranded at sea. Passengers left alone to man the vessel have been adrift after the vessel breaks free without knowledge of how to operate the radio and navigate back to the wreck site or even back to port, leaving the captain and mate lost at sea for hours. If dive buddies separate, one may become distressed and surface alone. If no one is available at the surface to help it can lead to tragic consequences. Proper manning is the law for Coast Guard inspected vessels and for those uninspected vessels carrying passengers for hire (six pack dive boats). Certificated vessels must be ready to operate with its licensed captain. It has been 15 years since I have heard of a Coast Guard-licensed captain leaving his certificated vessel to dive. It has happened less frequently on uninspected vessels, and routinely occurs when divers use privately owned vessels.

Recovery Plan

Have a plan for recovering exhausted or injured divers from the water. Removing a victim from the water may be the most difficult part of a rescue. The best-equipped dive boats will have a stern platform at or near water level that can aid in lifting a person out of the water. An inflatable dinghy or chase boat with its inherent stability low freeboard and rounded gunwales also provides a platform. Another way to lift an incapacitated person is to roll him up in a net, tarp, sail, blanket, or even an air mattress. Secure one end and roll the victim aboard by pulling on the other end; this cuts the effective weight in half as the person acts as a pulley. A sturdy piece of line can be used to make a rope-lift utilizing the same principle of mechanical advantage. Choose the largest diameter rope conveniently available to avoid chafing the victim, but almost any rope will do.

Communications Equipment

Have communication equipment such as a cell phone, marine very high frequency (VHF) radio, or single side band (SSB) radio. Equipment to summon help is essential at any shore-based or at-sea dive site. Know in advance where the closest recompression chambers are and have the phone numbers available to supply to any rescue agencies. Have the phone number easily accessible for diver's alert network (DAN).

Medical Guidance

Caution passengers to the frequency and severity of sunburn. Sunlight reflected from the water's surface and white fiberglass decks may cause severe burns on swimmers far more quickly than on shore. Because they are cooled by water washing over them, snorkelers can get badly burned on their backs and backs of legs and may not notice the injury until leaving the water. Provide sunscreen, shade and drinking water.

Prohibit alcoholic beverage consumption before diving. Prohibit recreational drugs at any time aboard.

In addition to basic first aid equipment and supplies such as band-aids, peroxide, aspirin, etc., dive boats need some supplies specifically for water sports. For jellyfish stings, Adolph's meat tenderizer, ammonia (Windex), After-Bite, or Solarcane can provide relief. For hypothermia, have onboard a sleeping bag or blanket and a thermos of hot liquid. It is essential to have oxygen at any dive site, and the apparatus to supply it at 100 percent as first aid for any suspected decompression illness, drowning or barotrauma. Obtain training on how to participate in a helicopter airlift (sometimes available from the U.S. Coast Guard). A few things you must do in the event of an airlift are to secure all items that may fly up into the rotors (wet suits, clothes, etc.) and lower antennas. As the helicopter approaches, determine the total number of crew aboard it so that you can get everyone out if it crashes into the water during the risky lift procedure. Get underway at an angle into the prevailing wind specified by the pilot. Allow the basket to discharge static electricity by first touching the vessel. Never tie the aircraft to the vessel via the lift cable. Secure victim into litter and send along any information available about the diver's exposure, gasses and deco along with any dive computer.

Enjoy ... But be Careful!

Contrary to what many scuba retailers and training agencies' marketing campaigns would have you think, diving is not "as safe as bowling." Scuba diving is an inherently risky activity; from the moment you step into the water you are entering an alien environment. Added to the inherent risk of the sport are the complexity of boating and the capricious nature of the sea. Because of these factors, it is not possible to eliminate all risk, but, by adhering to the above requirements, it will be greatly minimized.

New Trends In Drug Use Detection

by ROBERT C. SCHOENING
Drug and Alcohol Program Manager,
U.S. Coast Guard Office of Investigations & Analysis

The sea is a harsh mistress that has no forgiveness for errors or mistakes. This is a well-known fact among experienced mariners. The illegal use of controlled substances in the marine environment is a factor for accidents and/or death at sea. The Federal Register, Notice of Proposed Rulemaking for Chemical Drug and Alcohol Testing for Commercial Vessel Personnel (53 FR 25927, published on July 8, 1988), stated: “Not only do personnel who use drugs and alcohol pose dangers to themselves and shipmates, they are in a position to cause or contribute to vessel casualties that may take human life, destroy property, and/or seriously harm the environment.” Fortunately, there are many tools available to the marine employer to help fight this drug use scourge and help make the sea a friendlier environment in which mariners can operate.

The Economic Cost of Drug Abuse, 1992-2000 Overall Costs (in millions of 2000 dollars)

Cost Categories	1992	1993	1994	1995	1996	1997	1998	1999	2000
Health Care Costs	$13,132	$13,095	$12,959	$12,630	$12,402	$12,821	$13,435	$14,165	$14,899
Productivity Costs	$69,421	$91,874	$94,996	$98,411	$100,296	$100,218	$102,855	$106,648	$110,491
Other Costs	$21,912	$26,406	$28,078	$30,300	$29,782	$32,383	$33,513	$35,050	$35,274
Total	$104,465	$131,376	$136,033	$141,340	$142,479	$145,422	$149,803	$155,863	$160,664

Source: Analysis by the Lewin Group, 2001

Drug use costs the economy millions of dollars in health and productivity costs. The costs of substance abuse are a part of the marine industry's "up front" costs. While there are no readily identifiable costs attributable to the marine industry, costs are available for the U.S. economy as a whole. The chart above, released by the Office of National Drug Control Policy in its publication, "The Economic Costs Of Drug Abuse In The United States 1992-1998," published September 2001, summarizes these costs from 1992-2000.

There are tools already in place to help the mariner who has a substance abuse problem. The Coast Guard has long recognized that mariners who acknowledge that they have a substance abuse problem can voluntarily seek treatment or assistance with no forthright penalty for doing so. The regulations that govern this are contained in 46 CFR Part 5 Subpart E (Deposit or Surrender of License, Certificate or Document). They may perform a voluntary deposit and must comply with certain stipulating conditions.

Petty Officer 2nd Class Carlos Cruz hands out anti-drug knick knacks to teens at a drug-use prevention presentation in Miami, Fla. USCG photo by PA3 Danielle DeMarino.

There are additional methods in place to assist in effecting a drug-free maritime workforce. One of these is required Chemical Testing (46 CFR Parts 4 and 16), which came into effect in 1988. These regulations require the use of various tools to achieve a drug-free workplace using a three-tiered approach.

The first tier is the establishment and implementation of a drug-free workplace and includes a drug testing policy for employees by each marine employer. The marine employer must post or distribute this policy to each employee. The policy may include employee awareness about the dangers of illegal drug use and actions the marine employer will take when the problem of drug use/abuse is encountered.

The second tier is drug awareness. Drug awareness is a two-step process. The first step may include educational programs to assist supervisors in recognizing the signs and symptoms of drug abuse and how to deal with the troubled employee who may be a user of illegal drugs. The second step is employee education, which may include awareness about the dangers of illegal drug use and the consequences to the workplace and family.

The third tier is the use of urine-based drug testing, which is performed for several reasons. **(1)** Pre-employment testing is performed before an employee is placed in a safety-sensitive position. **(2)** Random testing of all safety-sensitive employees is conducted to deter the illegal use of controlled substances and to promote a drug-free and safe work environment. The random selection rate is 50 percent. **(3)** Reasonable suspicion testing is performed when there are signs or symptoms that an employee is using drugs illegally. **(4)** Serious Marine Incident (SMI) testing is performed after a serious marine casualty has occurred and has to meet the SMI requirements for testing as given in 46 CFR Part 4. **(5)** Periodic testing is done for certain license or Merchant Mariner Document transactions.

Other types of testing that can be performed include return-to-duty (RTD) and follow-up testing; procedures for these tests are included in 49 CFR Part 40.305 and 307. RTD testing is performed after an individual has completed the

recommendations of the Substance Abuse Professional (SAP) and the employer wants to rehire this individual. The test must be negative before the individual may be re-employed in a safety-sensitive position. Upon being re-employed, the individual is required to undergo a minimum of six follow-up tests in the following 12 months in addition to random testing. Additionally, credentialed mariners have to comply with the requirements given in 46 CFR Part 5, Subpart L for the re-issuance of their credentials.

The tests described above are federally mandated, require the use of a Federal Drug Testing Custody and Control Form (CCF), and must be performed in accordance with the requirements stipulated in 49 CFR Part 40. Those requirements include the collection of the specimen, analysis of the specimen by an accredited laboratory, and verification of the specimen by the Medical Review Officer (MRO) before the report is given to the marine employer.

Testing may be done by a marine employer for non-federal reasons, such as after an accident that does not involve a federal requirement to test. Federal forms will not be used for these tests.

What is on the Horizon for Drug Testing?

There are several new methods for detecting the use of controlled substances that are now being presented for possible use in the future. The new testing methods include hair testing, oral fluids (saliva) testing, sweat testing, and on-site testing devices. On-site testing devices can use urine or oral fluids as a specimen source. Some of these testing methodologies have existed for several years, but now the federal government is considering their use in the federal workforce.

The process of considering these alternative methods started in April 1998, with a three-day open meeting in front of the Drug Testing Advisory Board (DTAB)[1], sponsored by the Department of Health and Human Services/ Substance Abuse and Mental Health Services Administration (DHHS/ SAMHSA). This meeting was the first step in gathering information to determine whether these methodologies should be incorporated into a drug test matrix. The meetings on this subject have been continuing regularly since 1998. On Sept. 4, 2001, a draft guideline was prepared and distributed for comment. A paramount issue that faced DTAB was the forensic application of these different types of specimens into a federal workplace setting. This means that a testing methodology has to be proven to stand up in a court of law and withstand challenges to the methodology. Some of the issues that had to be addressed include: **(1)** the methods of analysis, both screening and confirmatory methods; **(2)** the quality control measures used to ensure reliability and reproducibility of the results; **(3)** collection of these specimens from different body sources; **(4)** MRO procedures for the test results; **(5)** drug detection times for each specimen matrix; **(6)** cut-off levels for both screening and confirmatory methods; and **(7)** applicability of each specimen type to a test reason. These are just some of the factors that have to be considered before incorporating these matrices into a federal workplace setting.

MARINERS WHO ACKNOWLEDGE THAT THEY HAVE A SUBSTANCE ABUSE PROBLEM CAN VOLUNTARILY SEEK TREATMENT OR ASSISTANCE WITH NO FORTHRIGHT PENALTY FOR DOING S

Each of the above-listed specimen types has its merits and place in achieving a drug-free workforce. Some of the factors to consider are: **(1)** ease of collection of the specimen, i.e., how intrusive is the collection process; **(2)** training of personnel to correctly collect the specimens; **(3)** acceptable test reason for specimen type; **(4)** proper performance of the on-site test devices; **(5)** training and qualifications of personnel to use the on-site testing devices; and **(6)** specimen integrity after collection. The above list is not all-inclusive. Another on-going question is approval by the Food and Drug Administration (FDA) of these on-site testing devices.

A load of more than 11,000 pounds of cocaine that was taken off two go-fast boats intercepted by CGC *Thetis*. The Coast Guard halted almost 33,000 pounds of marijuana and cocaine from illegally entering the United States in FY '02. USCG photo.

[1] DTAB meets once a quarter with a session that is open to the public and allows public comment. There is also a closed session (the public cannot attend these closed sessions). All public transcripts, members of DTAB, meeting schedule and other information can be found on the Internet at the following address: **http://workplace.samhsa.gov/frames/frame_drugtest.htm**

Detection times for each specimen source vary widely. The specimen with the longest detection window is hair. Hair will retain evidence of past drug use as a permanent record in the inner shaft. A normally collected hair specimen that is at least 3.9 cm in length will provide evidence of drug use for approximately 90 days prior to the date the hair specimen was collected. For oral fluids, the detection window is approximately 48 to 72 hours, and the use of drugs may be detected very early after recent drug use. Sweat patch testing will show whether drugs have been used as early as 24 hours before the patch is applied until the patch is removed. It has been recommended that the patch be worn for one week. Urine specimens will show the presence of drugs about 24 to 96 hours from time of last use, with the exception of marijuana, which may persist longer in the body due to several metabolic factors.

The following table shows what specimen source could be used to meet certain drug test requirements based on the detection time frames described above.

Type of Specimen	Reason for Test
Hair	Pre-employment; random; return to duty; follow-up
Sweat (patch)	Return to duty; follow-up
Urine	Pre-employment; random; reasonable suspicion/cause; post accident; return to duty; follow-up
Oral Fluid	Pre-employment; random; reasonable suspicion/cause; post-accident; return to duty; follow-up

All of the above specimens would be tested for the SAMHSA 5 panel drug test. SAMHSA currently accredits laboratories for the analysis of these five drugs or drug classes, which include **(1)** marijuana or its metabolite, **(2)** cocaine or its metabolite, **(3)** amphetamine class (methamphetamine and amphetamine), **(4)** opiate class (morphine, codeine, heroin), and **(5)** phencyclidine (PCP). These are all on the Controlled Substance List as Class I or II controlled substances (21 CFR Part 1308). Hair has a longer detection window for heroin use than the other specimen matrices. The use of heroin will remain embedded in the hair shaft while evidence of heroin use is quickly eliminated from the body.

Hair is collected from the crown of the scalp using barber scissors. The growth of hair on the scalp is consistent and not subject to growth variables like other potential body hair sources could be. Normally about 60 strands of hair, about 3.9 cm in length, will be an adequate specimen.

The sweat (patch) test is a device that is worn on the upper arm, chest, or back. It will absorb the sweat as it is excreted through the sweat pores in the skin. As the sweat leaves the body, it will be absorbed into a pad inside the patch. The patch has been designed so that the pad is not subject to external environmental elements nor can it be removed and then reattached. An attempt to do so will leave traces of tampering with the patch.

Oral fluids (saliva) testing is done by placing a pad inside the mouth to absorb fluids. The actual specimen collection process takes about two minutes. The donor places the pad inside his or her mouth under the observation of a trained collector. The pad is transferred to a container for shipment to the testing laboratory.

On-site testing can use urine or oral fluids as a specimen source. These specimens can be tested on-site giving a screen test result. One advantage is that if a test result is negative, the individual can be hired immediately, if the test is for pre-employment purposes. If the on-site test is positive, the specimen then has to go to the laboratory for confirmatory testing and MRO review as necessary before final results can be returned to the employer. There are some issues with this type of testing, including the training and qualifications of the personnel performing the collection and analysis of the specimens, ease of use of each device, quality control, confidentiality of the test results and blind proficiency testing.

All of these tools may become available to the marine employer in the distant future, after certain procedural actions have been taken. First, DHHS/SAMHSA would have to publish an NPRM to receive comments about the proposed changes. Once the comment period has closed, the comments would have to be evaluated and the Final Rule or Guidelines would have to be published. By law passed in 1991, DOT has to follow the changes that have been incorporated by SAMHSA. DOT would then have to revamp 49 CFR Part 40 to incorporate the new technologies as given by SAMHSA.

There are even more testing procedures on the far distant horizon, but further research and development is required of these methodologies.

While no immediate changes are contemplated, new testing procedures may someday assist the marine employer to maintain a drug-free workplace and a workforce that is better equipped to do business in a hazardous marine environment; the employer may have fewer concerns that drug use may be a factor when accidents occur.

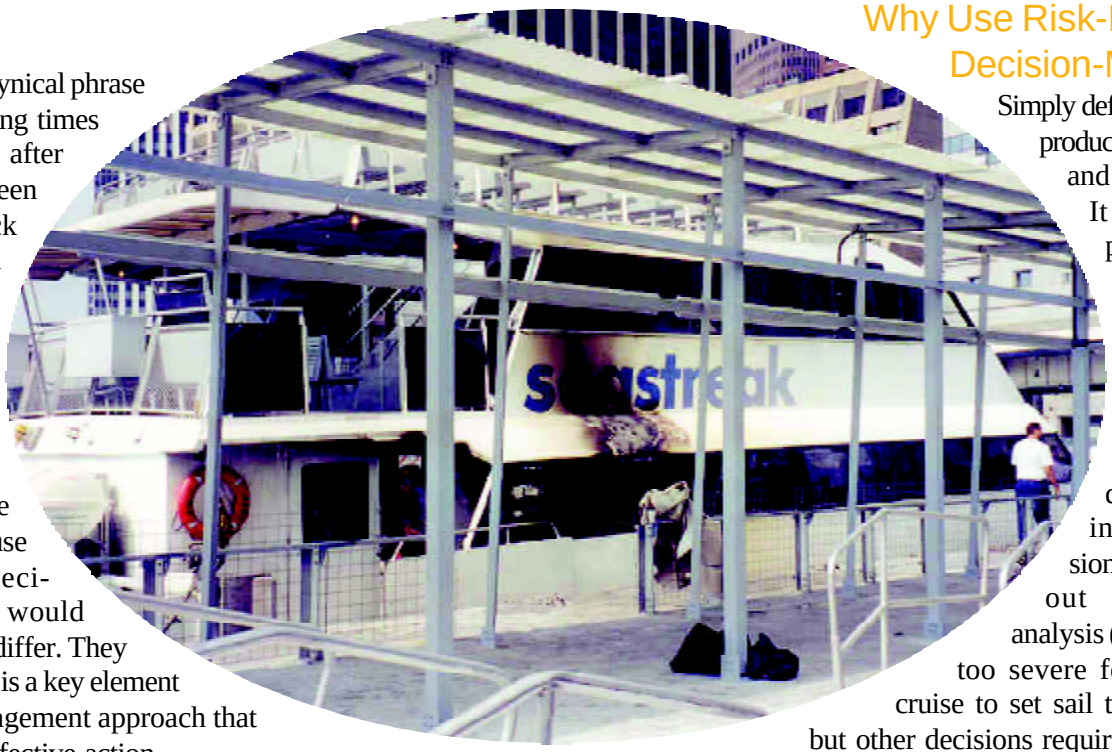
RISK

Taking a More Cost-Effective Approach to Safety:

Risk and the Passenger Vessel Industry

by JENNIFER BLAIN KIEFER[1] and JOSEPH MYERS[2]

Talk is cheap.



So often this cynical phrase is uttered during times of frustration, after people have been bantering back and forth on a subject with no result. To say "talk is cheap" implies that talk accomplishes nothing. Those people who use risk-based decision-making would wisely beg to differ. They know that talk is a key element of a risk management approach that will lead to effective action.

As the waters are ever changing, so is the maritime industry. The small passenger vessel industry is particularly susceptible to such constant changes; contingency planning, customer relations, changes in service, and potential casualties are just a few. Most times these changes can be dealt with efficiently and effectively, but sometimes the solution doesn't seem obvious or cost-efficient (or it may not be specifically addressed through regulations). In these times, it is important to have a tool that can help in the development and evaluation of the most meaningful (and cost-effective) risk management solutions.

Why Use Risk-Based Decision-Making?

Simply defined, risk is the product of probability and consequence. It decreases as probability or consequence decrease. Mariners make decisions based on risk every day. Some are informal decisions made without any formal analysis (Is the weather too severe for the dinner cruise to set sail this evening?), but other decisions require more formal thought and analysis. They require more work to arrive at a defensible decision (Can we safely increase the number of passengers? How can we get this change approved?). Everyone deals with risk at some level, so the question becomes how best to deal with it.

Effectively managing risk requires risk-based decision-making, a process that organizes information about the possibility for one or more unwanted outcomes into a broad, orderly structure. This process helps decision makers produce more informed management choices.

A worker ensures the safety of vehicles and passengers of a Washington Island ferry. Photo courtesy Washington Island Ferry Line.
PREVIOUS PAGE: M/V *Express I*, an express ferry that typically carries passengers from Atlantic Highlands, NJ to Manhattan, NY, after an onboard fire. USCG photo courtesy USCG Activities New York.

Forming the foundation for risk-based decision-making is the understanding that talk, far from being cheap, is actually integral to success. It is an invaluable first step toward implementing cost-effective solutions. Only by discussing potential concerns or changes with all affected parties, and systematically dissecting which concerns can be best handled, will the process work. Open communication between parties helps guarantee that all relevant information is gathered and incorporated as needed. Sharing input and keeping the parties involved also encourages everyone's acceptance of the final decision.

Taking a Cost-Effective Approach

Safety — of passengers, crew, vessels, and the environment — is the ultimate goal in the maritime industry. While the goal itself faces little dispute, implementation of it is often cause for serious discussion. Lack of personnel, time, and money are often cited as reasons for complacency against needed changes. Risk-based decision-making offers the solution.

While it is acknowledged that certain safety requirements must be met, regardless of the cost or time to implement and maintain them, there are further safety improvements that can be made without automatically investing great amounts of personnel time or money. By systematically examining the changes, or potential risks, that need to be addressed, solutions can be reached that are both effective and cost-efficient.

One tool that has been developed especially for identifying, evaluating, and managing risks cost-effectively is the PVA Risk Guide. The Coast Guard/ Passenger Vessel Association Partnership created this guide with the objective of providing passenger vessel owners and operators with a means to assess and manage risk within their operations. The guide helps owners and operators develop and evaluate the effectiveness of risk management options, in effect making operations safer. It can be used to evaluate proposed operations, survey existing operations, and determine the effect of operational changes.

Through its straightforward, systematic process, the guide breaks down risk-based decision-making into three basic phases: problem definition, risk assessment, and risk management.

What needs to be identified in the first phase are the issues being addressed and the appropriate people who should be involved. Factors such as anticipated changes to operations, employee turnover, increased waterway usage, security concerns, and increasing liability costs could be considered when applying the guide. Gathering this necessary information will help pinpoint the specific issue and determine who needs to be involved in the decision.

Risk assessment is the second phase of dealing successfully with risk, and it involves identifying and assessing the overall and specific situation. Areas to consider include hazard identification, probability assignment, consequence assignment, and calculation of relative risk. Basically, this process aims to answer three questions: **1)** What can go wrong? **2)** How bad can it be? **3)** How likely is it to happen?

After the risks have been identified and evaluated, they can be prioritized. This is known as risk management. Based on the prioritization, each hazard can be systematically considered for development of safeguards or risk management options. In this phase, particular attention should be paid to development of countermeasures and estimation of costs and benefits.

Applying the Risk Guide

In one workshop demonstration of the PVA Risk Guide, BB Riverboats (on the Ohio River) brought forth its concerns with passenger movement on its 100-ft. paddle wheel riverboat. The problem was slips, trips and falls surrounding a passenger stairway. Bringing together relevant members (including the company, Coast Guard, and local waterways personnel), the group created a list of potential hazards. After identifying the initial list of hazards, they paired them down into those most serious. Two of the main hazards included passengers tripping on the stairs and persons overboard. This allowed the group to discuss various solutions and their accompanying benefits and costs, in essence ranking the

The M/V *Belle of Cincinatti*, owned by Ohio River-based BB Riverboats. Photo courtesy BB Riverboats.

solutions by their cost-effective results. The final solution was an essentially cost-free, time-free rerouting of passenger movement away from the troublesome stairway during debarkation. Alan Bernstein, owner of BB Riverboats, commented afterward that the Risk Guide was a very useful tool that made the group better aware both of various risks and their cost-effective solutions.

In another example, Washington Island Ferry Line (WIFL) of Washington Island, Wis. applied the PVA Risk Guide to assess risks associated with its ferry operations during the icy winter. Though its winter ferry already met or exceeded the applicable federal safety regulations, WIFL recognized that certain winter conditions such as ice and a reduced availability of search and rescue resources could create a difficult challenge in the case of an emergency. Meeting with various local maritime members (including the Coast Guard), they reviewed the situation for risk countermeasures. Eventually, WIFL determined that its most cost-effective countermeasure for its two highest-rated hazards was a Vessel Emergency Response Plan. WIFL accordingly revised its existing plan to include its new risk assessments, which the Coast Guard then reviewed, and conducted a tabletop exercise with various local maritime members to determine the new plan's feasibility.

This gathering of local maritime members helped achieve a stronger understanding of each other's expertise and concerns, and provided an opportunity to thoroughly examine their related safety factors. In turn, this new appreciation for each group's role in maintaining safety within their shared maritime community helped to establish a stronger sense of trust. Dick Purinton, WIFL President and a member of the group involved with implementing the Risk Guide, commented that he was particularly impressed with the Coast Guard's efforts to improve its own knowledge of his company's operations. Conversely, WIFL benefited from the opportunity to get an in-depth look at safety from the Coast Guard's point of view. The experience provided WIFL with a solution that was not only practical but also inexpensive; the conclusion also satisfied the Coast Guard's concern of ensuring passenger and vessel safety during the winter ice season.

However, this Risk Guide application also raised some concerns that are worth noting. Not surprisingly, because the Coast Guard is the maritime regulator, the non-Coast Guard participants felt an initial sense of unease in openly discussing potential hazards or shortcomings. This is a reasonable general concern, but one that fortunately proved unfounded with WIFL's safe operations. However, as the Risk Guide is designed as a non-regulatory tool to implementing risk-based decisions, it is important to remember that Coast Guard participants are also very open to non-regulatory safety solutions. An independent facilitator may help with this uneasiness by creating a setting of more open communication among the various group members.

Another concern mentioned when discussing the use of the Risk Guide has been that of liability. If a company were to perform a risk assessment, and then identify a risk but choose not to address it, could it be held liable if an incident involving that risk occurred? Although the answer to this is speculative, it must be emphasized that the Risk Guide is not designed as a tool to help a company meet regulation compliance. It is designed to help a company improve safety beyond minimum compliance — it is about proactively looking to identify and correct risks. Companies who want to continue making their operations safer should therefore view using the Risk Guide as a smart step, not a precarious one. A company will not be sued simply because they have acknowledged a certain risk through their risk assessment. Rather, performing the risk assessment will help a company by potentially reducing risks and preventing accidents in the first place. By systematically searching out high probability/ high consequence risks and implementing cost-effective countermeasures, companies show their commitment to safety.

Benefits of the Risk Guide

The riverboat and ferry examples are just two of many demonstrating that cost-effective solutions are feasible. The risk-based decision-making approach of the Risk Guide can be extremely beneficial if there is a specific issue affecting

operations or if significant changes are being planned. Some other benefits of using risk-based decision-making and/or the Risk Guide include:

Improved Safety Record/ Improved Safety Awareness
By spending the time to review the strong areas of a company's operation, and especially taking the time to strengthen other areas, a company can improve its safety record. Also, this time spent using the Risk Guide sends a message throughout the company that safety is a priority.

Consistent Structured Approach
By applying the Risk Guide in the method provided, operators are able to ensure that most issues are considered and that a comprehensive set of safety measures is developed.

Risk Reduction for Least Financial Amount
The Risk Guide acknowledges that companies cannot always throw large amounts of money at numerous problems. Therefore, the Risk Guide walks through a systematic process to determine the most cost-effective measures.

Defendable Decisions
When working with the Coast Guard, the public, or other groups (such as environmental groups, local fire departments, etc.), it is imperative that decisions be easily understood by all affected. Being able to present a simple explanation of the risk — and its proposed solution — can aid greatly in establishing support from needed parties. By using the Risk Guide, decisions are made that are easier to defend because of the process followed and the stakeholders involved.

Smart Starting Point
Best of all, risk-based decision-making and the Risk Guide provide a tangible way to begin addressing problems that could initially seem overwhelming. They help break down the numerous potential risks inherent in the passenger vessel industry, allowing a company to choose which risks can be most effectively addressed.

RISK-BASED DECISION-MAKING AND/OR THE RISK GUIDE CAN BE APPLIED IN NUMEROUS AREAS

- Change in number of passengers
- Change of service (route, location, time)
- Contingency planning
- Crew training needs
- Emergency disaster drills and evacuation
- Environmental impacts (oil pollution, noise, wake damage)
- Fire prevention
- Flooding prevention
- Injury prevention of crew or passengers
- Medical emergencies
- Oil pollution due to vessel accident
- Passenger (or crew) exposure to weather elements
- Pre-season preparations
- Prevention of allisions, collisions, and/or groundings
- Prevention of mechanical failure/equipment problems
- Security
- Special events
- Wake damage

Conclusion

The Risk Guide was developed as a tool to facilitate safe maritime operations. For those companies striving to improve their safety level beyond minimum compliance, the Risk Guide can be a very helpful tool. It is not intended to lure in poor operators and attack them with citations for regulatory requirements. The Coast Guard encourages the proactive response of any industry organization that approaches it about participating in a risk review. And consequently, the industry is being asked to understand that the Coast Guard, while still the regulator, is trying to improve safety through non-regulatory measures as well. For the Risk Guide to be successful, mutual trust is imperative.

For all its different terminology and phases, the PVA Risk Guide is essentially simply that — a guide. It is designed to help people identify areas of potential risk in their company, and help them formulate a smart plan to decrease those risks. By implementing risk-based decision-making, and using the guide as a tool if needed, organizations can improve their safety and thereby reduce losses. The PVA Risk Guide is available online at **www.uscg.mil/hq/g-m/nmc/ptp/pdf/pvarisk_guide.pdf**.

Talk may be cheap for some, but for those who use it wisely, talk is an invaluable first step toward implementing cost-effective solutions. For those who take advantage of risk-based decision-making, talk is priceless.

Risk-based decision-making is not just for the larger vessels and their operators. The Coast Guard encourages all small passenger vessel operators to become familiar with this safety strategy. Do you still have questions regarding RBDM after reading this article and the PVA/Coast Guard Risk Guide? To find out more, contact Joseph Myers at (202) 267-0170 or **JMyers@comdt.uscg.mil**.

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STCW and Small Passenger Vessels

by Lt. Cmdr. LANCE LINDSAY, U.S. Coast Guard Office of Operating & Environmental Standards

The 1995 amendments to the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978 (STCW) have ushered in sweeping changes for the marine industry. The Coast Guard has recently experienced an increase in questions from small passenger ("T" or "K" boat) crews who are wondering how STCW applies to them.

T and K boats on international voyages (entering the waters of another country party to STCW, e.g., Canada, Mexico, Bahamas, etc.) are subject to STCW. International voyages are those beyond our boundary line, whether or not within other parties. This means the crews are required to have either an STCW endorsement on their license or an STCW certificate. As for companies that operate small passenger vessels on international voyages, STCW holds additional requirements regarding manning, familiarization, and training for vessel crews. These requirements include non-documented crewmembers, e.g., deckhands. Since fulfilling the requirements for STCW takes time, often beyond the direct control of the mariner, it makes sense to obtain your endorsements or certificates as soon as possible.

The United States decided to delay enforcement of the STCW requirements for mariners sailing on near-coastal voyages in domestic service until Feb. 1, 2003. This decision was made primarily due to the shift in resources and priorities for the Coast Guard as a result of the events of Sept. 11, 2001. Those who have not yet fulfilled the requirements should make the most of this opportunity to schedule training and assessment classes. It is easier to meet the transitional provisions now; in the future, there will be additional training requirements.

The IMO recommended that signatories to STCW delay port-state enforcement of the STCW through July 31, 2002 to allow adequate time to process the volume of applications and issue certificates.

Small passenger vessels operating domestically have been exempted from the requirements of STCW by domestic rule —not by the treaty itself. A near-coastal, domestic voyage is one that begins and ends in a U.S. port, does not touch at a foreign port or enter foreign waters, and is not more than 200 miles from shore. The United States determined that the officers of small passenger vessels are not subject to further obligations under STCW because of their special operating conditions.

The International Maritime Organization (IMO), and the United States as a party to IMO, remain committed to the philosophy of reducing maritime casualties by improved training standards for mariners. Despite the shift in Coast Guard resources as a result of the September 11 attacks, the Coast Guard continues to evaluate and process STCW applications. Contact your nearest Regional Examination Center to complete your application. For more information on the requirements of STCW, log on to **www.uscg.mil/stcw/m-pers.htm**.

SUBJ: ENFORCEMENT GUIDANCE FOR INTERNATIONAL CONVENTION ON STANDARDS FOR TRAINING, CERTIFICATION AND WATCHKEEPING FOR SEAFARERS, 1978, AS AMENDED (STCW 1995)

Sent to Coast Guard districts on June 30, 2002

REF A. NVIC 03-98, PORT STATE CONTROL GUIDELINES FOR THE ENFORCEMENT OF THE 1995 AMENDMENTS TO THE INTERNATIONAL CONVENTION ON STANDARDS OF TRAINING, CERTIFICATION AND WATCHKEEPING FOR SEAFARERS, 1978.

1. ON 1 FEB 2002, THE TRANSITIONAL PROVISIONS IN REGULATION I/15 OF STCW 95 WILL END, IMPLEMENTING THE REMAINING PROVISIONS OF THE 1995 AMENDMENTS TO THE STCW CONVENTION. THIS MESSAGE CONTAINS STCW 95 ENFORCEMENT GUIDANCE FOR US AND FOREIGN-FLAGGED VESSELS. MARINE SAFETY OPERATIONAL COMMANDERS SHOULD CONTINUE TO ENFORCE THOSE PROVISIONS OF STCW 95 THAT TOOK EFFECT PRIOR TO 1 FEB 2002 AND BEGIN ENFORCING THE PROVISIONS THAT BECOME EFFECTIVE ON 1 FEB 2002. HOWEVER, RECOGNIZING THAT A CONSIDERABLE NUMBER OF FLAG ADMINISTRATIONS HAVE NOT YET ISSUED 1995 CREDENTIALS, FIELD COMMANDERS SHOULD NOT DETAIN VESSELS OR PENALIZE MARINERS THAT DO NOT MEET THE CERTIFICATION AND ENDORSEMENT PROVISIONS OF STCW 95 THAT TAKE EFFECT ON 1 FEB 2002.

2. BECAUSE A LARGE NUMBER OF MARINERS WORLDWIDE MUST UPDATE THEIR CREDENTIALS, MANY NATIONS HAVE HAD DIFFICULTY ISSUING THE DOCUMENTS NEEDED TO CONFIRM THAT THEIR SEAFARERS COMPLY WITH THE PROVISIONS OF THE 1995 STCW AMENDMENTS, PARTICULARLY THE ENDORSEMENTS ATTESTING TO THE RECOGNITION OF ANOTHER PARTY'S CERTIFICATES (AS REQUIRED BY REGULATION I/10). ON 24 JAN 2002, THE IMO SUBCOMMITTEE ON STANDARDS OF TRAINING AND WATCHKEEPING (STW) ADOPTED A CIRCULAR RECOGNIZING THAT ALL SEAFARERS ON BOARD SHIPS MAY NOT YET HOLD THEIR STCW 95 CERTIFICATES OR FLAG STATE ENDORSEMENTS. THE CIRCULAR URGED PORT STATE CONTROL (PSC) AUTHORITIES TO CONSIDER THIS FACTOR WHEN TAKING ACTION UNDER THE CONTROL PROCEDURES IN ARTICLE X AND REGULATION I/4 OF THE CONVENTION. THE SUBCOMMITTEE AGREED "IN CASES WHERE A SEAFARER'S DOCUMENTATION COMPLIES WITH THE REQUIREMENTS IN FORCE IMMEDIATELY BEFORE 1 FEB 2002, BUT IS NOT IN ACCORDANCE WITH THE REQUIREMENTS OF STCW 95, PORT STATE CONTROL OFFICERS, UNTIL 31 JULY 2002, ARE RECOMMENDED TO ISSUE ONLY A WARNING TO COMPANIES AND TO NOTIFY THE SEAFARERS AND ADMINISTRATIONS CONCERNED ACCORDINGLY." THE US WILL OBSERVE THE SUBCOMMITTEE'S RECOMMENDATION AND WILL NOT, UNTIL 1 AUGUST 2002, DETAIN VESSELS SOLELY BECAUSE THEY ARE NOT IN COMPLIANCE WITH THE CERTIFICATION AND ENDORSEMENT PROVISIONS OF STCW 95 THAT TAKE EFFECT ON 1 FEB 2002. INSTEAD, PSC BOARDING OFFICERS SHALL ISSUE A LETTER WARNING VESSEL OWNERS AND CREWMEMBERS THAT THEY DO NOT MEET STCW 95. BEGINNING 1 AUGUST 2002, VESSELS NOT IN COMPLIANCE WITH STCW 95 SHOULD EXPECT TO BE DETAINED.

3. PSC ENFORCEMENT GUIDANCE:

A. NO ADDITIONAL BOARDINGS SHOULD BE UNDERTAKEN SOLELY FOR STCW ENFORCEMENT. THE GUIDANCE IN REFERENCE A REMAINS IN EFFECT. SECTION 5.B (PROCEDURES DURING PSC EXAMS) AND SECTION 5.B.5 (CRITERIA FOR DETAINING A VESSEL) OF REFERENCE A SHOULD CONTINUE TO BE USED TO GUIDE ENFORCEMENT OF THE STCW 95 PROVISIONS IN EFFECT PRIOR TO 1 FEB 2002. THE CONTROL GUIDANCE FOUND IN REGULATION I/4 OF THE STCW CONVENTION SHOULD BE USED WITH THE EXCEPTION THAT VESSELS NOT IN COMPLIANCE WITH PARAGRAPH 2.1 OF THAT REGULATION SHOULD NOT BE DETAINED UNTIL 1 AUGUST 2002. DURING ROUTINE PSC BOARDINGS, PSC BOARDING OFFICERS SHOULD EXAMINE ALL SEAFARER CERTIFICATES AND ENDORSEMENTS DURING THE PSC EXAMINATION WITH A VIEW TOWARDS DETERMINING THEIR COMPLIANCE WITH THE 1 FEB 2002 AMENDMENTS TO STCW 95. DURING THE COURSE OF THE BOARDING, IF IT BECOMES APPARENT THAT EITHER THE VESSEL OR CREW DO NOT MEET THE PROVISIONS OF STCW THAT TOOK EFFECT ON 1 FEB 2002, THEN THE BOARDING OFFICER SHOULD ISSUE A LETTER WARNING THE VESSEL THAT THEY ARE NOT IN COMPLIANCE. VESSELS SHOULD NOT BE DETAINED FOR FAILING TO MEET THE CERTIFICATION AND ENDORSEMENT PROVISIONS OF STCW 95 THAT BECAME EFFECTIVE ON 01 FEB 2002. A SAMPLE WARNING LETTER IS AVAILABLE AT HTTP://CGWEB.COMDT.USCG.MIL/G-MO/MOC/MOCHM.HTM.

B. BETWEEN 01 FEB 2002 AND 01 AUGUST 2002 VESSELS WHOSE FLAG STATES ARE NOT SIGNATORY TO STCW OR ARE NOT ON THE “WHITE LIST” SHOULD BE EXAMINED IAW EXISTING PSC POLICIES. “WHITE LIST” NATIONS ARE THOSE COUNTRIES WHOSE STCW IMPLEMENTATION SCHEMES HAVE BEEN REVIEWED BY AN IMO PANEL OF COMPETENT PERSONS AND HAVE BEEN FOUND TO HAVE GIVEN FULL AND COMPLETE EFFECT TO THE CONVENTION. A LIST OF NATIONS WHICH ARE ON THE WHITE LIST CAN BE OBTAINED AT: HTTP://WWW.IMO.ORG/INCLUDES/BLASTDATAONLY.ASP/DATA_ID=4045/1018.PDF . INFORMATION ON NON-SIGNATORY NATIONS CAN BE FOUND AT: HTTP://WWW.IMO.ORG/NEWSROOM/MAINFRAME.ASP?TOPIC_ID=70.

C. BEGINNING 01 AUGUST 2002, THE COAST GUARD WILL INCREASE BOARDINGS AND SCRUTINY OF VESSELS AND CREWS ASSOCIATED WITH FLAG ADMINISTRATIONS NOT SIGNATORY TO THE STCW CONVENTION OR NOT ON THE IMO “WHITE LIST.” NON-SIGNATORY FLAG STATES WILL BE ASSIGNED PRIORITY I BOARDING STATUS AND “NON-WHITE LIST” COUNTRIES WILL BE ASSIGNED PRIORITY II BOARDING STATUS. VESSELS ASSOCIATED WITH NON-SIGNATORY AND NON “WHITE LIST” FLAG STATES WILL EXPERIENCE INCREASED BOARDINGS, VALIDATION OF CREW COMPETENCY, AND A REVIEW OF HOW ADMINISTRATIONS HAVE CARRIED OUT THE RESPONSIBILITIES ENUMERATED IN STCW. G-MOC WILL NOTIFY FLAG ADMINISTRATIONS AND THE MARINE INDUSTRY OF OUR INTENDED ENFORCEMENT POLICY.

4. U.S. FLAG VESSEL ENFORCEMENT GUIDANCE:

A. NO ADDITIONAL BOARDINGS SHOULD BE UNDERTAKEN SOLELY FOR STCW ENFORCEMENT. REFERENCE A SHOULD BE USED FOR GUIDANCE ON STCW ISSUES DURING INSPECTION OF U.S. VESSELS. HOWEVER, THE DETENTION GUIDANCE IN REFERENCE A IS NOT APPLICABLE TO U.S. VESSELS.

B. U.S. MARINERS MAY SERVE ON U.S. VESSELS SAILING FOREIGN IF THEY HOLD THE REQUIRED STCW DOCUMENTS OR CAN PROVIDE PROOF THAT THEY HAVE A COMPLETED STCW APPLICATION ON FILE WITH A COAST GUARD REGIONAL EXAM CENTER PRIOR TO 01 FEB 2002. A COPY OF THE STCW APPLICATION MAY BE ACCEPTED AS PROOF OF AN APPLICATION. THESE MARINERS SHOULD BE MADE AWARE THAT THIS POLICY MIGHT NOT BE HONORED BY PORT STATE CONTROL AUTHORITIES IN OTHER NATIONS. U.S. MARINERS WHO SUBMIT THEIR STCW 95 APPLICATIONS ON OR AFTER 01 FEB 2002 ARE NOT AUTHORIZED TO SAIL FOREIGN UNTIL THEY ARE ISSUED THE APPROPRIATE STCW 95 ENDORSEMENT. U.S. MARINERS ON DOMESTIC, NEAR COASTAL VOYAGES WITH STCW 78 CERTIFICATES HAVE UNTIL 01 FEB 2003 TO OBTAIN STCW 95 CERTIFICATES, BUT ARE ENCOURAGED TO INITIATE THE APPLICATION PROCESS AND REQUIRED TRAINING ASAP. THIS POLICY CAN BE OBTAINED AT THE NMC WEBSITE: HTTP://WWW.USCG.MIL/STCW/M-POLICY.HTM

C. 46 USC 8103 ALLOWS MOBILE OFFSHORE DRILLING UNITS AND OFFSHORE SUPPLY VESSELS OF LESS THAN 1600 TONS TO USE NON-U.S. LICENSED MARINERS. THE COAST GUARD WILL NOT ISSUE A REGULATION I/10 ENDORSEMENT TO MARINERS WHO HOLD STCW CERTIFICATES, LICENSES OR OTHER DOCUMENTS ISSUED BY ANOTHER COUNTRY. 46 CFR 15.720 REQUIRES THE MASTER OF THE OSV TO ASSURE THAT A NON-U.S. LICENSED MARINER IS EQUIVALENT IN EXPERIENCE, TRAINING, AND OTHER QUALIFICATIONS TO THE U.S. LICENSE OR DOCUMENT REQUIRED FOR THAT POSITION.

D. STCW REGULATIONS V/2 AND V/3 REQUIRE SPECIALIZED TRAINING FOR CERTAIN RO/RO PASSENGER VESSELS AND NON-RO/RO PASSENGER VESSELS. GUIDANCE FOR THIS TRAINING IS CONTAINED IN NVICS 6-98 AND 4-99. DUE TO THE NON-AVAILABILITY OF APPROVED SCHOOLS AND DESIGNATED EXAMINERS, THE COAST GUARD WILL ACCEPT A LETTER FROM THE VESSEL'S MASTER CERTIFYING THAT THIS TRAINING HAS BEEN COMPLETED. FIELD COMMANDERS SHOULD WORK WITH VESSEL REPRESENTATIVES TO ENSURE THAT THIS SELF-CERTIFICATION IS COMPLETED USING THE ABOVE REFERENCES AS GUIDANCE.

5. QUESTIONS PERTAINING TO STCW COMPLIANCE RELATED TO PSC ACTIVITIES SHOULD BE ADDRESSED TO LT LINDSAY DEW AT (202) 267-0476, AND STCW COMPLIANCE MATTERS RELATED TO US VESSELS SHOULD BE DIRECTED TO LCDR GERARD ACHENBACH AT (202) 267-2735.

6. FIELD COMMANDERS ARE ENCOURAGED TO COMMUNICATE THIS POLICY TO THEIR LOCAL MARINE INDUSTRY REPRESENTATIVES.

7. RADM PAUL J. PLUTA, ASSISTANT COMMANDANT FOR MARINE SAFETY AND ENVIRONMENTAL PROTECTION.

Marine Safety Insignia Presented to Auxiliarist

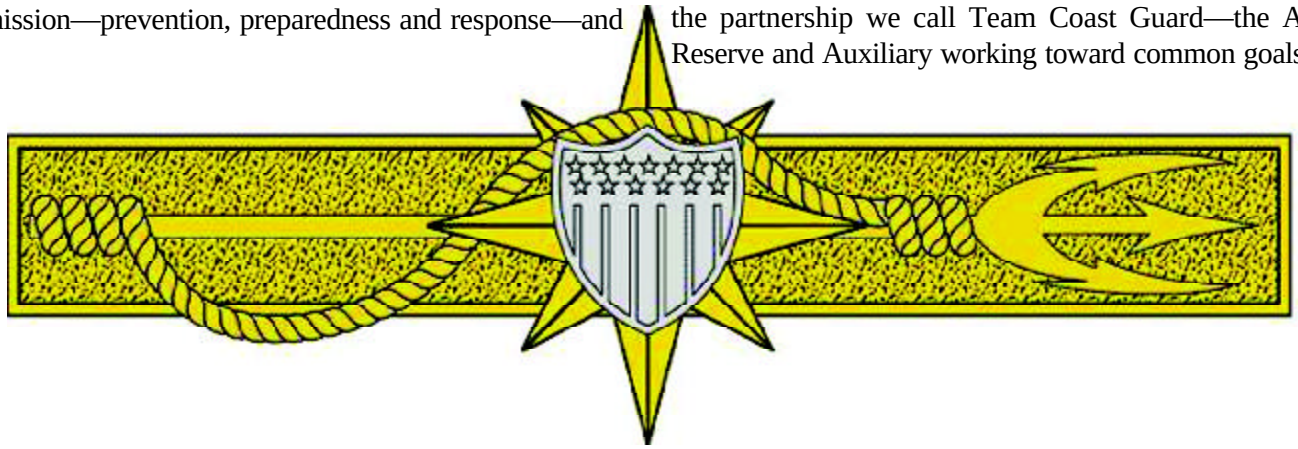
On March 16, 2002, the Marine Safety insignia was presented to Auxiliarist James Perry of the Eighth Coast Guard District, marking the first time the insignia was presented to a Coast Guard auxiliarist.

Rear Adm. Carlton Moore pins the Marine Safety Insignia on to Coast Guard Auxiliarist James Perry of the Eighth Coast Guard District. Perry is the first Auxiliarist to receive the insignia. USCG photo.

In November 2000, the Commandant recognized the Marine Safety and Environmental Protection Program as a major contributor to the Coast Guard and the American public by authorizing a distinctive insignia to be worn by its professionals working in the field who have met its high standards. The Marine Safety insignia was created to represent the personal fulfillment of the professional training and qualifications necessary for a marine safety career. The time, training, and qualifications are a major achievement for an active duty member or a reservist.

The Marine Safety and Environmental Protection insignia consists of the trident, which represents the three-pronged approach to the Marine Safety and Environmental Protection mission—prevention, preparedness and response—and is also the recognized symbol of the marine science technician rating. The compass rose is a recognized symbol of the world, acknowledging our worldwide reputation, influence, and duty stations. The combination silver and gold in the same insignia represents enlisted members and the officer corps, symbolizing the similarity of qualification and teamwork that is required to fulfill the mission. The braided rope represents the Coast Guard seal, our service, and its maritime heritage. This rope intertwined among the other symbols represents the coordination between all Coast Guard programs for the successful completion of our mission.

Auxiliarist Perry has more than four years of service at Marine Safety Office Huntington and has achieved four marine safety qualifications, including: harbor safety officer; license examiner; pollution investigator, and casualty investigator. His achievement reaffirms the importance of the partnership we call Team Coast Guard—the Active, Reserve and Auxiliary working toward common goals.



Passenger Vessel Association & Coast Guard Partnership

by Lt. Cmdr. KEVIN KIEFER, U.S. Coast Guard Office of Design & Engineering Standards

As stated in the Passenger Vessel Association (PVA) and United States Coast Guard Outline of Partnership Agreement, the purpose of the partnership is to improve the communication and working relationship between the Coast Guard and the domestic passenger vessel industry. Its objectives, for both the PVA and Coast Guard, are to promote the passenger vessel industry and protect the environment within our nation's waters. This partnership is not intended to subvert the role of government regulation in establishing minimum standards necessary to ensure the protection and safety of U.S. waters, vessels, passengers and crews; nor is it intended to supplant the important role that has been and continues to be played by existing federal advisory committees to the Coast Guard. Rather, the partnership is intended to complement these other government and industry functions by providing an efficient mechanism for joint Coast Guard-industry action in a results-oriented, nonregulatory environment.

Partnership provides a means of direct communication between the passenger vessel industry and the Coast Guard. It is industry's voice to the Coast Guard. By maintaining this partnership, the passenger vessel industry and the Coast Guard can identify concerns and address them early, before such concerns grow into problems.

Within the partnership is a Partnership Action Team (PAT) composed of PVA leadership and senior Coast Guard personnel. Over the past six years, the PAT has identified and pursued many passenger vessel industry and Coast Guard concerns. These concerns include the creation and implementation of a Streamlined Inspection Program (SIP) for passenger vessels, a risk tool for identifying opportunities to reduce risk exposure, fire safety equivalencies to 46 Code of Federal Regulations (CFR) Subchapter K, and guidance for enhancing the operational safety of high-speed passenger vessels. The PAT currently is working on the following issues: risk management implementation, determination of casualty data requirements, and development of manning guidelines for high-speed passenger vessels.

Efforts of previous PAT work items have been extremely successful in identifying and resolving concerns of the passenger vessel industry and the Coast Guard. This work done by the PAT has and will continue to promote passenger, personnel, and property safety within the domestic passenger vessel industry and the protection of the environment within our nation's waters. Through partnership, everyone in the marine industry can contribute to a safer working environment.

For a more in-depth article on the U.S. Coast Guard/ Passenger Vessel Association Partnership, please see page 10 of the July-September 2001 Volume 58, Number 3 issue of *Proceedings* magazine. You may view this article online at:
www.uscg.mil/hq/g-m/nmc/pubs/proceed/index.htm

M/V *Seaport Taxi* is a Subchapter T vessel that can carry 71 passengers. It operates between points near Baltimore, Md.'s Inner Harbor. USCG photo courtesy Ken Olsen.

Preventing Casualties Through Proper Maintenance

by WILLIAM ABERNATHY[1]
and PAUL EULITT[2]

The Coast Guard's Office of Investigation and Analysis recently reviewed seven years of marine casualties involving inspected vessels less than 100 tons that flooded, capsized or sank (without deaths). One thread that quickly became apparent in the review was the role of the human element, or more accurately, the lack of the role of the human element. Of the 149 cases reviewed, a majority could have been prevented had there been a larger focus on the human's role in improving safety through proper vessel maintenance and upkeep.

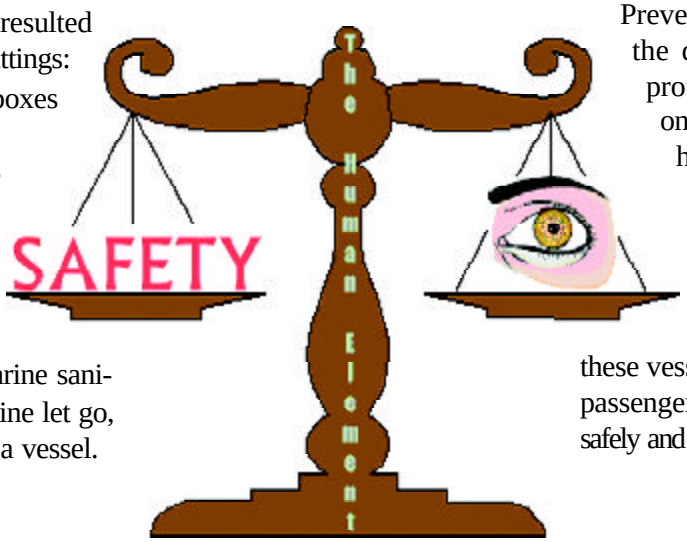
> "Of the 149 cases reviewed, a majority could have been prevented had there been a larger focus on the human's role in improving safety through proper vessel maintenance and upkeep."

Seventeen percent of the cases were the result of a water hose failure that involved cooling, live well, or exhaust systems, including:

- A raw water-cooling hose had become rotten and let go, flooding the engine compartment;
- A clamp gave way on the hose, causing the hose to come off the pump or hull fitting, flooding the engine compartment;
- One clamp was corroded beyond any effective use;
- One case determined that the main cooling water line was not even clamped coming out of an overhaul period.

Another 17 percent of the cases resulted from issues with through hull fittings:

- Rudder and shaft stuffing boxes let go;
- Shaft seals kept too loose or too tight;
- Dissimilar metals caused corrosion of the hull fitting; and
- A corroded fitting on a marine sanitation device water supply line let go, which led to the sinking of a vessel.



Several cases involved instances where holes developed in the hull or bulkheads due to corrosion and a lack of proper hull maintenance.

Four percent of the reviewed cases showed improper winterizing of cooling systems. Some cases dealt with simple bilge housekeeping. When uncontrolled flooding occurred, the pump responsible for dewatering a space became inefficient when jammed with debris, leading to vessel capsizing. In another case, the bleed valve on a bilge pump was inadvertently left open, which resulted in the flooding of the engine compartment.

Other major factors in the reviewed cases included overloading, which resulted in uncontrolled down flooding. Several small passenger vessels departed port overloaded with passengers and (dive) gear. Other vessels left the dock failing to install portable coamings — designed to prevent water from shipping into interior spaces — causing uncontrolled flooding. Still others sailed without watertight covers to lazarettes and engine compartments secured. When seas shipped onboard these boats, the extra weight of the water and free surface effect resulted in other stability problems that led to downflooding and loss of the vessel.

Prevention of these casualties starts at the deckplates. It is the individual professional mariner that uses not only his physical senses, but also his common sense to check the watertight integrity of the vessel before starting the day's operation. He needs to know and respect his boat. Those who operate and those who manage these vessels have a responsibility to their passengers, crew, and industry to operate safely and prudently. It is the right thing to do.

[1] General Engineer, Human Element and Ship Design Division, U.S. Coast Guard
[2] Marine Safety Analyst, Compliance and Analysis Division, U.S. Coast Guard

Mariner's Seabag

Sunken Freighter is Source of Mystery Spill that Has Killed California Birds

A freighter that sank nearly 50 years ago is the source of oil that has incapacitated or killed more than 1,800 seabirds off the Northern California coast since November 2001. The U.S. Coast Guard Marine Safety Office San Francisco and the California Department of Fish and Game Office of Spill Prevention and Response (OSPR) identified the source of oil as the SS *Jacob Luckenbach*, a 468-foot freight ship that sank approximately 17 miles southwest of the Golden Gate Bridge off of San Francisco on July 14, 1953.

A submersible remotely operated vehicle (ROV) collected oil from the *Luckenbach* in February. The sample was analyzed by both the Coast Guard's Marine Safety Laboratory in Groton, Conn., and OSPR's Petroleum Chemistry Laboratory near Sacramento. The fingerprint matched the oil taken from the oiled birds' feathers and tar balls. The oil also matched historical samples taken from past mystery spills off the coast of San Francisco in 1992-93, 1997-98, 1999, and February 2001. The location the ship went down further matches the site of a mysterious oil spill in 1997 and 1998, in which an estimated 10,000 seabirds were killed.

The Coast Guard and OSPR have worked together in a unified effort to locate the source of the oil since Nov. 24, 2001, the date of the most recent report of sea birds being impacted by oil. The National Oceanic and Atmospheric Administration (NOAA) and the California State Lands Commission joined the investigation team to solve

Mariner's Seabag

the mystery. The team used numerous methods and technologies to assist in their search, including satellites, trajectory modeling, seismic data, and petroleum fingerprinting.

The latest count showed 748 oiled birds, mostly common murres, were recovered live; 477 have died or been euthanized; 1,121 were found dead; 232 were released, and 39 currently are in care.

The collision of the two vessels occurred shortly before daybreak on July 14, 1953, as the SS *Hawaiian Pilot* was approaching San Francisco en route from Honolulu, and the *Jacob Luckenbach* was leaving that port for Korea. Both vessels, operating under fog and low visibility conditions, saw each other on their radarscopes while they were miles apart. The master of the *Hawaiian Pilot* mistakenly assumed that the *Luckenbach* was the San Francisco Lightship and he ordered course changes that resulted in the collision of the two vessels. The Marine Board of Investigation concluded that the "failure of the Masters of both vessels to develop a radar plot of each other is considered negligence. Had the Master of the *Hawaiian Pilot* taken a simple note of the time and the rate of change of range, he should have known that the pip he was observing [on the radarscope] could not be the anchored lightship."

The *Luckenbach* sank approximately 30 minutes after the collision; all crewmembers were taken aboard the *Hawaiian Pilot* and no lives were lost in the collision.

Until recently, the wreck of the *Luckenbach* was visited only by a few experienced recreational divers. The Coast Guard and OSPR—the Unified Command—are now working together to remove the oil onboard the *Luckenbach*, which has been linked to mystery oil spills that have been impacting wildlife and the California coastline since 1992.

1,121 oiled birds, mostly common murres, were found dead; 748 were recovered live; 477 have died or been euthanized; 232 were released, and 39 are currently in care.

These Oiled Wildlife Care Network veterinarians are aiding a few of the common murres rescued from the mysterious oil spills. Visit www.ibrrc.org **for a good description of the cleaning process.** PREVIOUS PAGE, *top left:* **Dr. Chris Kreuder examines an oiled murre up close.** *Bottom left:* **An oiled murre that has just been washed is now being rinsed in warm water with a high pressure nozzle to remove all traces of soap.** THIS PAGE, *right:* **Kreuder and Dr. Marty Haulena examine an oiled murre that has just come into the OWCN. All photos are courtesy Nancy Ottum, OWCN.**

Nautical Deck Quiz

1. What is the minimum height of rails on passenger decks of ferryboats, excursion vessels, and vessels of a similar type?

A. 18 inches (0.5 m) high
B. 24 inches (0.6 m) high
C. 39 and 1/2 inches (1.0 m) high
D. 42 inches (1.1 m) high

2. A vessel's Certificate of Inspection will show the _____.

A. crew requirements
B. minimum fire fighting and lifesaving equipment
C. route permitted
D. all of the above

3. A vessel of not more than 65 feet in length must have a collision bulkhead if it carries more than _____.

A. 6 passengers
B. 12 passengers
C. 36 passengers
D. 49 passengers

4. Each small passenger vessel that operates on the high seas, or beyond 3 miles from the coastline of the Great Lakes, must have a Category 1 (406 MHz) EPIRB that _____.

A. is in good operating condition and is stowed near its charger
B. will float free and clear of a sinking vessel and automatically activate
C. is protected against all weather elements
D. all of the above

5. Survival craft required on a steel small passenger vessel operating in cold water must _____.

A. have sufficient capacity for all persons on board the vessel in ocean service.
B. have sufficient capacity for at least 50% of all persons on board for vessels in ocean service
C. be only inflatable life rafts
D. international orange in color only for vessels in lakes, bays and sounds service

6. The permanent magnetism of a vessel may change in strength due to _____.

A. the nature of the cargo being carried
B. changes in heading
C. a major structural repair
D. all of the above

7. Tropical cyclones do not form within 5° of the Equator because _____.

A. there are no fronts in that area
B. it is too hot
C. it is too humid
D. of negligible Coriolis force

8. BOTH INTERNATIONAL & INLAND When do the Rules require both vessels to change course?

A. Any time the danger signal is sounded
B. When two power-driven vessels are crossing and it is apparent to the stand-on vessel that the give-way vessel is not taking appropriate action
C. When two power-driven vessels are meeting head-on
D. All of the above

9. If within 500 yards (460m) of a Northern Right Whale, you are lawfully obligated to _____.

A. turn away from the whale and leave at full speed
B. turn away from the whale and leave at slow speed
C. slow to bare steerageway until the whale swims away
D. stop the vessel and sound repeated blasts on the ship's whistle to scare the whale away

10. Which area is designated a "Special Area" by Annex V to MARPOL?

A. Gulf of Saint Lawrence
B. Sargasso Sea
C. Red Sea
D. Great Lakes

Answers: 1.C, 2.D, 3.D, 4.B, 5.A, 6.C, 7.D, 8.C, 9.B, 10.C

Nauti-cal Engi-neering

1. A three-phase alternator is operating at 450 volts with a 0.8 power factor. If the ammeter indicates 250 amperes, what should be the KW meter reading?

A. 90.00 KW
B. 127.27 KW
C. 155.70 KW
D. 194.85 KW

2. The concentration of total dissolved solids in the water of an auxiliary boiler can increase as a result of _____.

A. seawater contamination
B. frequent surface blows
C. dissolved oxygen deaeration
D. frequent bottom blows

3. In a steam propulsion plant, the primary source of auxiliary exhaust steam is from the _____.

A. main condenser
B. main feed pump
C. distilling plant
D. air heaters

4. The device that most commonly utilizes the principal of electromagnetic induction is the _____

A. diode
B. transformer
C. transistor
D. rheostat

5. Corrosion due to electrolytic action in modern water-tube boilers is uncommon because _____.

A. boiler water is a strong electrolyte
B. alkalinity control
C. boiler components are generally constructed of similar metals
D. electrolytic action cannot occur at high pressure

6. Bearing "crush" as applied to diesel engine main bearings, will result in __ _____.

A. positive seating of the bearings in their housing
B. above normal operating temperatures
C. damage to the journals
D. damage to the bearings

7. Short cycling of the potable water system's pump is prevented by using _____.

A. constant speed supply pumps
B. variable speed supply pumps
C. variable delivery supply pumps
D. a hydropneumatic pressure tank

8. The best way to effectively use a dry chemical type extinguisher in fighting a fire, is to _____.

A. discharge a stream horizontally and allow it to flow evenly on all burning surfaces
B. discharge a stream at the base of the fire, starting at the near edge, and use side-to-side sweeping motions
C. play the stream off adjacent vertical surfaces until the area is blanketed
D. use concentrated amounts in small locations and put the fire out in sections

9. The heat required to change a substance from a liquid to a gas without experiencing a temperature change, is defined as the latent heat of _____.

A. fusion
B. vaporization
C. sublimation
D. condensation

10. When liquid reaches the compressor of a refrigeration system through the suction line, the condition is called)_____.

A. flooding back
B. superheating
C. overflowing
D. recycling

Answers: 1.C, 2.A 3.B, 4.B, 5.C, 6.A 7.D, 8.B, 9.B, 10.A

U.S. Coast Guard Regulations for Small Passenger Vessels

by MIKE VAUGHN, Attorney at Law, www.shipinformationcenter

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1996 U.S. Congress made substantial changes in the laws governing small passenger ships. Generally called "T" boats, many vessel owners took liberties wi easurements that allowed them to circumvent many of the Coast Guard Regulations.

operate as a passenger vessel, the vessel must possess a valid Certificate of Inspections (C.O.I), which describes:

- he vessel
- the route that it may travel
- the minimum manning requirements,
- the maximum number of passengers and total persons that may be carried,
- he survival and rescue craft carried,
- the minimum fire extinguishing equipment and lifejackets required to be carried,
- the minimum number of passengers the vessel may carry on overnight accommodation spaces
- the name of the owner and managing operator; and
- any other conditions of operations.

bchapters T & K provide the basic formulas and rules for determining whether a vessel will be certified under a T or K rule. The requirements for K boats ore extensive than for T boats. The current law has attempted to fill in many of the areas and provide for a more comprehensive and understandable syste

bchapter T applies to vessels of less than 100 gross tons that carry more than six passengers.

a vessel of under 100 gross tons carries more than 150 passengers or has overnight accommodations for more than 49 passengers; or is more than 200 feet ngth, the vessel must comply with the rules for Subchapter K vessels.

though the 100 gross ton rule controls the regulations (the Coast Guard is entitled to make a determination that the gross tonnage is attained by exem ns, reductions, or other devices that will circumvent or be incompatible with the regulations) the Coast Guard may determine that the gross tonnage is n e valid criterion for use and require that the vessel be brought into compliance with Subchapter K.

C.O.I. is obtained or renewed by making an application of Form CG 3752 "Application for Inspection of U.S. Vessel" to the Coast Guard in the zone in whi e vessel will operate.

determining the route of the vessel, the Coast Guard has divided the operations into zones reflecting lesser or greater severity of conditions. The zones c degree of severity of conditions:

Oceans **2.** Coastwise **3.** Limited Coastwise **4.** Great Lakes **5.** Lakes, Bays and Sounds **6.** Rivers

enerally, a vessel with a valid C.O.I. may operate in a zone of less severity than already entitled.

e total number of passengers and persons permitted is very important. Passenger determination may be made by several different methods or a combin n of methods designed to reflect safe loading. The criteria for determining passenger numbers are:

NGTH OF RAIL STANDARD

ne passenger may be permitted for each 30 inches of rail space available to the passengers at the periphery of each deck. Areas of rail space excluded fro e computation are areas near anchor handling equipment or gear, sail booms, running rigging, paddle wheels or along pulpits; stairways, etc.

CK AREA STANDARD

ne passenger may be permitted for each 10 square feet of deck area available for passengers' use. Obstructions such as stairways and elevator enclosures c cluded, but not areas taken by slot machines, tables, or other room furnishings.

XED SEATING STANDARD

ne person may be permitted for each 18 inches of width of fixed seating provided. Each selling berth shall be counted as only one seat. A combination of De ea and Fixed Seating may be used to determine the total passenger count. Leeway is given to the Coast Guard in making this determination in the inter safety.

WHEN MAY THE INSPECTION TAKE PLACE?

ITIAL INSPECTION

fore construction or conversion of a vessel intended for passenger service the owner must submit plans, manuals and calculations to the Coast Guard. T tial inspection determines that the vessel was then constructed or converted in compliance with those approved plans. All parts of the vessel includi achinery and workmanship, may be inspected to see if it is satisfactory.

E-INSPECTIONS

nually thereafter, the vessel will be inspected. The scope of the re-inspection will be the same as the initial inspection, but in less detail unless it is determin at a major change has occurred.

enerally, a vessel making an international voyage must undergo drydocking and internal structural examination at least once every 12 months. A ves posed to salt water more than three months in any 12-month period must be drydocked every two years unless extended.

boats built before March 11, 1996 are also affected and a list of changes to their procedures can be found at 46 CFR 185

Articles

Articles

Understanding & Preventing Lobsterman Entanglement: A Preliminary Survey; Vol. 58, No. 2 (Fishing Vessel Safety, April-June 2001; p. 50)

Chamber of Shipping of America and American Petroleum Institute/ PTP Partnership; Vol. 58, No. 3 (Partnerships, July-Sept. 2001; p. 13)

USCG Auxiliary
Coast Guard Auxiliary, Commercial Fishing Vessel Examiner; Vol. 58, No. 2 (Fishing Vessel Safety, April-June 2001; p. 30)

USCG Marine Safety and Environmental Protection Program
The Value of PTP Quality Partnerships; Vol. 58, No. 3 (Partnerships, July-Sept. 2001; p. 4)

U.S. Merchant Marine (USMM)
The Road to Implementing STCW at a Maritime Academy; Vol. 58, No. 4 (The End of the STCW Transition … Learn the Ropes, Oct.-Dec. 2001; p. 20)

A Look Back; Vol. 58, No. 4 (The End of the STCW Transition … Learn the Ropes, Oct.-Dec. 2001; p. 32)

Western Rivers Performance Plan
Performance on the Western Rivers; Vol. 58, No. 1 (View From the Bow … As We Sail Into the New Millennium, Jan.-Mar. 2001; p. 67)

USCG photo courtesy U.S. Coast Guard Activities New York. The sunken party cruise vessel *Crescent* in Roundabout Creek in Connelly, NY. An investigation determined that the vessel took on water due to detoriated fasteners throughout the wood hull of the vessl. Additionally, there was putt over a seam on the hull that was cracked.

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Wilcox, Lt. Tamara
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Williams, Lt. Cmdr. Jennifer
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Woodley, Lt. Chris
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A multi-deck passenger ferry with a catamaran-type hull.

M/V *Ranger*, a whale-watching boat, spies a whale. BACK PAGE: Damage is shown to Terminal 2 in the Port of Richmond, Calif., which was damaged by the M/V *Nita M* when it was hit. Pier-side and underwater survey indicated that there are six cracked cement pilings and 50 feet of wooden fenders sheared near the two bollards used mainly for spring lines. The *Nita M* has been inspected by the vessel's classification society surveyor and found to have sustained an indention on the stem that can be repaired during a dry-dock period. USCG photo.

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