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Special issue on merchant vessel inspection

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Cover Photo

Coast Guard inspectors are dwarfed by the hull of the SS Independence in drydock in San Francisco. The ship is one of two United States passenger vessels.
Photo by LCDR Stephen Ciccalone.

Proceedings

of the Marine Safety Council

July-August, 1992 *Vol. 49, No4*

Special issue on merchant vessel inspection

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From the field

Coast Guard inspectors check lifesaving equipment.

Photo by PA2 Don R. Wagner

Objective: Safety at Sea

By RADM A. E. "Gene" Henn

The safety of worldwide shipping and the protection of the marine environment are of vital concern to us all. Recent marine disasters highlight the reality that we still have much to do to ensure the safety of life at sea.

It is time to critically examine our role and improve the way we do business. Working with ship owners, classification societies, other governments and the marine industry as a team, the Coast Guard is continually striving to find better ways to create a safe, clean marine environment.

Over the years, the scope and range of the Coast Guard inspection program has changed. However, the basic objectives have stayed the same: to minimize deaths, injuries, property loss and damage on vessels engaged in commercial service. This objective is pursued through the administration of federal statutes, the development and enforcement of Coast Guard regulations and standards, and the implementation of international agreements.

The inspection program is administered by the Merchant Vessel Inspection and Documentation Division, Office of Marine Safety, Security and Environmental Protection.

Human element

Recent tragic disasters, such as the *Exxon Valdez* spill in Alaska's Prince William Sound in 1989 and the *Mega Borg* fire in the Gulf of Mexico in 1990, emphasize the need to refocus on the human element embodied in sound management and operating practices. We must properly shift the primary responsibility for safety back to the ship owner and operating company. To be effective, safety must start at the corporate level as a line management responsibility. The policy of "safety first" must be firmly established and backed up with adequate resources for it to work.

The United States supports the development of an international safety code on quality management for ship operations. Vessel safety can be increased and marine pollution decreased by using better operating practices. Operating efficiency and profitability can be increased if the company provides effective supervision and plans a safety strategy which anticipates problems and prepares ship crews to respond to operational needs. Foresight on safety by ship operators produces better results than government attempts to regulate them.

Era of dramatic change

The maritime industry is experiencing an era of dramatic change. If we have grown complacent, our complacent period is over. Demands are being voiced throughout the world for a renewed commitment to safeguard our ocean environment. The Coast Guard is broadening efforts to examine the human element embodied in sound ship management principles and to regenerate the oversight of seafaring proficiency. The Coast Guard is increasing its guidance to, and heightening its expectations of classification societies, and doubling efforts to achieve a more uniform application of International Maritime Organization (IMO) requirements.

The United States Coast Guard will not ignore the casualties and mistakes of the past. Together, we will search for solutions. And together, we will solve the problems of the future.

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---Overview---
on
marine inspection

By Mr. Glenn Moore

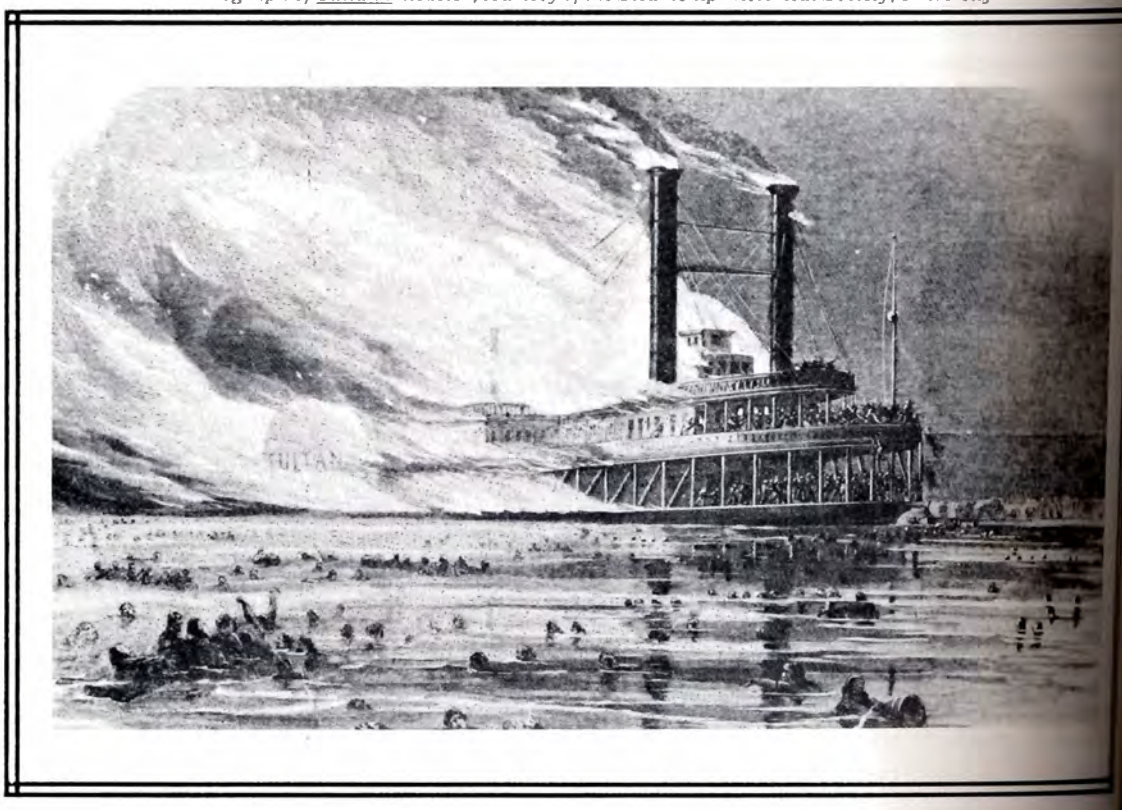
On April 27, 1865, the worst maritime disaster in United States history took place. The Civil War was a very recent memory when the paddlewheel steamer Sultana embarked from Vicksburg, Mississippi, up the Mississippi River to Cairo, Illinois.

The Sultana had probably been driven hard during the Civil War, and its boilers were known to be weak. Nevertheless, even though the Mississippi steamboat was legally certified to carry only 376 passengers, including crew, the army officer in charge of transporting Union soldiers home from Confederate prisons ordered nearly 1,900 additional men aboard.

About 2 a.m., a boiler exploded and the vessel caught fire. The entire ship was soon engulfed in flames and burned to the waterline. More than 2,200 people perished in the fire or drowned.

Appalling as the disaster was, it hardly made headlines. Newspapers, filled with Lee's surrender, Lincoln's assassination and the pursuit of Booth, had little space for a steamboat accident in the west.

Lithograph of Sultana disaster, courtesy of the Steamship Historical Society, University



Accidents such as this prompted Congress to enact marine safety and vessel inspection laws.

Introduction

In 1871, Congress repealed previous marine safety laws and enacted a new comprehensive code of navigation and vessel inspection legislation. This marked the beginning of the modern inspection system.

Since that time, public concern for maritime safety has encouraged Congress to continually enact statutes ensuring the safety of United States vessels, their crews and passengers, and the marine environment.

This legislation is designed to correct shortcomings in the scope of existing laws and industry practices in order to protect lives. This is reflected in the Marine Inspection Program, which regulates many safety aspects of commercial vessels and, more recently, facilities operating on the outer continental shelf.

Basically pursuing safety of life at sea, the Marine Inspection Program is an intrinsic part of the Coast Guard's total maritime safety effort. Additional program objectives include marine environmental protection, port safety and national defense.

Most commercial vessels are required to be inspected by the Coast Guard. Items under particular scrutiny include lifesaving and fire protection systems and equipment, navigation systems, hull structure and integrity, vital engineering and electricity systems, and compliance with applicable pollution prevention regulations. Foreign vessels operating in United States ports are held to the same operational standards, international material requirements, and domestic pollution prevention and port safety regulations as comparable United States vessels.

The Marine Inspection Program is also responsible for the administration of United States vessel documentation and tonnage ad measurement laws, which require the issuance of vessel registration forms and official numbers to specified vessels. These documents, kept on record for legal purposes, are used to provide proof of vessel citizenship and designate what trades in which a vessel may be engaged.

Vessel inspection and documentation

Organized into five specific branches, the Merchant Vessel Inspection and Documentation Division is responsible for planning, administration and management of vessel inspection and documentation. Regulatory and policy decisions are made through cooperative efforts between the branches.

Considerable advice and cooperation is solicited from industry and the public in forming inspection and documentation regulations and policies. When practical, recognized industry standards are incorporated into the regulations and policies. The division staff generates strong links between the public and the administration concerning regulatory and enforcement issues.

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Shipyard inspectors ensure that another chain meet classification society standards.

Photo by PA2 Don R. Wagner.

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Compliance and enforcement

The Compliance and Enforcement Branch develops procedures and provides policy guidance to 64 field marine safety units. This policy addresses the inspection of commercial and recreational vessels, as required by law.

The branch oversees the application of and monitors compliance with domestic laws and regulations, as well as international treaty requirements, on United States vessels and foreign vessels operating in United States waters. It represents the Marine Inspection Program on matters relating to the development and maintenance of applicable training requirements for personnel and units.

Dealing daily with a wide variety of marine inspection subjects, the branch prepares the commandant's responses to time-sensitive Congressional inquiries, public requests and appeals of decisions made by field commanders regarding such subjects. Staff participates in national and international conferences in the interest of advancing vessel inspection standards.

The branch also provides commercial vessels with up to date inspection information through its Marine Safety Network, formerly the Marine Safety Information System.

Standards development

The Standards Development Branch prepares policies and writes regulations that effect the Marine Inspection Program. Sometimes called the "engineering" side of MSO, the staff seeks new and better ways to promote safety in the marine environment within the constraints of technical and economical realities.

Currently, many efforts of the branch are directed toward regulations and reports mandated by the Oil Pollution Act of 1990 (OPA 90). (See the May-June 1992 issue of *Proceedings* for information on Coast Guard activities under OPA 90.) The double hull standards for vessels carrying oil in bulk and a report to Congress on alternatives to double hulls are two major projects under OPA 90, which have significant national and international implications. In addition, the branch works closely with the OPA 90 staff to provide policy guidance on related issues such as interim measures for existing vessels.

The Standards Development Branch is also responsible for analyzing casualty investigations, reviewing all legislative proposals for their potential impact on the Marine Inspection Program, developing occupational safety and health policy and guidance for marine inspectors, and administering the container safety code and certification program.

Survival systems

Primarily, the Survival Systems Branch establishes the technical and testing requirements for Coast Guard- approved equipment. Although the manufacturers are responsible for testing their equipment, survival systems engineers evaluate design features and laboratory test reports. If a device passes the tests and meets all other requirements, a formal approval certificate is issued to each device of the same design. After a design is formally approved, the branch oversees manufacturing production inspections and tests to ensure that production runs of approved items continue to meet the necessary requirements.

tion of inspection regulations on mobile offshore drilling units (MODUs) and offshore supply vessels in international service.

The branch is responsible for safety compliance, enforcement and standards development relating to specialized offshore industries, such as oil patch and commercial fisheries. Staff participates in national and international conferences concerning fishing vessel and/or offshore safety. They also maintain liaison with classification societies and industry organizations to encourage their participation in regulation development and to promote Coast Guard involvement in setting overall industry standards.

Coast Guard personnel prepare to board a vessel.

Fishing vessel and offshore safety

What was the Offshore Activities Branch is now the Fishing Vessel and Offshore Safety Branch. In the fall of 1991, the branch was enlarged and assigned additional responsibilities of implementing new fishing vessel safety initiatives. (See the October-November 1991 special fishing vessel safety issue of *Proceedings*.)

The fishing vessel safety section of the branch coordinates efforts dealing with new regulations for safety equipment on commercial fishing vessels, and other fishing industry initiatives.

The offshore safety section develops, coordinates and administers policy for the Coast Guard's Outer Continental Shelf Safety Program. The section also works closely with other branches and field units overseeing the applica-

The branch administers two safety advisory committees of representatives from each industry to provide the Coast Guard with expertise in developing programs for commercial fisheries, and offshore mineral and energy organizations. The Coast Guard welcomes their participation in preparing regulatory packages and in discussing potential solutions to safety problems.

Documentation and tonnage survey

Authorized by the first Congress, tonnage and vessel documentation activities date back to 1789. Tonnage determinations affect taxation, manning levels and safety requirements. Documentation is proof of nationality and conclusive evidence of entitlement, which vessels must have to engage in certain trades.

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Inspectors examine preparations for a shell plate insert in the hull of a vessel in drydock.

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The Vessel Documentation and Tonnage Survey Branch deals with technical and legal issues concerning documentation and measurement, maintains records and develops a vessel documentation system.

Conclusion

The catastrophic steam ship accidents which took place in the early and middle 1880s brought about enormous losses of life and property. Today, the United States marine transportation interests include a wide variety of waterborne craft. The Marine Inspection Program helps provide a measure of protection to the users of this vast marine transportation system by actively working to prevent future disasters at sea.

The ongoing work of the Merchant Vessel Inspection and Documentation Division, as well as cooperative efforts with the public, industry and other federal agencies, has carried out the intentions of Congress with remarkably high levels of success.

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For want of a nail . . .

By Mr. Daniel F. Sheehan

I used to have a commanding general who said, "The best man in the world ain't worth a dam if he isn't where you need him when you need him."

This phrase keeps coming to mind as the IMO attempts to come to grips with the problem of implementation and enforcement of maritime treaties. While maritime casualties and marine pollution have been in a steady rate of decline during the last 15 years, continued examples of a lack of enforcement of standards embodied in maritime treaties are evident.

The evidence takes many forms: ships in decrepit condition that show up in United States ports with new certificates issued by or on behalf of flag states, or ships that have casualties and when those casualties are investigated, you find that they did not comply with the basic conditions of the international conventions. It is axiomatic to say that without appropriate measures and equal enforcement of standards, those standards might just as well not exist.

Enforcement

The enforcement of standards has traditionally been a shared responsibility between the flag state, the vessel owner and the classification societies used by the owner. Over the last 20 years, there has been a shift in the burden sharing to the port state. This has occurred, in my opinion, because a minority of the members of the enforcement mechanism became lax in their efforts. This laxity manifested itself in maritime casualties, loss of life and pollution of the oceans.

In many instances, it was apparent that standards were either not enforced or they were not consistent with widely held interpretations of the international conventions. The port state, seeking to protect its citizenry and its economic well-being, became a more active participant in the process. The proliferation of regional agreements between port states for the enforcement of maritime treaties is testament to the growing concern about this issue.

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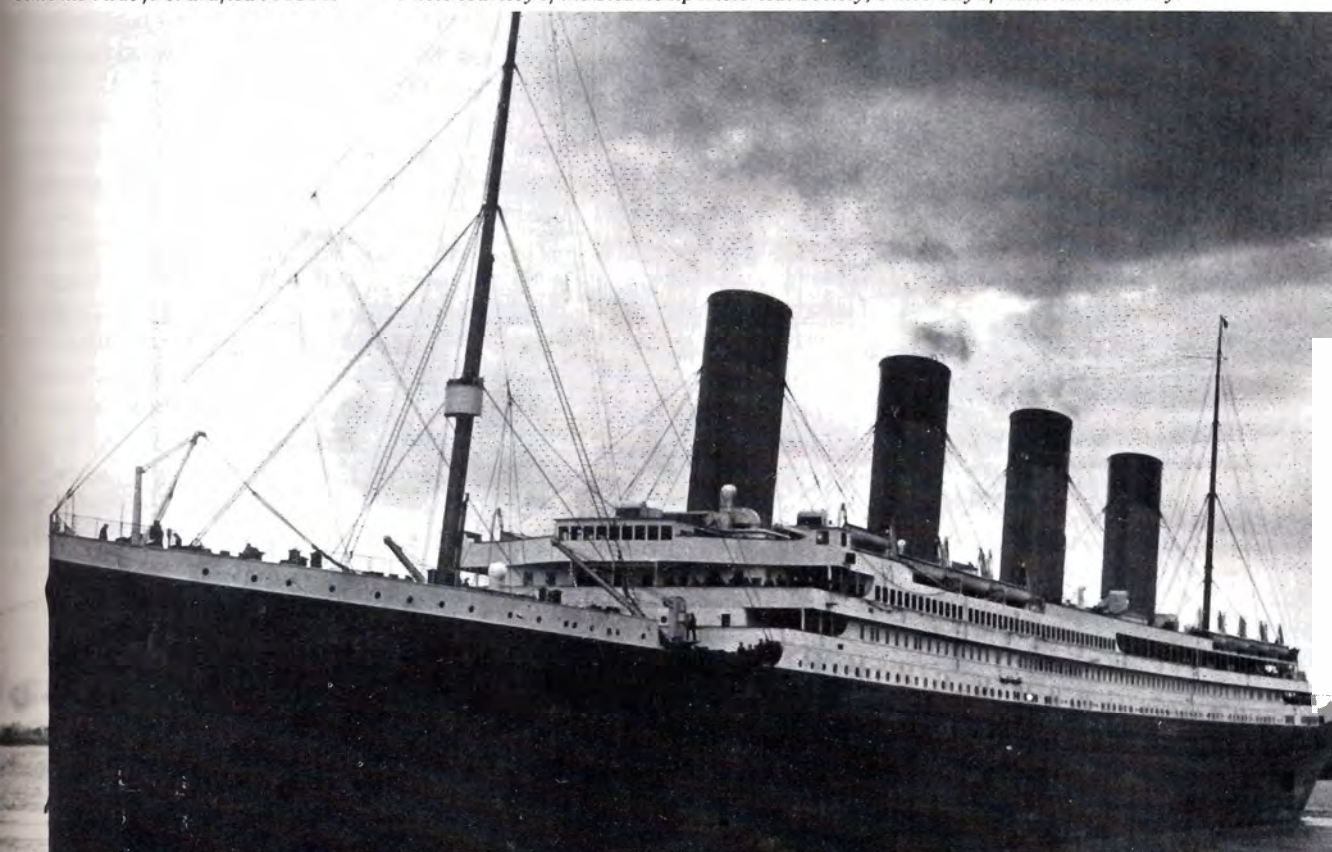
The sinking of RMS Titanic on April 12, 1912, with the loss of more than 1,500 lives, had a great impact upon safety at sea. Setting minimal international standards for passenger ship navigation, construction, radiotelegraphy, fire protection and lifesaving equipment became a priority among a number of maritime nations. The Safety of Life at Sea (SOLAS) International Convention was first drafted in 1914. Photo courtesy of the Steamship Historical Society, University of Baltimore Library.



Coast Guard inspectors examine the hull of the SS Independence in drydock in San Francisco. The ship is one of two United States passenger vessels.

Photo by LCDR Stephen Ciccalone.

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The implementation of maritime treaties and their subsequent enforcement presents a classic dilemma for flag states. In the aftermath of casualties, it is, in my observation, necessary to seek and identify a culprit and craft a solution. The real culprit, in most instances, is a combination of events, conditions and factors, many of which are not capable of being easily quantified. The role that human factors plays, the interaction between the flag state, the shoreside company that owns and operates the ship, and the ship's crew are difficult to measure, yet in many casualties this interaction plays a role.

Similarly, the responsibility for continual maintenance of high standards aboard ship is often diffuse and ill defined. The tendency for administrations is to seek a more quantifiable and less complicated solution for the prevention of future casualties -- a solution which is tangible, touchable and understandable -- a new or changed component, piece of equipment or system which will alleviate such future occurrences.

Consequently, IMO and national administrations are faced with a seemingly unending task of implementing and incorporating new standards. The initiatives for these new solutions are generated by flag states, and most are in response to significant marine casualties.

There is no question that IMO has been singularly successful in developing standards for the safety of life at sea and the protection of the marine environment. Having been deeply involved in this standard-making process for more than 20 years at both the national and international level, I submit that we have developed some outstanding standards which will continue to have a positive and even dramatic impact on safety of life at sea and prevention of marine pollution, but only if they are adequately enforced, not only during construction, but during the entire life cycle of the ship. Further, the enforcement of those standards has to be taken as seriously by all parties involved.

Turning point

At the most recent meeting of IMO's Maritime Safety Committee, the working group on flag state compliance discussed the possibility of a new subcommittee being established to address the implementation of IMO instruments. This subcommittee would have as its charge the monitoring of flag and port state enforcement, and the provision of advice and assistance on implementing maritime treaties.

This, coupled with IMO's consideration of mandatory requirements for a safety management system, represents a turning point in efforts to enforce standards -- a turning point which should have major benefits for the safety of life at sea and the protection of the marine environment.

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Managing ship safety

A lifeboat drill aboard the cruise ship Monarch of the Seas is observed by a Coast Guard inspector while underway.

Photos by CDR Robin E. Crusse

By CDR Marvin Pontiff

Increasing the level of marine safety by promoting sound ship management principles is an important goal of the Coast Guard Marine Inspection Program. The ship safety management concept, previously referred to as "incentive inspection" or "model company" efforts, has been an informal topic of conversation at various industry conferences for some time.

Still in the conceptual stages, the application of ship safety management as a tool to improve the use of Coast Guard marine inspection resources is still being explored. Relying on such principles shifts more responsibility for safe ship operation to the vessel operator.

Five safety nets

The marine safety system can be viewed as a series of five "safety nets" surrounding a commercial vessel's operation to protect a ship, its passengers, crew and cargo. At the center, the **first net is the vessel master and officers.** They are directly charged with the awesome responsibility for the vessel's safe operation.

The **second net** consists of the **owner, operator** and, specifically, the **management company** that is concerned with the day-to-day operation of the vessel. They are required to ensure that safety and maintenance measures are carried out, balancing business concerns with preventing the loss of ships and cargo.

The **third net** is the **classification society** which attests to the appropriate construction of the ship for its route and service. The society coordinates with the insurance underwriters to back up the owners.

Since shipping is performed in the market place, the government is responsible for ensuring the level of safety expected by the public. The **flag administration,** the **fourth net,** registers vessels and certifies their compliance with safety standards, such as the International Convention for the Safety of Life at Sea (SOLAS).

The **fifth net** is the **port state,** in whose waters a vessel trades. The port state boards the vessel to verify compliance with applicable standards for ship safety and pollution prevention.

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Together these successive safety layers endeavor to protect life and property at sea, and the marine environment.

Coast Guard role

Whether the Coast Guard is in the role of flag administration or port state, the Marine Inspection Program is applied in the same manner to all vessels within specific categories of service, depending on their routes and sizes. Regulations are developed through the public rulemaking process and published in the *Federal Register* as the Code of Federal Regulations (CFR). The Coast Guard 's objective is to enforce these regulations fairly and evenly.

Clearly, some companies are managed better than others, and are easily recognized by their histories of safe, responsible operations. When safety management principles are carried out, the Coast Guard could recognize responsible companies by reducing its activities on board their vessels. The Coast Guard could then target resources to identify and discourage "bad actors" and encourage improved safety performance. Wider acceptance of safety management principles provides the Coast Guard with the flexibility to direct resources where they are needed the most at any given time.

As high as the Coast Guard's interest is in a safe management enforcement program, it will not proceed without careful study and consultation with industry representatives. What is envisioned is an inspection and certification process which would be simplified for companies which promote and actively administer safety management principles. Conversely, inspections of vessels operated by companies not subscribing to safe ship management principles would be longer and more exacting in detail.

This fairly new concept needs further development, but it is a worthwhile goal considering today's limitations on public resources and the general movement in the industry toward quality management.

IMO initiatives

Recently, the IMO has focused attention on the role of the human element in maritime safety, and the establishment of guidelines for universal shipboard safety management. IMO Resolution A.647(16), revised by Resolution A.680(17), entitled "IMO Guidelines on Management for the Safe Operation of Ships and for Pollution Prevention," addressed these subjects. The resolution was endorsed by the Coast Guard and published in NVIC No. 1-90, dated August 17, 1990.

At the IMO Maritime Safety Committee's 60th session in April 1992, a joint working group met to develop a draft international code for the safe management and operation of ships. Norway, taking the role of "lead country" in developing the code, presented a rough draft version to the group for discussion and comment. The Coast Guard, the United States representative, participated in the discussions and submitted comments.

The new IMO code would provide guidelines for the development of a "safety management system" on each vessel to which it applies. The system would be carried out appropriately and documented. It would define the operating company's safety and environmental policy, describe the organizational structure, clearly identify levels of authority and responsibility for those individuals who work in safety and pollution prevention areas, and delineate procedures for internal audits and management reviews. It would also contain procedures for reporting system breakdowns and accidents.

The final time frame for adopting this code depends upon further deliberations at the 61st session of the Marine Safety Committee scheduled for December 1992. Here decisions will be made as to which ships it will apply, whether it will be mandatory or voluntary, and whether it will be made part of the present SOLAS convention or become a separate convention.

Conclusion

The Coast Guard actively supports this initiative. A clear recognition of the roles and responsibilities of management and classification societies in the safe operation and maintenance of merchant vessels is a vital element in the development of any such safety management program. By incorporating the use of shipboard management principles into its inspection program, the Coast Guard will more accurately focus public resources in the areas of the marine industry that require the most attention.

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Agreement improves ready reserve ship inspections

Mr. Harlan T. Haller and RADM A. E. "Gene" Henn sign memorandum of understanding.

By Ms. Teresa O. Preston

Improvements in the inspection of ships in the Ready Reserve Force (RRF), a component of the National Defense Reserve Fleet, were recently set in motion by an important interagency agreement. On March 25, 1992, RADM A. E. "Gene" Henn, chief of the Coast Guard's Office of Marine Safety, Security and Environmental Protection, and Mr. Harlan T. Haller, associate administrator for MARAD's Office of Shipbuilding and Ship Operations, signed a memorandum of understanding for Coast Guard RRF inspection.

This memorandum between two Department of Transportation agencies constitutes a major revision of their previous agreement signed in 1989, before the experiences of Operation Desert Shield and Desert Storm. The new agreement incorporates improvements suggested by Coast Guard and MARAD studies of RRF ship activation inspections during that conflict.

Background

Started in 1976, the RRF was designed to support a rapid deployment of United States military forces. It is programmed for quick response beyond that which is possible for commercial ships or older, less preserved vessels of the National Defense Reserve Fleet.

Soon after the RRF was established, the need for an understanding between the Coast Guard and MARAD regarding vessel inspections became apparent. The unique practice of keeping ships in a deactivated condition while maintaining a rapid response capability required that different inspection criteria than that earmarked for commercial ships should apply.

Commercial ship inspections and their timetables are geared toward active trading vessels, where all ship systems are operational and scheduling of inspections can be arranged well in advance. Since RRF ships are deactivated during normal inspection intervals, and require rapid response when activated, such inspection timetables need to be altered.

In response to the unique RRF inspection needs, the first memorandum of understanding was signed in 1977. This document allowed for deactivated ship inspections and delayed testing operational systems, usually until a vessel's activation. Since that time, the make up of the RRF and Coast Guard inspection requirements have changed, requiring revisions of the memorandum of understanding on several occasions.

Beginning in August 1990, 79 of the 96 ships in the RRF were called up to carry national defense cargo for Operation Desert Shield/Desert

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S.S. Green Mountain State, an auxiliary crane ship, is the latest addition to the Ready Reserve Force.

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Storm. This was the first large-scale activation of the RRF since its inception, and it tested both MARAD and Coast Guard procedures.

New memorandum

The new memorandum incorporates procedures to streamline safety inspections of deactivated RRF vessels and establishes clearer lines of communication between the Coast Guard and MARAD. One major innovation is a requirement to operationally test all RRF ships every two to three years to retain valid Certificates of Inspection. Other significant changes are in the areas of command, control and communication, and the correction of material deficiencies while vessels are in a deactivated state.

Command - control - communication

Procedures were added to improve coordination and communication between various levels of the Coast Guard and MARAD, and ship managers. The new procedures directly address lessons learned from inspections of the RRF during the Persian Gulf operations.

Early and frequent contact between all involved parties is absolutely essential. There are many parties involved in the complex process of acquiring, deactivating, maintaining and activating an RRF ship. Ship operators, shipyards, Coast Guard inspectors, marine surveyors, port engineers, ships officers and crew, and others help maintain RRF-ship readiness for the mission of transporting national defense cargoes.

The new memorandum provides a reference guide, defining roles and responsibilities of the two agencies in RRF ship inspections. Also, the agreement encourages employees of both agencies to meet regularly to discuss problems. Such advance preparation is intended to build a team approach to problem solving that will minimize confusion during RRF ship activations.

Operational testing

A concerted effort will be made to test, inspect and correct material deficiencies on RRF vessels during maintenance. Under the previous agreement, such tests and necessary repairs could be deferred until a vessel needed to be activated. Testing and repairing the vessels more frequently will reduce delays during activations.

Conclusion

Now that the new memorandum of understanding is signed, a working group is preparing a presentation for both MARAD and Coast Guard field personnel to brief all individuals involved in maintenance and inspection of RRF ships on the new requirements. These briefing sessions will provide opportunities for personnel from both agencies to openly discuss any effects the memorandum may have on their operations and to work out any differences they might have.

To make this memorandum meaningful, both Coast Guard and MARAD personnel will continue to look for better ways to maintain reliable RRF ships. The hard work and commitment of everyone involved in the two agencies will be needed to make this vision a reality. The new agreement is a visible sign of that commitment and represents another significant team effort within the Department of Transportation.

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Inspector examines machinery guards on fish reel and the condition of a ringbuoy. *Photo by PA2 Don R. Wagner.*

How to prepare for inspection . . .

By LCDR Scott E. Hartley

Set up and stick to a regular maintenance program

This is the best way to get ready for a Coast Guard vessel inspection. Detailed review of Coast Guard investigations into major casualties involving mechanical equipment reveals:

a) **the failure was due to a lack of or improper maintenance, and/or**
b) **the equipment was pushed past the manufacturers' recommended operating limits.**

In the shipping industry, the old axiom, "time is money," is the bottom line. Murphy's law will ensure that the most important or most expensive piece of gear will fail when you can least afford it. Therefore, your maintenance program should cover everything -- all machinery, lifesaving and fire-fighting equipment, electronics and electrical equipment, necessary publications -- and anything else you spend money on for your vessel.

The ideal maintenance program starts with the naval architect in the design stages of your vessel. If you are not that fortunate or if you just took over *M/V Disaster*, get a copy of the regulations (regs) covering your vessel class and read what the Coast Guard considers minimum operating standards. Of course, these standards depend on the size of your vessel, how many passengers or what cargo you carry, route restrictions and other criteria.

Study the regs

When you sit down to plow through the regs, keep your vessel's Certificate of Inspection handy for quick reference. The regs are divided into subchapters corresponding to different vessel classes. The subchapters are relatively easy to follow with indexes for quick reference.

Subchapter C -- uninspected vessels

The Coast Guard does not conduct annual inspections on these vessels, which include inland tugs, fishing boats and push boats. However, if your vessel is involved in an accident or pollution spill, the Coast Guard may inspect your vessel while conducting an investigation.

Subchapter D --	**tank vessels**
Subchapter H --	**passenger vessels of 100 or more gross tons**
Subchapter I --	**cargo vessels** **offshore supply vessels** **liftboats**
Subchapter IA-	**mobile offshore drilling units**
Subchapter T --	**passenger vessels under 100 gross tons**

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Each subchapter is divided into general topics called "parts." There are three parts with which you need to be familiar.

Inspection and certification

This part tells you when and what type inspection is required, and what the Coast Guard looks at and wants tested.

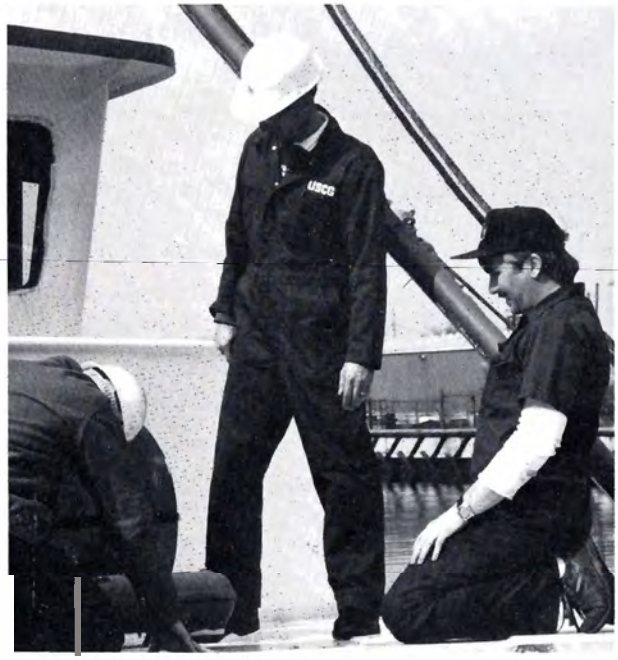
Vessel control, and miscellaneous systems and equipment

Here you learn what miscellaneous equipment you must have to operate, i.e., radar, a compass, etc.

Prepare up to the last minute

Once you have done your homework and inspection day is around the corner, be sure that whatever is on your vessel works. If you have inoperable equipment on board that is not required, take it off. The Coast Guard only wants operable emergency equipment available. (In an emergency situation, equipment at hand that doesn't work could prove disastrous.)

Perform the same tests the day before that you will have to conduct for the Coast Guard. If there are any problems, you can either correct them or inform the inspector what you have done and will do to fix them.



Inspector examines hydrostatic release attached between inflatable liferaft and vessel.

Photo by PA2 Don R. Wagner.

Operations

What you need to do in the normal day-to-day running of your vessel; when to report accidents and repairs; when and what tests, drills and inspections need to be accomplished; what log entries to make; what markings are required on fire and emergency equipment; and what markings must be on your vessel are among the subjects in this part.

Other subchapter topics or parts feature information on stability, lifesaving and fire-fighting equipment.

Reading the regs while referring to your Certificate of Inspection should give you a good idea of what you need to do to pass inspection.

You are the expert on your vessel and have a distinct advantage over the inspector. Before the inspector arrives, prepare a game plan as to how you want the inspection to go. Have all paperwork laid out in one location, fire hoses hooked end to end for testing, lifejackets in one location, main engines and generators up, air receivers pressed up ready to test relief valves and anything else you can do ahead. If possible, have someone take care of little problems that the inspector points out. Being well organized and able to fix things on the spot makes big points with the inspector.

If something doesn't work or needs adjustment and it can't be fixed quickly, move on to the

pection item. Come back when it is fixed. If you are issued a deficiency (form CG-835), it is nd of the world.

If you need more time to correct a problem, rite the appropriate Marine Safety Office before t he due date.

A word about inspectors, they come from ferent backgrounds, but they all made it through a formidable training program and qualification process, concluding with a board of veterans passing muster on their experience, judgment and knowledge. The inspector uses all of these in deciding what is and what is not acceptable, and always errs on the side of safety.

Check emergency gear

Two things an inspector has no latitude in are deficiencies in lifesaving and fire-fighting equipment. If any of these items are missing, beyond annual servicing or don't function properly, for whatever reason, they will have to be replaced or repaired before a new Certificate of Inspection can be issued.

Since lifesaving and fire-fighting equipment is not used in the normal operation of a vessel, the Coast Guard stresses the need to properly service and test it at least annually so that it will be ready in an emergency. Such equipment should be the best maintained gear on your

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Coast Guard inspector checks electrical generator control board on a commercial vessel.

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vessel. You should inspect it periodically and have annual servicing done before an inspection.

If your emergency gear is on the weather deck, check it for damage. The sun quickly deteriorates polypropylene line. One good pull could snap line on rafts, floats, liferings, etc.

The manufacturer's label should always be attached to emergency equipment. If not, find an approved repair facility, send the item back to the manufacturer, or replace it.

If you paint fire extinguishers, do not remove the underwriters laboratory label. The inspector will have no way of determining if it is adequate, and you will have to replace it.

If you have an emergency position indicating radio beacon (EPIRB), test it and replace the battery before it expires. This important piece of equipment should have your vessel's name stenciled on it, and it should be located where it will float free and not be tied to the vessel. Having a properly operating EPIRB can save the Coast Guard hours or days of searching for you. It could save your life.

If you see a problem, correct it

Spanner wrenches and nozzles disappear from fire stations. Every time you walk by, get in the habit of looking at these items. When you see a problem, correct it right away. Not only will this make preparing for an inspection easier, it will ensure that necessary equipment is in its proper location, ready to use in case of an emergency - -

and that is what the whole Coast Guard inspection program is all about.

Check these tips

Here are some inspector favorites. They like to open navigation lights to look at the bulbs. If a bulb has screw-type threads, it is a dead giveaway that the light has been altered. Bulbs are matched with specific lenses to give the proper illumination at a required distance. If you are involved in a collision at night or in reduced visibility, the other guy's lawyers would have an easy case against you.

Emergency fuel cutoffs are usually only exercised at inspection time and rarely work without a cheater bar (a long pipe used to apply force). If they are labeled properly and work easily from the main deck, the inspector will check to make sure that they have not been disconnected.

Life jackets with cigarette or welding slag burns or with missing elements are not acceptable. Keep plenty of spare lights, batteries, whistles and clips on board.

Knife edges and gaskets on watertight doors, hatches and scuttles need to be in good condition and paint free. They must be adjusted properly to ensure a complete seal when closed.

Oil in the bilges, oil rags or trash left about not only gives the wrong impression, they constitute safety hazards. Keep bilges clean and dry, spaces clean and all gear properly stowed. Your vessel should be ship-shape at all times.

If the inspector spots a red hand patch covering a hole in metal or anything jury-rigged, this will immediately change the scope of an inspection. They are considered red flags and usually indicate further problems.

Now that you know the trade secrets, you shouldn't have any problems with your inspection. However, if you have any questions about the regs, equipment or inspections, call your local inspector. That's what you pay us for!

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Innovations

in Coast Guard-approved equipment

By Mr. Robert L. Markle

Introduction

The Coast Guard equipment approval system covers lifesaving, fire-protection and pollution-prevention equipment for commercial ships and recreational boats. Complete details on how this system works appeared in the November-December 1988 issue of *Proceedings*.

International developments

The International Convention for the Safety of Life at Sea (SOLAS) was developed after the loss of the *Titanic*, and, today, covers most international commercial shipping, except fishing vessels. The 1981 and 1983 amendments to this treaty revised fire protection and lifesaving equipment measures.

Technical requirements for lifesaving equipment were specified for the first time, eliminating many differences between United States-approved equipment and that of other countries. Many manufacturers produce single items for all of their customers throughout the world. These items have sometimes been called "SOLAS approved," but there is no such thing.

Different shipping administrations, such as the Coast Guard in the United States are responsible for approving equipment according to SOLAS requirements. The determining factor for United States vessels, however, is still Coast Guard approval. Without a Coast Guard number, a device is not approved under United States regulations, regardless of a manufacturer's claims of "SOLAS approval."

The IMO is now developing a system of international approval, the initiative of which was introduced by the Coast Guard. When and if this system is established, lifesaving equipment meeting its standards would be able to be used on ships of virtually all nations, eliminating the need for manufacturers to duplicate test items for numerous authorities.

National marine safety authorities, such as the Coast Guard, would not have to duplicate review and approval work already completed by other authorities. It would be easier for ship owners to find equipment they need anywhere in the world. A "SOLAS approval," or something like it, would be a reality.

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Totally enclosed, fire-protected, aluminum lifeboat is stowed on an inclined ramp in a ready-to-launch position.

Free-fall lifeboat hits the water.

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Free-fall lifeboats

One of the most spectacular innovations in equipment design being introduced today is new ship-abandonment apparatus, called free-fall lifeboats.

Conventional lifeboats are launched by wires from davits down the side of a ship. This can be difficult and downright dangerous in heavy seas.

The free-fall lifeboat slides off a ramp mounted over the stern of a ship, dives into the water and surfaces while moving away from the vessel. The passengers are seated in padded seats, held in place by four-point seat belts while facing away from the direction of launch. These lifeboats work well under any conditions, including heavy seas.

The concept of launching a lifeboat from an inclined ramp through the air was explored by many inventors and visionaries since 1897. In 1961, a Dutch manufacturer built a fishing vessel lifeboat that could be launched from up to six meters (20 feet) above the water. Newer systems can be launched at nearly 130 feet.

Current free-fall lifeboats originated with a Norwegian system which was totally enclosed with an inclined launching ramp. The first version of this system was approved by Norwegian authorities for launch heights of up to 65 feet.

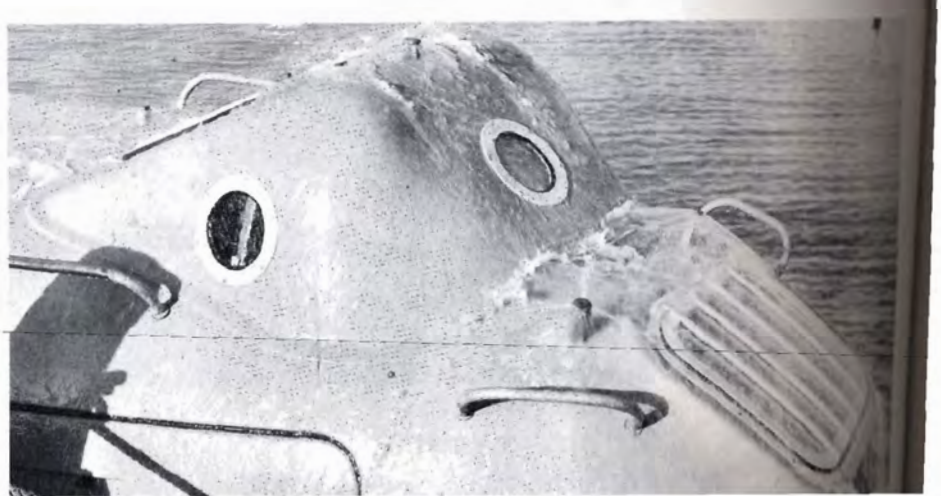
At least six manufacturers in different countries are now building free-fall lifeboat systems. Several have completed most of their testing for Coast Guard approval. The Coast Guard and MARAD encourage designers and builders of United States vessels to consider these systems for their ships.

Though the prospect of dropping through the air without restraint from such a height is frightening at first, this system is gradually gaining worldwide acceptance and may be the lifesaving system of the future. A free-fall lifeboat has not yet been used in an actual abandon-ship emergency, but many seafarers have been safely launched during training exercises.

Fire/gas-protected lifeboats

There was a dramatic increase in the transportation of oil by ship in the 1960s. The size of the ships increased as well. With the depletion of onshore oil reserves and the development of drilling rigs able to operate in deeper waters, offshore oil exploration and development also expanded. Concern grew for the safety of the crews of these ships and offshore rigs, should a ship be involved in a casualty that ignited the cargo or a rig be involved in a blowout and fire.

A number of countries began working on totally enclosed lifeboats that could travel for five or ten minutes through fire on water. After a number of designs were tried, the best solution was found to be a totally enclosed lifeboat with an exterior water spray system and an interior air supply system for the engine and occupants.



Lifeboat water-spray system is tested for navigation through fire on the water.

An HH-3 helicopter nears a Coast Guard-approved inflatable liferaft to determine its stability in high winds.

Used for about 15 years now for offshore drilling units, fire- and gas-protected lifeboats were required for tankers under the SOLAS treaty in 1986. They are now being installed on almost all new tankers, whether or not the ships are covered by SOLAS.

Inflatable lifejackets

Inflatable lifejackets have been used successfully for many years by the military and on aircraft. They have the potential for excellent performance, while still being comfortable to wear when not inflated.

The SOLAS treaty amendments, which came into force in 1986, set performance requirements for inflatable lifejackets. In 1989, the Coast Guard published its approval regulations for such devices intended for use on commercial vessels.

A thorough program of maintenance and inspection of inflatable lifejackets on vessels is essential to ensure their reliability. Despite some mild interest, however, there are no approved inflatable lifejackets currently being manufactured for commercial vessels.

The Coast Guard is investigating the possibility of approving inflatable personal flotation devices for use on recreational boats. The Boat/U.S. Foundation has nearly completed a two-year study on currently manufactured inflatables involving 500 volunteers testing different inflatables. When this study is finished, the Coast Guard will decide whether to approve inflatables for recreational boats. The study is also expected to provide useful data on the use of inflatable lifejackets on commercial vessels.

About ten years ago, a study was conducted with the Coast Guard Auxiliary on inflatables for recreational boats. It concluded that there would be some increase in the wearing of flotation devices if they were approved, but this would not make up for the low reliability of inflatables observed in the study. Now the Boat/U.S. Foundation study is reevaluating the inflatables.

Inflatable liferafts

The first inflatable liferafts known to be used in the United States were developed in Italy and England around 1919. They were intended for airships, and their use for about 30 years remained almost entirely limited to aircraft. After World War II, the British Royal Navy became interested in their use as lightweight, compact survival craft for ships. Shortly thereafter, inflatable liferafts were adapted for fishing boats, and then were used on large ships to provide spare survival craft that could automatically float free of a sinking ship, inflate and be available in case the lifeboats could not be used.

In the 1960 SOLAS revision, the use of liferafts became mandatory on passenger and cargo ships as spare survival craft.

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The SOLAS amendments, which came into force in 1986, allow davit-launched inflatable liferafts to be substituted for some lifeboats on passenger ships, and require cargo ships to have liferafts in addition to lifeboats for every person on board.

Inflatable liferafts also have a major role to play on smaller ships, where it is difficult to find space for lifeboats. Cargo ships of less than 85 meters (279 feet) long and passenger ships of less than 500 gross tons with less than 200 passengers may carry enough liferafts in place of lifeboats on each side of the ship to accommodate all persons on board. If it is more than 4.5 meters (15 feet) from the water to the deck where the rafts are boarded, they must be launched by davits so persons abandoning ship do not have to jump from excessive heights.

The inflatable liferaft is also improved under the new SOLAS requirements. One of the main functions of these liferafts is to float-free, allowing people in the water to board. Many casualty cases have demonstrated that it can be very difficult to board the raft from the water, especially if the survivors are cold and weak. Rope or web ladders are placed at the entrance of the rafts, but their flexibility makes them difficult to use. A way to improve access is to provide a water-level platform outside the raft at an entrance. One can easily roll onto the platform from the water, and then climb into the raft.

SOLAS also requires that liferafts be "stable in a seaway." High winds can pick up a lightly-loaded raft and blow it away before anyone is able to get on board. In heavy breaking seas, they can capsize, trapping occupants inside underwater. One way to lessen the chance of this occurring is to fit the rafts with large water ballast chambers, which is being worked on.

The next revision of SOLAS lifesaving requirements may well address stability standards for inflatable liferafts. The Coast Guard currently is involved in a regulatory project that will address this stability. Many liferaft manufacturers have expressed interest in this subject, each suggesting a different way of improving stability or making the liferafts self-righting.

Radio lifesaving equipment

A new radio communications system known as the global maritime distress and safety system will be introduced in the 1990s. This is

Satellite EPIRB is shown beside float-free storage device.

an international marine radio communications system based on satellite communications, digital data transfer and other new technology.

Under a new regulation published by the Federal Communications Commission, large commercial vessels operating on open seas will begin carrying satellite emergency position indicating radio beacons (EPIRBs) by August 1, 1993. They will replace Coast Guard-approved class A EPIRBS now on most of the vessels, as well as the hand crank-powered portable lifeboat radios on ships on international voyages.

The new satellite EPIRBs have been carried by some United States-registered commercial fishing vessels for nearly two years. The devices have been credited with saving 15 lives, and have dramatically reduced the time for search and rescue units to find distressed vessels.

SOLAS ships are also required to have two radar transponders, one mounted on each side of the ship, ready to be taken to a survival craft.

Information

Information on approved equipment may be obtained through the Marine Safety Hotline at 1 (800) 323-SAFE, or the Boating Safety Hotline at 1 (800) 368-5647. (See page 39 for ordering instructions for the new equipment list.)

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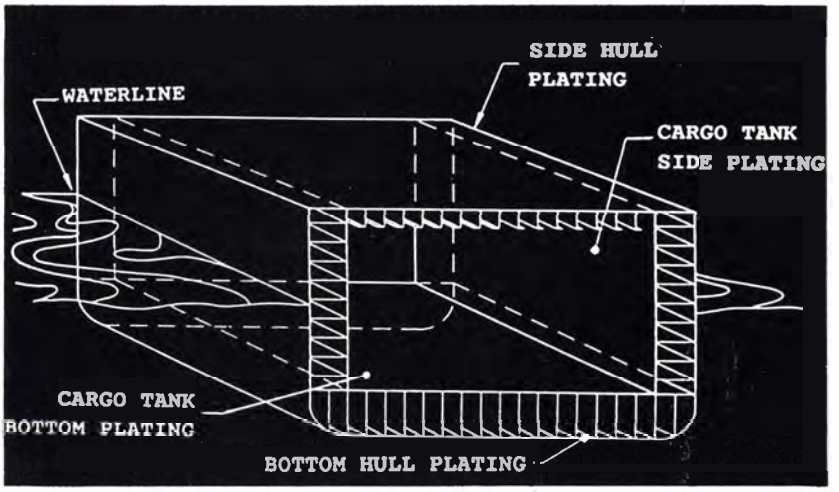

* * IMO adopts * * double hull requirements

By CDR Peter A. Popko and Mr. Stephen M. Shapiro

New international standards for double-hull oil tanker construction were adopted on March 6, 1992 at the 32nd session of the Marine Environment Protection Committee (MEPC 32) of the IMO.

Regulations 13F and 13G

These standards are in regulations 13F and 13G of annex I to the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78).

Regulation 13F will require most tank vessels contracted for after July 6, 1993, to have double hulls.

Regulation 13G will require most earlier tankers to be retrofitted with double hulls or retired no later than 30 years after delivery.

Regulation 13G also requires protectively located segregated ballast tanks on the earlier vessels 25 years after delivery.

Vessels calling at ports in countries that are parties to MARPOL 73/78 must comply with 13F and 13G.

OPA 90 requirements

The United States Oil Pollution Act of 1990 (OPA 90) requires double hulls to be fitted on all vessels, including those under foreign flags, carrying oil in bulk as cargo or cargo residue.

With some specific exceptions, any such vessel constructed or undergoing a major conversion under a contract placed on or after June 30, 1990, must have a double hull fitted at the time of construction or major conversion. Starting in 1995, an existing vessel must be fitted with a double hull according to an OPA 90 timetable. All vessels operating in United States waters must comply with OPA 90's double-hull provisions.

The Coast Guard has drafted an interim final rule to implement these provisions. This rule is in clearance and is expected to be issued during the summer of 1992.

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The Patriot, Conoco's first double-hulled tanker, is shown offshore Korea at the start of its maiden voyage.

Photo courtesy of Conoco.

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Major differences

The major differences between regulation 13F and OPA 90 are:

A) 13F applies to oil tankers of 600 deadweight (DWT) tons and above. OPA 90 applies to all tankers regardless of tonnage.

B) 13F applies to oil tankers contracted for on or after July 6, 1993, or delivered on or after July 6, 1996. OPA 90 applies to tankers contracted for on or after June 30, 1990, or delivered on or after January 1, 1994.

C) 13F allows mid-decks, splitting cargo tanks into upper and lower sections, in lieu of double bottoms. OPA 90 requires double sides and bottoms, permitting no alternatives.

D) 13F allows oil tankers of less than 5,000 DWT to have double bottoms and small cargo tanks in lieu of double hulls. OPA 90 requires all tank vessels, regardless of size, to have double hulls. Vessels under 5,000 gross tons may have equivalent double containment systems. However, the law does not provide the specifics of such systems.

The major differences between regulation 13G and OPA 90 are:

A) 13G applies to crude oil tankers of 20,000 DWT and above, and product carriers of 30,000 DWT and above. OPA 90 applies to all tank vessels, regardless of tonnage.

B) 13G requires the phasing out of existing single-hull oil tankers 30 years after delivery. OPA 90 requires phasing out based on a detailed schedule ranging from 20 to 45 years after delivery. Larger and newer tank vessels will be required to have double hulls sooner under OPA 90, but smaller and older oil tank vessels must have double hulls sooner under 13G. There are about 40 United States oil tankers that would be required to have double hulls sooner under 13G than under OPA 90.

United States position

RADM A. E. "Gene" Henn, chief of the Coast Guard's Office of Marine Safety, Security and Environmental Protection, was head of the United States delegation to MEPC 32. He stated that the United States fully supports the principles embodied in regulations 13 F and G because they reflect the same principles of OPA 90. However, since there are differences between 13F and 13G, and OPA 90 requirements, the United States reserved its position (abstained pending further review) on adopting these regulations.

Under the provisions of Article 16 of MARPOL 73/78, regulations 13F and 13G will enter into force on July 6, 1993, unless more than one-third of the countries which are parties to annex I of the MARPOL convention object to them by January 6, 1993.

The Coast Guard is currently reviewing and evaluating possible courses of United States action in regard to 13F and 13G.

Mid-deck design

The inclusion of the mid-deck design in 13F as an alternative to a double hull is one difference from OPA 90 which caused the United States delegation to MEPC 32 to reserve its position.

Since MEPC 31 in July 1991, the United States has clearly voiced objections to permitting the mid-deck concept as an alternative to a double hull, stating that, as a potential alternative, the mid deck must be thoroughly proven to be equivalent to the double hull prior to acceptance.

Consequently, IMO launched a study to compare the projected oil outflow of double-hull and mid-deck tankers, and to consider guidelines defining equivalency (to a double hull) for the development and evaluation of other alternative designs. The Coast Guard was an active participant on the IMO Steering Committee to ensure that the study be impartial and that the selection of research facilities to carry it out be equitable. The United States Navy's David Taylor Research Center was one of the facilities selected.

The IMO Steering Committee concluded that the mid-deck design is equivalent to the double-hull, with respect to total oil outflow based on various casualty cases. The United States reserved its position on this conclusion.

The Coast Guard is preparing a report on the effectiveness of alternative tank vessel designs. Mandated by OPA 90, this report is expected to be submitted to Congress during late summer of 1992.

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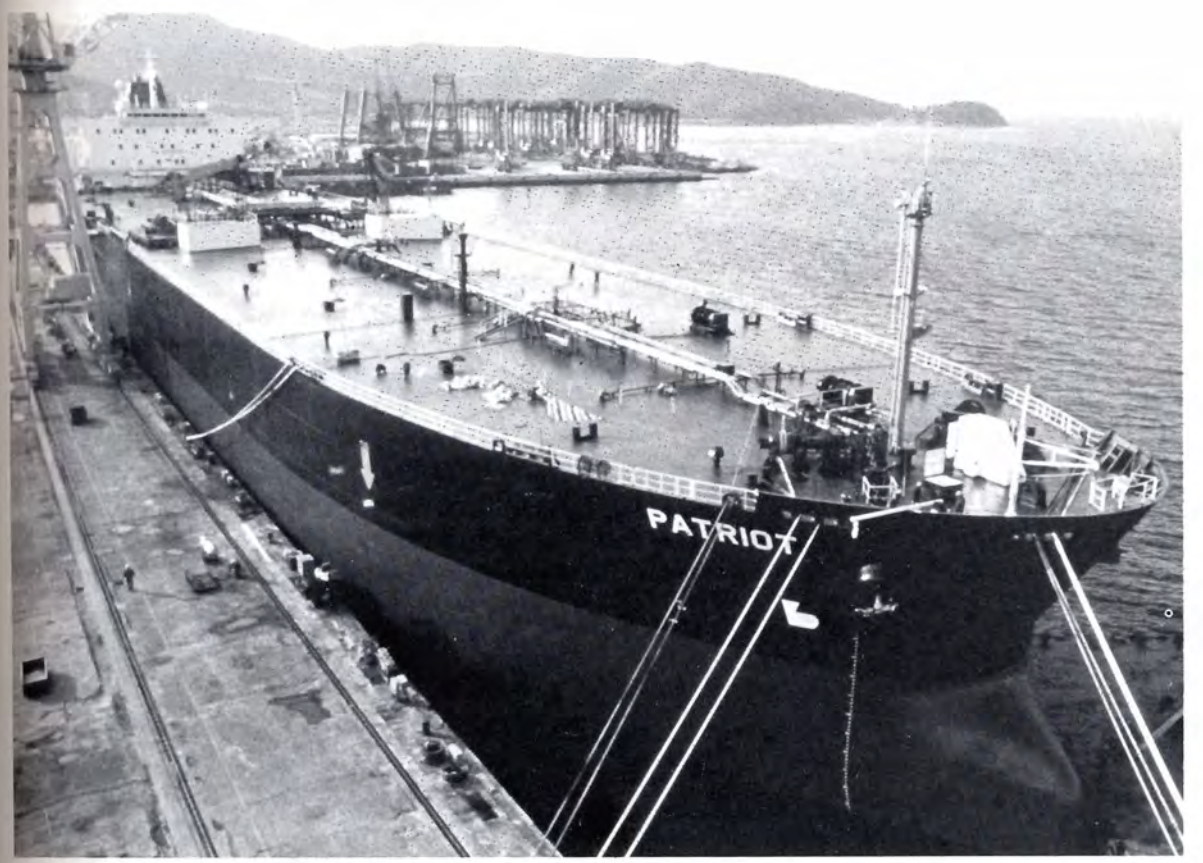
The Patriot is dockside at the Samsung Shipyard in Koje Island, Republic of Korea. *Photo courtesy of Conoco.*



What happens during recreational boat builder visits

By Mr. John Hannon and Mr. Alston Colihan

Introduction

There are approximately 4,000 manufacturers in the United States who produce an estimated 500,000 recreational boats every year. About 2,250 companies build boats which are subject to Coast Guard safety standards.

The Factory Visit Program is a major part of recreational boating standards compliance monitoring in the field. Under this program, the Coast Guard visits manufacturers and importers of recreational boats for educational and enforcement purposes.

The Recreational Boating Product Assurance Branch of the Auxiliary, Boating and Consumer Affairs Division, Office of Navigation Safety and Waterway Services, is the primary program manager for the administration of boating standards. Local Marine Safety and Marine Inspection Offices throughout the country conduct factory visits under the supervision of the Compliance and Enforcement Branch of the Merchant Vessel Inspection and Documentation Division.

Background

In August 1971, Congress passed the Federal Boat Safety Act. Among other things, this act authorized the Coast Guard to establish national construction and performance standards for manufacturers of recreational boats, and to develop enforcement mechanisms.

The first safety standards became effective in November 1972. These included the display of capacity information, safe loading, safe powering and flotation standards, which apply to manufacturers of monohull boats of less than 20 feet in length, except sailboats, canoes, kayaks and inflatables. Between 1977 and 1980, the Coast Guard published additional standards covering electrical systems, fuel systems and ventilation applicable to all boats with permanently installed gasoline engines for electrical generation, mechanical power or propulsion.

From the early 1970s to the mid-1980s, field enforcement, including factory visits, was handled by boating standards offices in the 12 Coast Guard districts: Boston, Massachusetts; St. Louis, Missouri; New York City, New York; Norfolk, Virginia; Miami, Florida; New Orleans, Louisiana; Cleveland, Ohio; Long Beach, and San Francisco, California; Seattle, Washington; Anchorage, Alaska and Honolulu, Hawaii.

In 1986, the Coast Guard proposed the establishment of three regional boating standards units as part of a general reorganization designed to improve operations without additional funding. The principal gains realized by regionalization were closer headquarters supervision and a slight increase in the average visits per year, per person.

The birth of a boat . . .

Workers lay up fiberglass in a mold for a recreational vessel hull.

Many boat manufacturers have plants throughout the country, and most of them distribute their product nationally. Therefore, interpretations of the regulations must be uniform and consistent year after year.

In the summer of 1987, regional boating standards units were established in Long Beach, Miami and St. Louis. The following year, however, the Coast Guard had a $100 million budget shortfall and had to slow down operations, reduce personnel and close some field units, including the three regional boating standard units. The responsibility for factory visits was then transferred to the Marine Safety Offices and Marine Inspection Offices, which conduct commercial vessel inspections. The officers in charge, marine inspection (OCMIs) are now directly responsible for conducting visits to recreational boat manufacturers in their zones.

Factory visits

There are three types of factory visits: informal, investigative audit and technical.

Informal factory visit

Not intended to be an inspection, the informal visit is a basic educational effort to introduce the Coast Guard and present the regulations to the manufacturer. It generally takes no more than two hours.

Factory investigative audit

This is a thorough investigation of a particular problem. A factory investigative audit should produce enough documentation for valid analysis and evaluation since it either follows an order for a defect notification and recall campaign, or determines the imposition of a civil administrative penalty on the manufacturer.

Technical factory visit

The technical factory visit is the first step in checking a manufacturer's compliance with regulations and standards. The inspectors help manufacturers identify noncompliances. A typical technical factory visit is a comprehensive effort toward educating boat manufacturers in federal safety standards.

Typical technical visit

First, the local OCMI writes the president of a manufacturing company in his or her area, requesting and explaining the purpose of a visit. During the visit, the Coast Guard inspector asks to see the plant, the construction process and

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Like popping cakes from a pan . . .
A finished hull is removed from a mold

. . . a finished deck is lifted from another mold.

Voila! -- *Put the two layers together and the boat is finished and ready for a coat of paint.*

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current boat production. During an examination of current production, the inspector looks for:

(a) noncompliance with federal regulations involving safety standards applicable to the boat manufacturer,

(b) incorrect installation of equipment, such as navigation lights, according to federal regulations, and

(c) construction practices which differ from recognized voluntary industry safety standards.

Once the inspection is completed, violations or potential violations of federal regulations are identified. Potential noncompliance items that cannot be confirmed by inspection, such as safe loading figures that appear too large or amounts of flotation material that seem insufficient, are discussed, and management's calculations and test procedures reviewed.

When possible, a list of dealers selling the company's boats is obtained. This is helpful when a test lab contracted by the Coast Guard buys boats on the open market to physically test them for compliance with certain standards.

Violations of federal regulations are pointed out to the manufacturer, and voluntary compliance is encouraged to increase boating safety, as well as to help create good customer relations. Practices related to voluntary industry standards are also discussed. The manufacturer will receive a written report of all noted violations.

Training

Formal training in recreational boating standards of inspectors from all 46 Coast Guard Marine Safety Inspection Offices started in October 1990 at the Reserve Training Center, Yorktown, Virginia.

Candidates are trained in Coast Guard policy and procedures for factory visits, including recreational boating standard inspection; budget and administrative functions; laws and regulations for the construction of recreational boats; manufacturer responsibilities; application of regulations to different boat types and sizes; manufacturer calculations for ventilation, flotation and horsepower; and elements of recreational boating standards violations. After completion of training, final certification for qualification as a recreational boating standard inspector is made in writing by the appropriate OCMI. To date, 80 individuals have completed training.

Achievements

Between 1989 and 1991, Coast Guard Marine Safety/Inspection Offices conducted more than 4,300 factory visits at recreational boat manufacturing plants all over the country. Most of these visits focussed on manufacturers which are subject to federal safety standards. Manufacturers of boats not subject to federal safety standards, e.g., sailboats, canoes, kayaks and inflatables, were visited less frequently.

Conclusion

The Coast Guard performs a wide variety of functions designed to enhance the safety of the maritime community, the port and the environment. Traditionally, the Marine Inspection Program focus has been on the commercial maritime community.

With the added responsibility for visiting recreational boat manufacturers, OCMIs have greatly increased the numbers of vessel owners and passengers who benefit from the vessel inspection program. From outboard runabouts to super tankers, the Marine Inspection Program focuses its efforts and dedication toward the safety of both the commercial and recreational user of America's waterways.

Photographs accompanying this article are courtesy of Mr. E. Charles Game, director of product reliability at Hatteras Yachts Inc., High Point, North Carolina.

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Inspection plans help solve problems for TAPS tankers

By LCDR Stan Deno

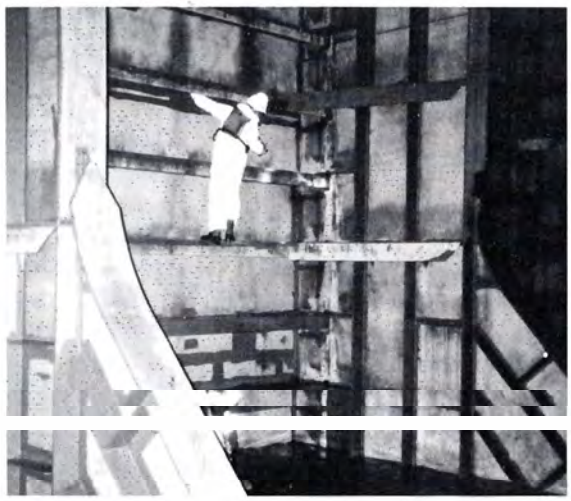
Problems

The structural integrity of tankers engaged in the Trans-Alaskan Pipeline Service (TAPS) is a matter of concern for the owners, the American Bureau of Shipping (ABS) and the Coast Guard.

Reports on a comprehensive TAPS tanker structural failure study were published in June 1990 and in May 1991. Both reports address reasons why the tankers experience a disproportionately high number of structural failures compared to vessels in other trades.

Recommendations

One of the most important recommendations contained in the studies was that all TAPS vessels should have critical areas inspection plans (CAIPs). These plans are management tools that track the historical performance of a vessel, identify problem areas and provide greater focus for periodic structural examinations. CAIPs are applications of the philosophy contained in IMO resolution A.647(16), "IMO Guidelines on Management for the Safe Operation of Ships and for Pollution Prevention."



TAPS tanker hull is carefully inspected for cracks.

The original TAPS study determined that hull cracks were usually caused by:

(1) imperfect design of structural details,

(2) poor workmanship and quality control,

(3) the use of high tensile steel in combination with the above two,

(4) a lack of maintenance of corrosion control systems, and

(5) harsh environment in the Gulf of Alaska.

A follow-up report confirmed the above determinations and discussed in detail the circumstances of the *Atigun Pass* and *American Sun* class vessels, which had undergone the greatest number of structural failures.

The primary responsibility for preparing CAIPs lies with the vessel owner or operator. The CAIP requirement is the cornerstone of the TAPS monitoring program to maintain vessel safety and to protect the environment. The most essential element in furthering those ends, however, is the quality of management exercised by the vessel owner/operator.

The only vessels to date required to have CAIPs are TAPS trade tankers. Since this requirement was put in place, the need for specific policy guidance for the implementation of CAIPs on the tankers has surfaced in meetings of operators, ABS and Coast Guard representatives.

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TAPS tanker Arco Anchorage bunkers in Port Angeles, Washington, before voyaging north to Alaskan waters.

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Specific guidance for CAIPs' implementation is contained in Navigation and Vessel Inspection Circular (NVIC) No. 15-91 and in Commandant G-MVI Policy Letter No. 17-91.

NVIC 15-91

NVIC 15-91 provides guidance for the development, use and implementation of CAIPs. A performance standard is provided, which outlines the essential elements for CAIPs.

Any vessel service or class can be required by the Coast Guard to have CAIPs inspection plans. The decision to require a CAIP on a specific vessel or on an entire class may be based on its history, service or the climate and conditions of the trade route. Such a requirement is in keeping with the intent of Title 46 U.S.C. 3703 and 3714, and Title 46 CFR, which give the Coast Guard authority to require the inspections and documents necessary to ensure vessel and environmental safety.

Policy letter 17-91

Policy letter 17-91 provides guidance for the institution of CAIPs as a management tool and for its implementation on TAPS tankers. The letter is not intended to dilute the authority of the Officer in Charge, Marine Inspection (OCMI), but to establish a framework for the OCMI and the vessel operator to complete consistent, acceptable repairs. The letter is intended to amplify guidance found in NVIC 15-91.

TAPS vessels

TAPS vessel operators were notified in late 1990 of the requirement for CAIPs. They must submit the CAIPs for review by their classification society as outlined in NVIC 15-91. To allow sufficient time for review, CAIPs already on the vessels were acceptable until June 30, 1992. The Merchant Vessel Inspection and Documentation Division maintains an up-to-date status list of CAIPs, including a copy of the plans reviewed by the classification society.

All OCMIs have been encouraged to attend critical area surveys required on TAPS tankers to help the Coast Guard properly monitor the structural fitness of the vessels. Credit towards a vessel's internal exam requirements may also be granted for critical area surveys completed with an OCMI present.

TAPs vessel operators and/or owners are responsible for finding a solution to the chronic fracturing of their tankers. The CAIP program serves as a tool to assist in this process.

Good communication between OCMIs, districts, traveling inspectors and appropriate Coast Guard headquarters offices is essential to maintain an adequate monitoring program of the TAPS fleet.

Conclusion

All vessels can use CAIPs inspection plans for tracking and recording structural history. All owners and operators should consider incorporating the principles of CAIPs into their management practices, even though they are not required to do so.

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Fishing vessel safety gets fully underway

By Mr. Tim Farley

The Coast Guard's effort to reduce the high accident rate in the commercial fishing industry through the new commercial fishing vessel safety regulations (46 CFR part 28) is now fully underway. A permanent fishing vessel safety section established in August 1991 in the Merchant Vessel Inspection and Documentation Division is taking on the challenge of developing practical ways to carry out these requirements.

Background

Commercial fishing is one of the most dangerous occupations in the United States, according to the Department of Labor. The industry has lost an average of 100 lives and 250 vessels per year during the last decade. Until now, uninspected fishing vessels only had to meet minimal safety equipment requirements.

Responding to this terrible safety record, Congress passed the Commercial Fishing Vessel Safety Act of 1988, and assigned the Coast Guard to develop and carry out mandatory safety regulations for the commercial fishing industry. Considering all points of view, the Coast Guard attempted to develop a workable set of safety regulations for the industry.

Process

After considering numerous recommendations from the Commercial Fishing Industry Vessel Advisory Committee, along with more than 500 comments from the public and testimony from 13 public hearings, the Coast Guard published the Commercial Fishing Industry Vessel Safety Regulations on August 14, 1991.

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Commercial fishing is one of the most dangerous occupations in the country.

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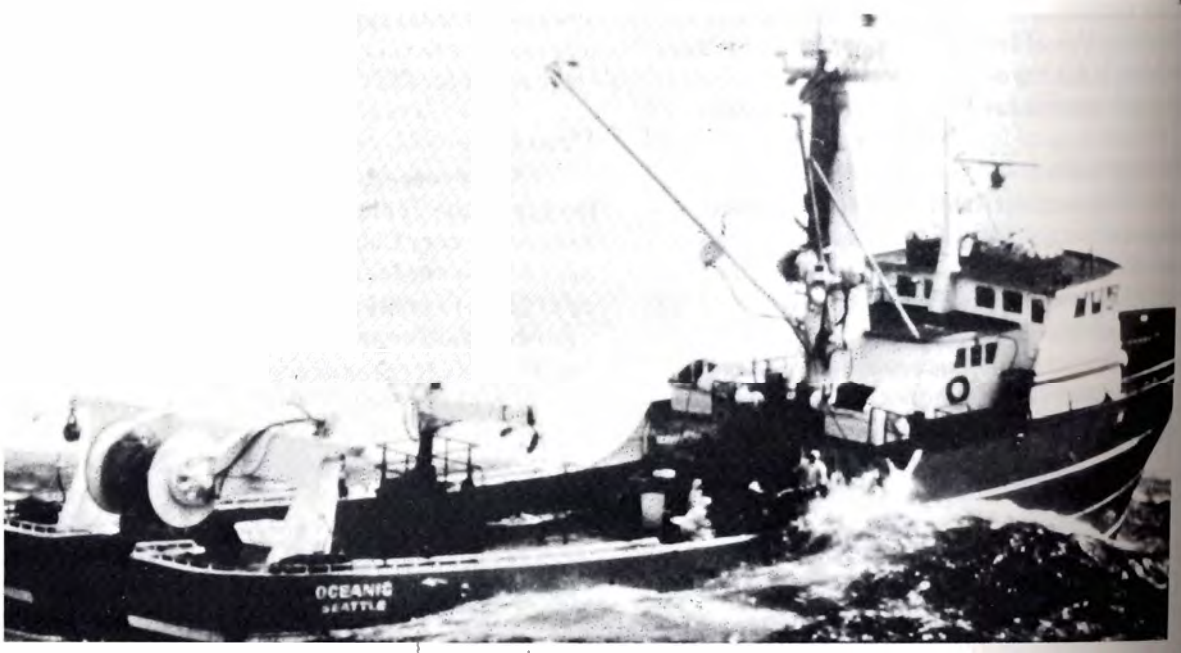
(See the November-December 1991 special fishing vessel safety issue of *Proceedings of the Marine Safety Council* for a complete rundown of the regulations.)

The advisory committee of 17 fishing industry representatives played an important role in the development of the regulations. A distinctive blend of commercial fishermen, vessel owners and industry representatives, the committee contributed their unique experience in making valuable recommendations to the Coast Guard. It will continue to act in an advisory capacity on fishing vessel safety issues.

Implementation

Making the public aware of the new requirements was the first task undertaken by the Coast Guard in its implementation program. Coast Guard personnel participated in national, regional and local trade shows and expositions. Informational pamphlets, press releases and the special fishing vessel safety issue of *Proceedings* were widely distributed. Articles were written for such popular trade magazines as the *National Fisherman* and *Commercial Fisheries News*.

The program philosophy consists of outreach and education through voluntary dockside examinations.



Regulations

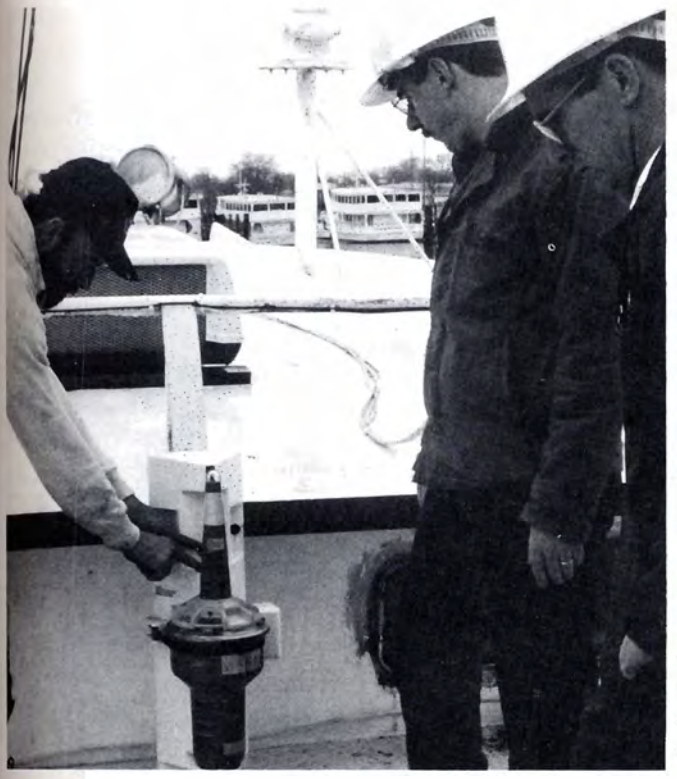
Effective September 15, 1991, the regulations include carriage requirements for items such as lifesaving and fire protection equipment, immersion suits, distress signals and EPIRBs.

Recognizing the diverse safety needs of the industry, the Coast Guard designed the new rules in a stratified fashion. Vessel and crew size, operational areas, documentation and construction data are all major factors in determining the type and amount of safety equipment needed. For example, distinctions are acknowledged between a 300-foot fish processor operating 80 miles offshore and a 35-foot shrimp boat operating inside the boundary line. Clearly, the larger vessel with more crew members would have a greater need for certain types of safety equipment, such as survival craft.

Dockside examinations

The voluntary no-fault dockside examination program was established on September 15, 1991, to assist members of the commercial fishing community to understand and comply with the new regulations. Several hundred vessels have participated nationwide.

The program consists of an informal Coast Guard visit to a fishing vessel to check the safety equipment to see if it complies with the regulations. If so, a special decal is given to the vessel operator to display in the pilothouse window. If the vessel does not comply with the regulations, the deficiencies will be pointed out and explained to the operator, but there will be no violation issued. When the deficiencies are corrected, the fisherman may request the dockside examiner to return and issue the decal.



Dockside examination
Coast Guard inspectors observe the installation of an EPIRB on a commercial fishing vessel.

To prevent violations or fines resulting from at-sea boardings of commercial fishing vessels, owners and operators are encouraged to contact their district fishing vessel safety coordinator and arrange a dockside examination. The time spent dockside learning what equipment is required and successfully completing an examination may not only avoid penalties, it may save a life.

Recent initiatives

The following fishing vessel safety initiatives have been completed or are in development:

* • **Implementation instruction (COMDTINST 16711.13)**
This instruction outlines the goals of the fishing vessel safety program for Coast Guard personnel. It also summarizes the responsibilities of Coast Guard personnel in coordination, boarding and examination roles.

* • **Navigation and Vessel Inspection Circular (NVIC) No. 12-91 -- Guidance for the termination of unsafe operations aboard commercial fishing vessels**
This NVIC provides guidance to the industry on the gravity of conditions which might warrant termination of voyages by Coast Guard enforcement personnel.

* • **NVIC 13-91 -- Guidance on fishing vessel third party examination and procedures for designation of "accepted organizations" and "similarly qualified organizations"**
This NVIC informs members of the marine surveying industry on how to become an "accepted organization" to conduct voluntary examinations of fishing industry vessels and the required examinations of fish processing vessels.

* • **Pamphlet**
A pamphlet, "Federal Requirements for Commercial Fishing Industry," explains the regulations applicable to fishing vessels in plain English. It is intended to serve as an education tool for both fishing industry members and Coast Guard field enforcement officers. About 250,000 copies of this pamphlet have been distributed throughout the country.

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* • **Form CG-4100F**
This fishing vessel boarding report supplemental form summarizes the requirements for fishing industry vessels and lists their applicable citations.

* • **Decals**
Fishing vessels which undergo dockside examinations and demonstrate compliance with the part 28 regulations are issued commercial fishing industry vessel decals. Fifteen thousand decals have been distributed to district fishing vessel safety coordinators. (A decal does not guarantee that a fishing vessel will not be boarded.)

* • **Computer program**
A computer program lists applicable requirements and regulation citations for uncomplicated vessel queries. The program will work on both IBM compatible personal computers and Coast Guard standard work stations.

• **Curriculum development**
A fishing vessel safety curriculum will be introduced into the Coast Guard formal training program at Yorktown, Virginia, in FY 1993. It will be targeted for all personnel who will be involved in boarding and examining commercial fishing vessels. In addition, district fishing vessel safety coordinators have set up training programs for their personnel.

• **Supplemental notice of proposed rulemaking**
A supplemental notice of proposed rulemaking has been drafted for publication in the *Federal Register*. It addresses stability requirements for fishing vessels less than 79 feet, exemptions, survival craft requirements for fishing vessels with less than four persons on board and within 12 miles from shore, stability for load line assignments, the Aleutian Trade Act, termination guidelines and criteria for safety instructor certification and course curricula.

* • **Headquarters directive**
Distributed throughout the Coast Guard on February 24, 1992, this directive provided additional guidance on the enforcement of the commercial fishing industry vessel regulations during at-sea boardings. This guidance was developed in concert with the Operational Law Enforcement Division of the Office of Law Enforcement and Defense Operations and the Search and Rescue Division of the Office of Navigation Safety and Waterway Services.

• **Interim rule**
Currently under review by the Department of Transportation, an interim rule has been drafted for publication in the *Federal Register*. The intent of this rule is to provide temporary relief of immersion suit carriage requirements for some vessels. It addresses documented commercial fishing industry vessels operating inside the boundary line on seasonally cold waters and undocumented commercial fishing industry vessels operating on seasonally cold coastal waters.

• **Personnel**
An additional 16 positions were assigned for district fishing vessel safety coordinators in FY 1991. These positions are in headquarters and the districts, and may be filled by either civilian or military personnel. In addition, 45 new fishing vessel dockside examiner positions were established in FY 1992.

• **Training**
Now that the implementation of the regulations is well underway, the Coast Guard is focusing on training and educating the fishing community. Through formal training, public meetings, workshops and the simple task of "walking the docks," Coast Guard personnel are spreading the word on safety -- not only about safety equipment requirements, but about the importance of including drills and on-board safety training in the fisherman's everyday routine.

With the Coast Guard's help, a standard, minimum training curriculum is being developed that will be used nationally by all maritime training institutions and will serve as the groundwork for all fishing vessel safety training. This instruction will ensure that individuals conducting the required drills and instruction are qualified, and that a consistent body of knowledge will be passed along to each member of the crew.

* Available from your Coast Guard district fishing vessel safety coordinator.

Summary

"The Coast Guard is committed to improving safety in the commercial fishing industry," said Commandant Admiral J. William Kime. "These regulations are a major step in reducing the unacceptably high accident rate in the fishing industry."

With this premise, the Fishing Vessel and Offshore Safety Branch will steam ahead, working continually with members of the fishing industry to improve fishing vessel safety, and to save property and lives.

Mr. Tim Farley is a licensed master mariner in the Merchant Marine, and is currently serving as a project officer in the Fishing Vessel and Offshore Safety Branch of the Merchant Vessel Inspection and Documentation Division.

Telephone: (202) 267-2307.

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Coast Guard district fishing vessel safety coordinators

Commander
First Coast Guard District
408 Atlantic Avenue
Boston, MA 02210-2209
Telephone: (617) 223-8444

Commander
Second Coast Guard District
1222 Spruce Street
St. Louis, MO 63103-2832
Telephone: (314) 539-2655

Commander
Fifth Coast Guard District
431 Crawford Street
Portsmouth, VA 23704-5004
Telephone: (804) 398-6414

Commander
Seventh Coast Guard District
909 S.E. 1st Avenue
Miami, FL 33131-3050
Telephone: (305) 536-5651

Commander
Eighth Coast Guard District
501 Magazine Street
New Orleans, LA 70130-3396
Telephone: (504) 589-6271

Commander
Ninth Coast Guard District
1240 East 9th Street
Cleveland, OH 44199-2060
Telephone: (216) 522-3994

Commander
Eleventh Coast Guard District
400 Oceangate
Long Beach, CA 90822-5399
Telephone: (213) 499-5330

Commander
Thirteenth Coast Guard District
915 Second Avenue
Seattle, WA 98174-1067
Telephone: (206) 553-1711

Commander
Fourteenth Coast Guard District
300 Ala Moana Boulevard
Honolulu, HI 96850-4982
Telephone: (808) 541-2114

Commander
Seventeenth Coast Guard District
P.O. Box 25517
Juneau, AK 99802-5517
Telephone: (907) 463-2212

Coast Guard keeps up with spill response technology

Oil spill response vessel is ready for action. *Photo courtesy of National Strike Force.*

By LCDR Jeff Brager

The 1989 *Exxon Valdez* oil spill in Prince William Sound, Alaska, created a demand for oil spill response vessels of all types. They may be tugs, fishing vessels, barges -- any vessel which can provide crucial spill support services -- or more sophisticated vessels built for the sole purpose of responding to oil spills. These are known as dedicated oil spill response vessels (OSRVs).

Dedicated OSRVs

The same flammable characteristics that have made oil an essential commodity pose problems for vessels operating in it. The designers of dedicated OSRVs are faced with a real challenge in producing a vessel that can safely operate in an environment filled with the volatile substance.

The vessels are being designed to respond immediately to an oil discharge. They may arrive at a spill when there are volatile vapors still present. Although they will eventually weather out of the spilled oil, these vapors present a real hazard to the OSRVs.

Most dedicated OSRVs are designed to recover and retain spilled oil. However, bringing oil with explosive vapors on board poses real problems as to their safe handling and storage. The vessels should be designed in a way to permit the crew safe refuge and evacuation measures in the event of an oil fire on board.

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Fishing vessels corral oily debris from 1987 tanker oil spill in Cook Inlet, Alaska. Photo by PAC Ed Moreth.

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Non-dedicated vessels

Ordinary, non-dedicated oil spill response vessels have traditionally been used for critical support functions during the responses. They may be inspected or uninspected vessels that can carry supplies, personnel, fuel, tow boom and can provide berthing and recover debris.

Most of these vessels are not designed to operate in volatile atmospheres, and should not be used for response efforts until all explosive vapor concentrations are at acceptable limits.

Inspection policy

Originally dedicated OSRVs that retained oil on board were inspected as tank vessels. To promote the building and conversion of these vessels, a 1991 policy relaxed the Coast Guard's position of inspecting dedicated OSRVs under 500 gross tons as tank vessels.

A careful comparison of the 1991 policy to previous safety issues resulted in inspection standards tailored to the design and operational requirements of these OSRVs. The new policy provides for segregation of accommodation spaces from recovered oil systems and tanks. There also are structural fire protective requirements for vessels with overnight accommodations.

In addition, the new inspection policy provides a clarification of vessel areas where volatile vapors may be expected to be present, and a requirement for the elimination of ignition sources in these locations.

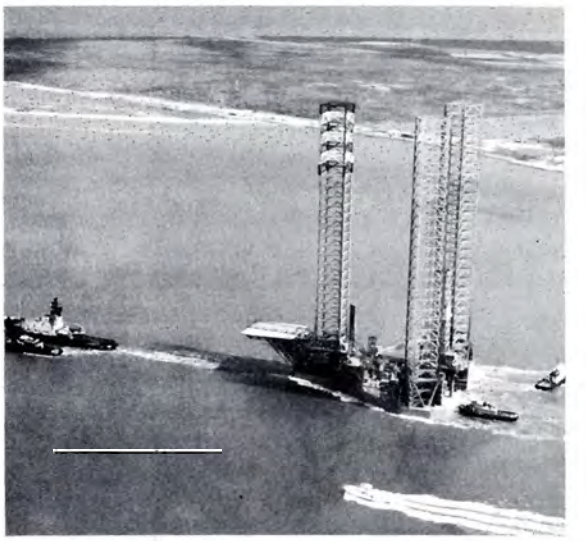
The new policy can be found in MVI Policy Letter 03-92, dated March 19, 1992. (This letter, which is available from the author of this article and at local MSOs throughout the country, contains a draft change to chapter 10.P, volume II of the Marine Safety Manual.)

The policy provides guidance to Coast Guard field inspectors and plan reviewers, along with vessel designers, owners and operators. It sets forth a reasonable set of inspection standards for vessels operating in a hazardous environment, which will promote safe, effective responses.

LCDR Jeff Brager is a project officer in the Compliance and Enforcement Branch, Merchant Vessel Inspection and Documentation Division. Telephone: (202) 267-1464.

Oil skimmer cleans up spill. Photo courtesy of National Guard.

Avoid "loose cannons" on jack-ups



The Rowan Gorilla IV is shown under conventional tow.

By Mr. James M. Magill

The recent loss of three jack-up drilling units under conventional tow in severe storms emphasized the urgent need for guidelines on safe ocean tow of these units.

- *December 15, 1988 -- Rowan Gorilla I capsized and sank approximately 500 miles southeast of Halifax, Nova Scotia. The jack-up was being towed from Canada to the United Kingdom when it met up with severe winter storms in the North Atlantic.*

- *November 1989-- Interocean II capsized and sank under tow in the United Kingdom's section of the North Sea.*

- *August 21, 1990 -- West Gamma capsized and sank while under tow in the Norwegian section of the North Sea.*

Guidelines

In August 1990, the National Offshore Safety Advisory Committee established a working group of representatives of United States offshore and marine industries and the Coast Guard's Offshore Activities Branch of the Merchant Vessel Inspection and Documentation Division to develop safety guidelines for ocean towing of jack-up drilling units. The guidelines were published by the Coast Guard in NVIC No. 11-91 on July 16, 1991.

The same guidelines were submitted to the IMO Subcommittee on Stability and Loadlines, and on Fishing Vessel Safety in early 1992. This subcommittee recommended that member governments circulate the guidelines to marine industry members; drilling contractors, owners and operators; and classification societies.

It is interesting to note that both Norway and the United Kingdom are working on guidelines for ocean towing of jack-up drilling units.

Loading plans

A significant contributing factor in the sinking of the jack-up drill units was the massive influx of green water through main deck openings. These openings were caused by temporary equipment and cargo breaking free like a loose cannon on the deck of an old warship.

Typical cargo could be a mud testing laboratory or a downhole testing unit -- as large as 20 by 10 feet by eight feet high. When broken loose, this gear can "wipe out" large vent trunks and hatches protruding above the deck. A jack-up's hull can fill up with water very quickly with only a few of these vents open.

Up until now, there have been no regulations to require advance planning for placing large containers on deck. Nor have there been any requirements for calculations on the dynamic stresses on deck fasteners and tie-downs holding temporary equipment and cargo.

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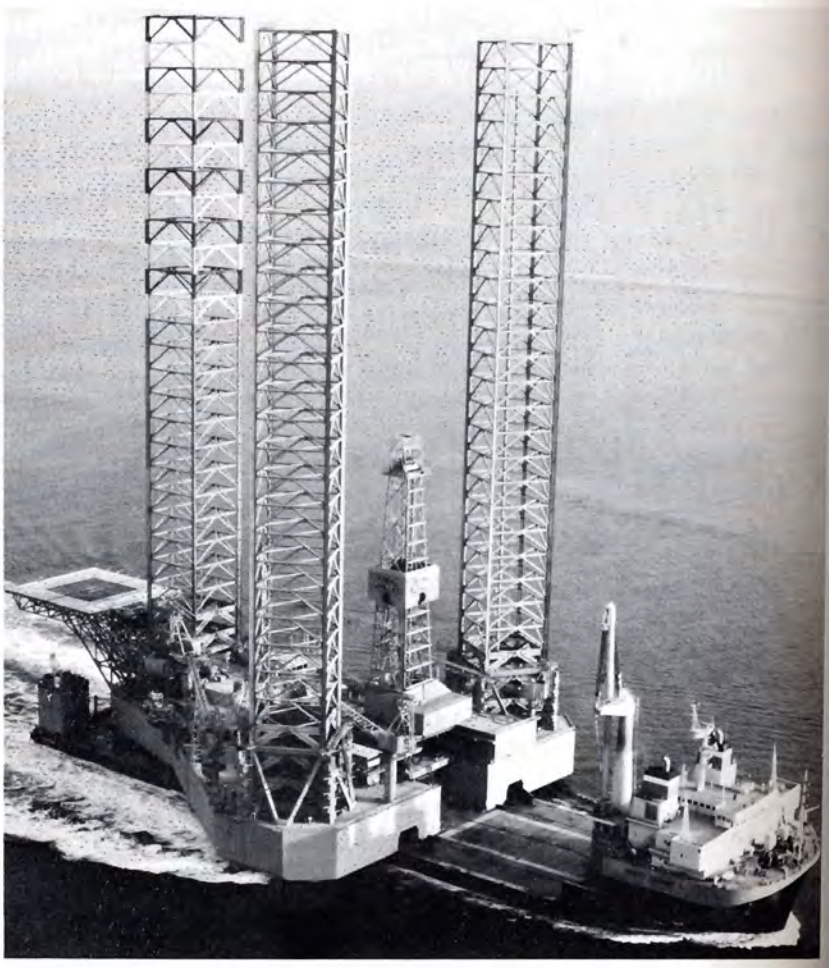

Jack-up drilling unit is transported by "piggy-back" tow.

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NVIC 11-91 recommends the development of a loading plan, showing the location of all temporary equipment and cargo, and calculations showing that all sea-fastenings of this gear and cargo can withstand likely vessel motions and outside forces. The loading plan and calculations should be reviewed, stamped and signed by a registered engineer and strictly adhered to during loading.

"Piggy-back" tows

The newest method of transporting jack-up and semi-submersible drilling units is by "piggy-back" tow on a large "heavy-lift," self-propelled vessel. This vessel can ballast down and partly submerge so that the drilling unit can float over it. It then deballasts to lift up the unit onto its deck. This is similar to a floating dry-dock ballasting down to allow a ship to float over it and then deballasting to lift the ship up out of the water.

The piggy-back tow method, developed about ten years ago, has become quite common, although it is more expensive than the usual wet tow. The piggy-back tow, however is about twice as fast, and reduces the dynamic motions and forces for jack-ups. The motions of the heavy-lift vessel are much less than that of a jack-up unit in the same seaway.

Therefore, while the guidelines of NVIC 11-91 apply to both towing methods, it is very important that they be followed when the wet tow method is used.

Conclusion

NVIC 11-91 provides valuable guidance for offshore industries the world over. If these safe towing guidelines are followed, the losses of jack-up drilling units should be greatly reduced.

Mr. James M. Magill is a naval architect in the Offshore Activities Branch of the Merchant Vessel Inspection and Documentation Division.

Telephone: (202) 267-2307.

Marine safety publications

by Ensign Barbara Rose

Coast Guard publications provide guidance to marine personnel on all aspects of the Marine Inspection Program. Available to the public, the publications present up to the minute news on Coast Guard safety regulations, enforcement policies, investigations, administrative procedures and other important subjects.

The Marine Safety Information System (MSIS) computer has also documented inspections, casualties and other vessel information. The following is a brief description of available publications and computer information.

Marine Safety Manual

Consisting of eight volumes, the *Marine Safety Manual* provides timely information on Coast Guard safety regulations, their development and application. The volumes, which are updated periodically, are available from the United States Government Printing Office. (These volumes are listed on the next page.)

NVICs

Published throughout the year, *Navigation and Vessel Inspection Circulars (NVICs)* inform the marine industry and the public of specific Coast Guard policies and regulations. They may be purchased as a full set by calender year or individually from the subscription service of the United States Government Printing Office. Prices vary. *NVIC No. 0-92* contains the names and prices of previous issues. The annual subscription fee is $38, payable in advance.

Copies of previous *NVIC* issues can be obtained from:

Commanding Officer
United States Coast Guard
Marine Safety Center
400 7th Street, S.W.
Washington, D.C. 20590-0001

Attn: Ms. Janice McKenzie

Equipment list

Commandant Instruction M16714.3D - Equipment List is an index of equipment that has been approved or certified by the Coast Guard for vessels. It can be obtained under stock number 050-012-00-306-8 for $12.00 from the U. S Government Printing Office.

IMO

The IMO's Publications Section provides the maritime community with numerous texts, including *The 1974 International Convention for the Safety of Life at Sea (SOLAS)*, as amended, and the *Regulations for the Prevention of Pollution by Oil.* IMO publications may be purchased at cost based on the current exchange rate for British currency. A catalog of all titles is available from:

International Maritime Organization
Publications Section
4 Albert Embankment
London SE1 7SR

MSIS

The Marine Safety Information (computer) System (MSIS) connects all facets of Coast Guard activity concerning the promotion of life, property and environment in the marine domain. MSIS records safety information on certificates of inspection and compliance, and SOLAS documents. It also maintains records of vessel casualties, pollution incidents, boardings, inspections, and histories of violations of federal regulations on safety and environmental protection.

A tape of the MSIS data file can be purchased for $453.00 (including handling) by ordering as follows:

Merchant Vessels of the United States
PB91-506907
National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161
Telephone: (703) 487-4650

To order Coast Guard publications from the United States Government Printing Office, give the name, stock number and price. Send to:

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402
Telephone: (202) 783-3238

Ensign Barbara Rose is a project officer in the Compliance and Enforcement Branch of the Merchant Vessel Inspection and Documentation Division.

Telephone: (202) 267-1464

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Exxon Valdez enters drydock after 1989 spill. *Photo by Kim Lee/National Steel and Shipbuilding Company*

Marine Safety Manuals

Publication	Name	Price	Stock Number
MSM Vol I	Administration & management	$76.00	950-037-00000-8
MSM Vol II	Materiel inspection	92.00	950-038-00000-4
MSM Vol III	Marine industry personnel	57.00	950-039-00000-1
MSM Vol IV	Technical	73.00	950-040-00000-9
MSM Vol V	Investigations	50.00	950-041-00000-5
MSM Vol VI	Ports & waterways activities	76.00	950-042-00000-1
MSM Vol VII	Port security	74.00	950-065-00000-1
MSM Vol X	Interagency agreements & acronyms	48.00	950-043-00000-8

Chemical Data Guide for Bulk Shipment by Water, 1990 Edition (CIM 16616.6A)

Updating the 1982 edition, the new *Chemical Data Guide for Bulk Shipment by Water* includes a number of new entry data pages, and, where available, the MARPOL Protection Agency's pollution category, the threshhold limit value published by the American Conference of Governmental Industrial Hygienists and the Occupational Safety and Health Administration's permissible exposure limit.

The new edition introduces three new features: a list of oils, a section on conversion factors and another on temperature conversion. It also includes a new section of appendixes with the compatibility chart as well as the medical kit information and carcinogens list.

In addition, the [illegible] completely revised, as has the reprint of the 46 CFR part 150 – Compatibility of Cargoes – incorporating amendments through 1990.

Corrections and suggestions for the next edition are welcome. Call the Hazardous Materials Branch of the Marine Technical and Hazardous Materials Division at (202) 267-1577.

The 1990 edition of the *Chemical Data Guide for Bulk Shipment by Water* is available for $15.00 under the stock number 050-012-00295-9 from:

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402
Telephone: (202) 783-3238

Tanker Operations: A Handbook for the Ship's Officer, by G.S. Marton

First issued in 1978, *Tanker Operations: A Handbook for the Ship's Officer* is a standard reference book, which has been updated and enlarged in a third edition. Used as a text book by United States maritime academies, the publication started out as a basic guide to tanker operations for junior officers, but has become more technical and complex in detail.

Tanker Operations covers detailed instructions of how to load various cargoes and how to plan loading, as well as information on piping, pollution and other pertinent subjects.

Three new chapters have been added concerning petroleum and the refining process, and international conventions governing tanker operation, including ramifications of the Oil Pollution Act of 1990.

In addition, new equipment and procedures have been introduced in the new edition, which is available for $35.00 from:

Cornell Maritime Press
P.O. Box 456
Centerville, MD 21617
Telephone: 1-800-638-7641

Crew Size and Maritime Safety, by the National Research Council

United States ocean vessels have half the crew size of 30 years ago, due to automation and mechanization. But are reductions in crew size increasing the risk of vessel accidents? *Crew Size and Maritime Safety* explores how we can minimize risk without hindering technology, thoroughly analyzing issues , including domestic versus foreign manning practices and safety performances; effect of crew size on fatigue, level of training and ship maintenance; and the Coast Guard's approach to crew size regulations.

The volume features a trend analysis of 20 years of maritime safety data, compares United States and international laws and treaties on ship manning, and makes recommendations for improvements. It also includes a model for setting optimum crew levels based on systems engineering and tested with actual ships.

Copies of *Crew Size and Maritime Safety* are available for $22.95 from:

National Academy Press
2101 Constitution Avenue
Washington, D.C. 20418
Telephone: 1-800-624-6242

Chemical of the month *3/C Eric P. Kowack*

Octane

Almost everyone who has ever filled a gas tank with unleaded gasoline is familiar with the name "octane". The more expensive, higher grades of gasoline are better for an automobile, because they have more octane in them. The octane is a gasoline additive which helps to create a strong, smooth expansion of gas, causing a smooth push of the piston and no knocking sound from the engine. The more octane in the gasoline, the smoother the explosions of gas in the pistons, which cause an engine to be more efficient.

The octane rating of gasoline is based on its "knocking characteristics," which are compared to the traits of gasoline which include "isooctane" (2,2,4-trimethylpentane) and heptane. This gasoline is said to have an octane number of 100. Based on this comparison, the gasoline is given an octane rating between zero and 100. An example would be in the gasoline with an octane rating of 92. This mixture has a knocking characteristic of 92 percent 2,2,4-trimethylpentane and eight percent heptane.

Hazards

Because octane is so common in today's society, it is important to realize its hazards. Overexposure to octane causes skin and eye irritation. Exposure to undiluted octane for one hour causes a diffuse burning sensation. Exposure for five hours causes blisters.

In case of contact with octane, immediately flush the skin or eyes with running water for at least 15 minutes. Remove and isolate contaminated clothing. If vapors are inhaled, move the victim to fresh air and call for emergency medical care. If the patient is not breathing, give artificial respiration until help arrives.

To control an octane leak or spill, first remove all sources of ignition from the hazard area. Then try to stop the leak, if this can be done without risk. To reduce vapors, use a water spray over the leakage. Take up a small spill with sand or some other noncombustible absorbent material, and then flush the area with water. In a large spill, dike the liquid far ahead of the spill to isolate it for later disposal. Make sure to keep unnecessary people away and to stay upwind of the spill, keeping out of low areas. If a large spill should occur, contact the National Response Center immediately at 1-800-424-8802.

Fires involving octane can be extinguished with water spray, CO_2, dry chemical or foam. If a tank is involved in fire, isolate the area for one-half mile in all directions. Self-contained breathing apparatus and full protective clothing should be worn at all times. If possible, withdraw from the area and let the fire burn. For emergency assistance, call CHEMTREC at 1-800-424-9300.

Shipping

Although octane is generally stable, it is obviously a potentially dangerous compound. Therefore, it is stored and shipped in sealed containers, and is regulated by the Coast Guard as both a Subchapter D and O, category C pollutant, for shipment under Title 46 CFR. Octane carries an IMO (International Maritime Organization) rating of class 3.2.

Octane

Chemical name:	Octane
Formula:	C_8H_{18}
Synonyms:	n-octane
Chemical family:	Paraffin
Physical description:	Colorless liquid with a gasoline-like odor
Physical properties:	
Boiling point:	258.1°F (125.6°C)
Freezing point:	-70.2°F (-56.8°C)
Vapor pressure:	11 mm Hg @ 20°C (68°F)
Threshold limit value:	
Time weighted average:	300 ppm
Short-term exposure limit:	375 ppm
Flammability limits in air:	
Lower flammability limit:	1.0% by volume
Upper flammability limit:	6.5% by volume
Combustion properties:	
Flashpoint:	56°F, CC
Autoignition temperature:	428°F
Densities:	
Vapor (air = 1):	3.86
Specific gravity:	0.703 @ 20°C
Density:	0.703 @ 25°C
Identifiers:	
U.N. number:	1262
CHRIS code:	OAN
CAS registry number:	111-65-9
Cargo compatibility group:	31 (Paraffin)
NFPA:	
Health hazard:	0
Flammability:	3
Reactivity:	0

Eric P. Kowack was a third class cadet at the Coast Guard Academy when this article was written as a special chemistry project for LCDR Thomas Chuba.

This article was reviewed by the Hazardous Materials Branch of the Marine Technical and Hazardous Materials Division of the Coast Guard's Office of Marine Safety, Security and Environmental Protection. Telephone: (202) 267-1577.

Nautical queries

The following items are examples of questions included in the third assistant engineer through chief engineer examinations and the third mate through master examinations.

Engineer

1. Which description is typical of an alarm annunciator on an engine room panel?

A. An alarm condition causes a light and siren to come on and stay on until the machinery is secured.
B. A flashing light comes on followed by an audible alarm. When an alarm acknowledge button is depressed, the alarm is silenced but the light stays on.
C. An alarm condition gives an audible and visual alarm signal, both of which are secured when the alarm acknowledge button is depressed.
D. An alarm condition causes a flashing light to come on, followed by an audible alarm. When the alarm acknowledge button is depressed, the light goes off.

2. When using a wheel dressing tool to true up a grinding wheel, you should always____.

A. wear goggles to protect your eyes
B. lubricate the dressing tool
C. operate the grinder at maximum speed
D. remove the tool rest from the grinder

3. If a horizontal centrifugal pump becomes air bound, you should vent it at the_____

A. suction line
B. discharge flange
C. top of the casing
D. bottom of the casing

4. Which should be used to wash boiler tubes?

A. Heated fresh water.
B. Cold fresh water.
C. Heated salt water.
D. Cold salt water.

5. Under Coast Guard definitions, a "non-sparking fan" cannot produce sparks to ignite a flammable mixture and will have .

A. blades and housing of nonferrous material
B. blades and housing of corrosion resistant steel
C. ferrous blades and housing with 1/2 inch or more designed tip clearance
D. any of the above

6. After bleeding trapped air from a diesel engine governor at idle speed, the air vent plug is tightened and oil is added to restore the correct level. The compensating needle valve should then be gradually _____.

A. opened until hunting is eliminated
B. closed to about 1/16 of a turn open
C. closed to cause the engine to hunt to purge trapped air from the new oil
D. closed until engine hunting is gone

7. The source of power for a general alarm system must be taken from the_____.

A. service generator
B. emergency generator
C. batteries
D. auxiliary generator

8. If the boiler gage glass remains steady in heavy seas, this indicates _____.

A. the gage glass is functioning normally
B. an obstruction likely in the lower valve
C. the steam drum is adequately baffled
D. the steam drum water level is too low

9. In a simple hydraulic speed droop governor, oil under pressure is ready for use in _.

A. the power piston
B. the governor sump
C. the spring-loaded piston accumulator
D. the pressure pilot valve assembly

Deck

1. INLAND ONLY - A vessel of less than 20 meters at anchor at night in a "special anchorage area" _____.

A. must show one white light
B. need not show any lights
C. must show two white lights
D. must show a light only on the approach of another vessel

2. BOTH INTERNATIONAL AND INLAND - Risk of collision is considered to exist if___.

A. four vessels are nearby
B. a vessel has a steady bearing at a constant range
C. there is any doubt that a risk of collision exists
D. a special circumstance situation is apparent

3. Which of the following is true concerning lifeboat gripes?

A. They must be released by freeing a safety shackle.
B. They should not be released until the boat is in lowering position.
C. They may be adjusted by a turnbuckle.
D. They are normally used only with radial davits.

4. INLAND ONLY - At night a barge moored in a slip used primarily for mooring purposes shall _____.

A. not be required to be lighted
B. show a white light at each corner
C. show a red light at bow and stern
D. show a flashing yellow light at each corner

5. An azimuth angle for a body is measured from the _____

A. observer's meridian
B. Greenwich meridian
C. body's meridian
D. zenith distance

6. What is the purpose of the intake/exhaust valves in a diesel engine?

A. They regulate the combustion cycle.
B. They supply cooling water.
C. They synchronize the ignition spark.
D. They supply and regulate the lubricant flow.

7. Which statement is true concerning life preservers?

A. Buoyant vests may be substituted for life preservers.
B. Life preservers are designed to turn an unconscious person's face clear of the water.
C. Life preservers must always be worn with the same side facing outwards to float properly.
D. Stained or faded life preservers will fail in the water and should not be used.

8. BOTH INTERNATIONAL AND INLAND - When action to avoid a close quarters situation is taken, a course change alone may be the most effective action provided that ____.

A. it is done in a succession of small course changes
B. it is not done too early
C. it is a large course change
D. the course change is to starboard

9. INLAND ONLY - Which term is NOT defined in the Inland Navigation Rules?

A. Seaplane.
B. Restricted visibility.
C. Underway.
D. Vessel constrained by its draft.

Answers

Engineer

1-B, 2-A, 3-C, 4-A, 5-D, 6-D, 7-C, 8-B, 9-C.

Deck

1-B, 2-C, 3-C, 4-A, 5-A, 6-A, 7-B, 8-C, 9-D.

If you have any questions concerning "Nautical Queries," please contact U.S. Coast Guard (G-MVP-5), 2100 Second St., S.W., Washington, D.C. 20593-0001. Telephone: (202) 267-2705.

Notice and request for comments

CGD 92-022, Structural fire protection for U. S. passenger vessels (46 CFR parts 70 /72) (April 1).

The Coast Guard is issuing this notice to solicit public comment on alternatives to existing requirements for structural fire protection aboard certain U.S. passenger vessels operating on restricted routes. In response to design proposals from the maritime industry, the Coast Guard intends to reevaluate existing requirements in 46 CFR part 72, which limit the mean length of main vertical zones. The intent of this action is to gather sufficient information to permit a comprehensive analysis of potential equivalent fire safety alternatives.

DATE: Comments must be received by July 30.

ADDRESS: Comments may be mailed to the Executive Secretary, Marine Safety Council (G-LRA-2/3406) (CGD 92-022), Coast Guard Headquarters, 2100 Second Street, S.W., Washington, D.C. 20593-0001, or may be delivered to room 3406 at the above address between 8 a.m. and 3 p.m., Monday through Friday, except federal holidays. Telephone: (202) 267-1477.

The executive secretary maintains the public docket for this notice. Comments will become part of this docket and will be available for inspection or copying at room 3406.

For further information, contact: Ms. Marcia Kupferman, Office of Marine Safety, Security and Environmental Protection (G-MTH-4), room 1304. Telephone: (202) 267-2997.

Notice

CGD 92-023, Oil Pollution Act of 1990 (OPA 90) -- Mailing list for interested parties (April 6).

The Coast Guard is announcing that it is maintaining mailing lists for those interested in Coast Guard actions taken to implement the provisions of the Oil Pollution Act of 1990 (OPA-90).

ADDRESS: Individuals interested in being added to a mailing list must write to Coast Guard Headquarters (G-MS-2), 2100 Second Street, S.W., Washington, D.C. 20593-0001.

For further information, contact: Mr. Bruce Novak, Manager, Clearance and Coordination, OPA 90 staff. Telephone: (202) 267-6819.

Notice of proposed rulemaking

CGD 91-203, Unattended machinery spaces: operating requirements (33 CFR part 164 and 46 CFR part 35) RIN 2115-AE12 (April 9).

The Coast Guard proposes to implement provision of OPA 90 by defining the conditions under which certain tank vessels may operate with unattended machinery spaces in U.S. navigable waters. This proposed rulemaking will promote the safe operations of tank vessels with unattended machinery spaces in U.S. waters.

DATE: Comments must have been received by June 8, 1992.

ADDRESS: Comments may be mailed to the Executive Secretary, Marine Safety Council (G-LRA-2/3406) (CGD 91-203), Coast Guard Headquarters, 2100 Second Street, S.W., Washington, D.C. 20593-0001, or may be delivered to room 3406 at the above address between 8 a.m. and 3 p.m., Monday through Friday, except federal holidays. Telephone: (202) 267-1477.

The executive secretary maintains the public docket for this notice. Comments will become part of this docket and will be available for inspection or copying at room 3406.

For further information, contact: LCDR Paul Jewell, project manager, OPA 90 staff (G-MS-1). Telephone: (202) 267-6746.

Notice and request for comments

CGD 92-019, Discontinuance of commercial re... of Loran-C and Omega system status (April 20).

The Coast Guard will cease providing Loran-C and Omega navigation system status information via the Defense Communications Service (DCS) Autodin Consolidated Commercial Refile center. The Omega Mail Status Advisory Service will also be discontinued. The information will be posted on an electronic bulletin board maintained by the Coast Guard Omega Navigation System Center in Alexandria, VA.

DATE: Commercial refiling of status messages will cease on September 30, 1992.

ADDRESS: Comments may be mailed to the Executive Secretary, Marine Safety Council (G-LRA-2/3406) (CGD 92-019), Coast Guard Headquarters, 2100 Second Street, S.W., Washington, D.C. 20593-0001, or may be delivered to room 3406 at the above address between 8 a.m. and 3 p.m., Monday through Friday, except federal holidays. Telephone: (202) 267-1477.

For further information, contact: CDR Clyde Watanabe, Executive Officer, Coast Guard Omega Navigation System Center, 7323 Telegraph Road, Alexandria, VA 22310-3998. Telephone: (703) 866-3800.

Notice

CGD 92-020, Move of Coast Guard Atlantic area Loran-C staff (April 20).

The Coast Guard Atlantic area Loran-C branch will move from its current location on Governors Island, NY to Alexandria, VA. This change is expected to result in better management and efficiency as a result of consolidation of similar operations.

DATE: The move will be completed by July 31.

ADDRESS: The staff can be contacted via ONSCEN at (703) 886-3800, FAX number (703) 886-3866, and mailing address: Commander, Atlantic Area, C/O Commanding Officer, Coast Guard, Alexandria, VA 22310-3998.

For further information, contact: CDR Clyde Watanabe, Executive Officer, Coast Guard Omega Navigation System Center, 7323 Telegraph Road, Alexandria, VA 22310-3998. Telephone: (703) 866-3800.

Notice

CGD 92-024, Amendment to the Inland Navigation Rules (April 21).

On December 19, 1991, the president signed Public Law 102-241, amending the Inland Navigation Rules Act of 1980 (33 U.S.C. 2001 et seq.) by changing the language of rule 1(e) and adding a new paragraph to rule 8. These changes, effective December 19, 1991, bring the Inland Navigation Rules into closer conformity to the International Regulations for Preventing Collisions at Sea (72 COLREGS). The Coast Guard publishes the full text of the International and Inland Rules in the publication, "Navigation Rules, International-Inland" (COMDTINST 16672.2B), which will be revised at the next scheduled publication. To facilitate ready access to the revised rules in the interim, this notice sets forth the modified text of rule 1(e) and rule 8. Affected parties are urged to note the changes and update all copies of the "Navigation Rules, International-Inland" (COMDTINST 16672.2B).

ADDRESS: Comments or questions should be addressed to Commandant (G-NSR-3), Coast Guard, 2100 Second St., S.W., Washington, D.C. 20593-0001.

For further information, contact: Mr. Jonathan Epstein, Navigation Rules and Information Branch, Office of Navigation Safety and Waterway Services. Telephone: (202) 267-0357 or (202) 267-0352.

Final rule

CGD 91-046, Vessel communication equipment: requirement for vessels subject to Bridge-to-Bridge Radiotelephone Act to carry VHF FM channels 22A and 67 (33 CFR part 26) RIN 2115-AE07 (April 21).

Under section 4118 of OPA 90, the Coast Guard is requiring all vessels subject to the Vessel Bridge-to-Bridge Radiotelephone Act of 1971 to be capable of transmitting and receiving on VHF FM channel 22A (157.1 MHz) while in U.S. navigable waters and on VHF FM channel 67 (156.375 MHz) while on certain portions of the lower Mississippi River. This rule will enable both domestic and foreign-flagged vessels to

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receive critical and timely navigation safety warnings and to communicate with the Coast Guard while in U.S. waters. This communications capability is essential to ensure safe navigation in U.S. waters and will help reduce the number of marine accidents in those waters.

EFFECTIVE DATE: August 19, 1992.

For further information, contact: LCDR Paul Jewell, project manager, OPA 90 staff (G-MS-1). Telephone: (202) 267-6746.

Notice

CGD 91-010, OPA 90; designating areas for area committees (April 24).

The Coast Guard is providing notice of designated areas for which area committees are required to conduct local oil spill contingency planning under OPA 90. Other areas will be designated by the Environmental Protection Agency in a separate notice. This division of responsibility reflects the working arrangements between the two agencies under existing national and regional oil spill contingency planning. This notice will permit planning to begin.

For further information, contact: Ms. Pamela M. Pelcovits, project manager, OPA 90 staff, Coast Guard headquarters, 2100 Second ST., S.W., Washington, D.C. 20593-0001. Telephone: (202) 267-6403.

Final notice of intent

CGD 92-010, Central Pacific Loran-C Chain closure (May 4).

On February 28. 1992, the Coast Guard published a notice and request for comments in the *Federal Register* (57 FR 6882) for early closure of the Central Pacific Loran-C chain, rate 4990. The Coast Guard terminated the Loran-C radionavigation service provided by this chain in the Hawaiian Islands on June 30, in lieu of continuing operations until December [illegible] ued operation is not economically ju[illegible]stified.

For further information, contact: CDR Richard Armstrong, chief, Radio Aids Management Branch (G-NRN-1), Coast Guard headquarters. Telephone: (202) 267-0900.

Notice of proposed rulemaking

CGD 89-007a, Documentation of ves[illegible]ls; recording of instruments; fees (46 CFR pa[illegible]57) RIN 2115-AD29 (May 20).

The Omnibus Budget Reconciliation Act of 1990 requires the Coast Guard to establish user fees for services related to the documentation of vessels. The Coast Guard, therefore, proposes to establish user fees for commercial vessel documentation activities and to revise existing user fees for documentation of recreational vessels and other services to reflect the actual cost of services provided.

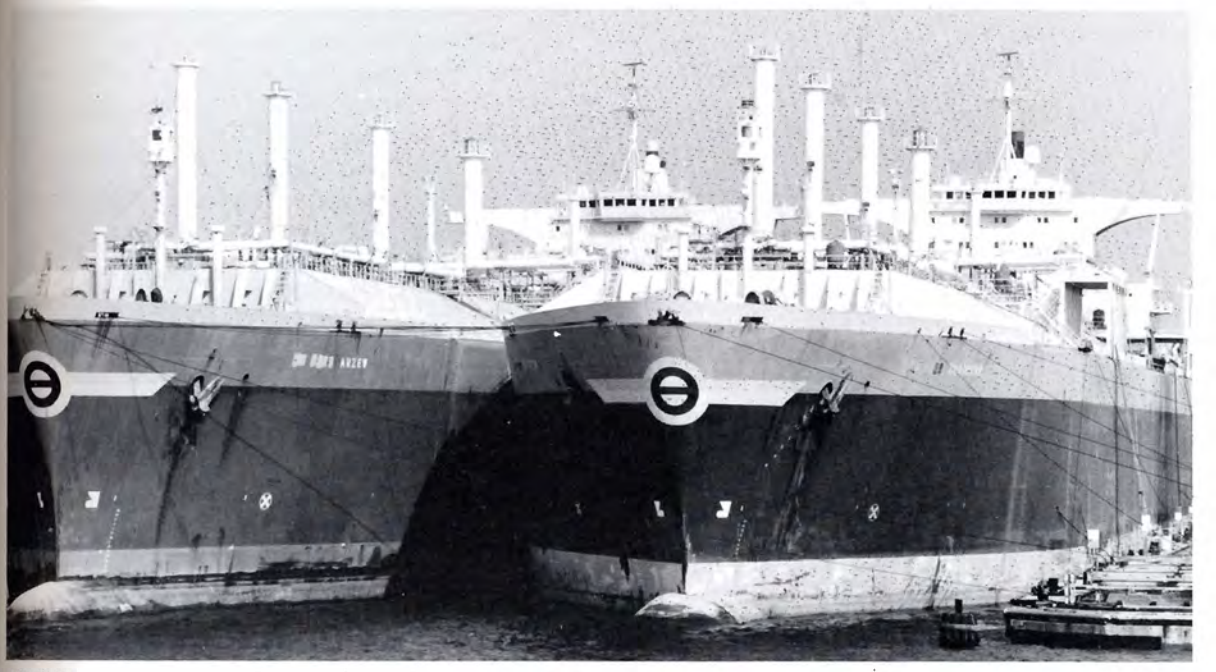
DATE: Comments must be received on or before July 20, 1992.

ADDRESS: Comments must be in writing and may be mailed to the Executive Secretary, Marine Safety Council (G-LRA-2/3406) (CGD 89-007a), Coast Guard Headquarters, 2100 Second Street, S.W., Washington, D.C. 20593-0001, or may be delivered to room 3406 at the above address between 8 a.m. and [illegible] p.m., Monday through Friday, except federal holidays. For information concerning comments, telephone: (202) 267-1477.

The executive secretary maintains the public docket for this notice. Comments will become part of this docket and will be available for inspection or copying at room 3406.

For further information, contact: LCDR John J. Kelley, chief, Plans and Analysis Branch, Planning Staff, Office of Marine Safety, Security and Environmental Protection. Telephone: (202) 267-6923.

Normal office hours are between 7 a.m. and 3:30 p.m., Monday through Friday, except federal holidays.



The S/S Arzew and S/S Southern await reactivation. *Photo by Judi Baldwin, Newport News Shipbuilding Company.*

Major tanker reactivation begins at MSO Hampton Roads

By LCDR Kevin S. Cook and CWO2 Brian T. Fisher

Introduction

In January 1991, three United States flag liquefied natural gas (LNG) tankers were towed to Newport News Shipyard after a ten-year lay-up. The vessels are *S/S Southern* (ex *El Paso Southern*), *S/S Arzew* (ex *El Paso Arzew*) and *S/S Gamma* (ex *El Paso Howard Boyd*).

For the past year and a half, Marine Safety Office (MSO) Hampton Roads, Virginia, has been closely involved with the vessels' owners as they prepare to reactivate these technically complex tankers for service from Arzew, Algeria, to the East Coast of the United States. The vessels are not expected to be placed in service before January 1994.

Background

The three LNG tankers are sister ships constructed at Newport News Shipyard, Newport News, Virginia, for El Paso Marine Company in the late 1970s. They traded between Arzew and the East Coast, delivering liquefied natural gas to Cove Point, Maryland, and Elba Island, Georgia. They were in service less than three years when the contract between El Paso Marine and the Algerian government was ended after large price increases by the Algerians. With no contract opportunities and no demand for "spot" market deliveries, the vessels were laid up in 1981.

The ownership of the vessels was eventually transferred to the Maritime Administration (MARAD), which oversaw their lay-up in Newport, Rhode Island. They were maintained in excellent condition by such measures as dehumidifying interior spaces, inerting the boilers and cargo tanks with nitrogen and an effective periodic maintenance program for rotating machinery and valves.

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In December 1990, MARAD sold the three tankers. *Southern* and *Arzew* were purchased by the Argent Marine Company to place them in service to Cove Point. Cabot LNG Shipping bought *Gamma*, and plans to have it deliver liquefied natural gas to Everett, Massachusetts.

The vessels were purchased in the belief that, despite a current over supply of liquefied natural gas in the United States, projected demands for the product in the mid-1990s will result in pricing that will more than offset today's investments. Although reactivation will be costly, the purchase price for each vessel was less than ten percent of the price of a new LNG tanker, estimated to be $300 million.

Currently, Argent Marine is proceeding with its plans, actively negotiating with several East Coast shipyards to finalize a reactivation package. However, the receiving facility at Cove Point is just beginning to be reactivated following its own ten-year lay-up. The facility is not expected to be on-line until mid-1994.

Cabot LNG Shipping has moved the *Gamma* to a lay berth at Norfolk International Terminals, in Norfolk, Virginia. The vessel's receiving facility in Everett is on-line and ready whenever the vessel is reactivated.

Vessels and cargo

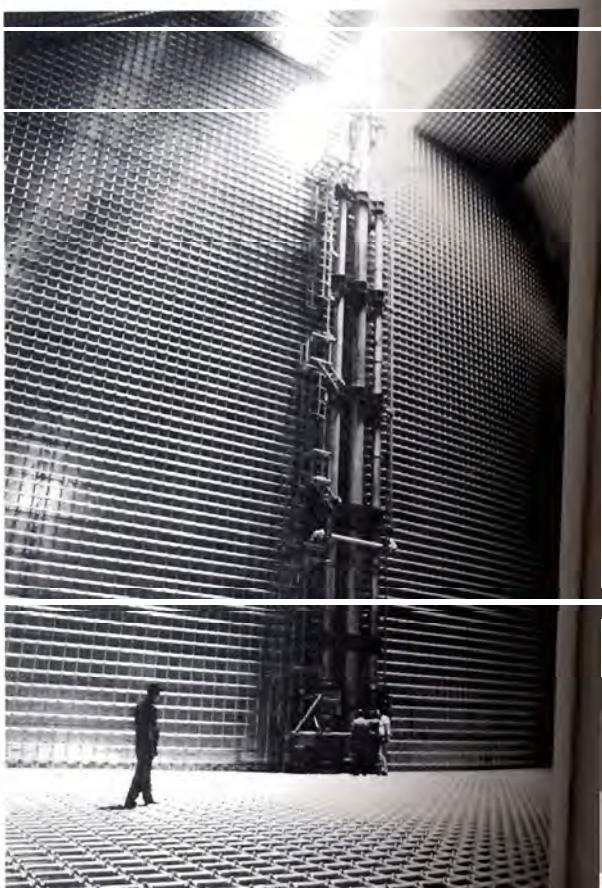
The vessels are nearly 950 feet long and hold about 792,666 bbls (126,000 cubic meters) of liquefied natural gas in six cargo tanks. They are each outfitted with two "dual fuel" burning top-fired boilers, enabling them to burn bunkers or cargo boil-off gas for steam propulsion.

What distinguishes liquefied natural gas tankers from all other ships are sophisticated cryogenic cargo-containment systems. The Technigaz Mark I system on these three vessels uses a thin membrane of .048-inch (1.2-mm) stainless steel as the primary barrier for containment of the gas in the tanks. This membrane is "waffled" to allow for the thermal contraction associated with carriage of liquefied natural gas at 256°F.

The primary barrier is supported and insulated by several layers of balsa wood. And, unique to the Mark I containment system, a liquid tight secondary barrier of sugar maple plywood surrounds the primary barrier as a back-up in case of a leak in the membrane.

Under ambient conditions, natural gas (methane) is a gaseous mixture. However, if cooled to -256°F, it liquefies. Slightly more than 600 times as much natural gas can be transported in a given volume in the liquefied state. When delivered, it can be returned to the gaseous state. In use, small percentages (five to 15 Percent) can be mixed with air to form a very clean burning, highly efficient fuel.

Because of its physical properties, the transportation of natural gas presents several hazards. The risks of handling cargo at such a low temperature are obvious. The contact of liquefied natural gas with mild steel anywhere on the vessel can cause instantaneous cracking. Also, because a small percentage of natural gas mixed with air is combustible, even a minor leak of the cargo creates a fire hazard. A fire on board a LNG tanker would be very serious, because the heat would cause the liquefied gas in the tanks to vaporize (expanding 600 times) when warmed above -256°F. This would force excess vapor into the atmosphere via the tank pressure relief valves, potentially adding fuel to the fire.



One of six cargo tanks in the liquefied natural gas tanker S/S Arzew.

Photo by Caroline Kiehner, Newport News Shipbuilding Company.

late 1970s when it was the El Paso Howard Boyd. Photo courtesy of Alexander, Starr and Kersey.

Reactivation

Although the reactivation work will be extensive, the Coast Guard has determined that its scope will not constitute major conversions and the vessels will retain their status as "existing" ships. As such, they will be required to meet the standards in Title 46 CFR part 154 for existing ships. Only the new systems will have to comply with IMO gas carrier codes and United States regulations for "new" ships.

Part of the reactivation process will be to bring the vessels into compliance with standards which have been implemented without grandfather clauses. For example, the 1974 SOLAS regulations require upgrades to the vessels' steering gear arrangements; the 1983 amendments to SOLAS require additional lifesaving equipment; and compliance with MARPOL [illegible] and V must be addressed. Also, [illegible] Coast Guard regulations for certification of existing gas carriers require modifications to the cargo relief valve exhaust piping and gas detection systems.

In addition to the regulatory upgrades, both Argent and Cabot plan some minor structural and general arrangement modifications to convert an after void space on each vessel into a workshop and auxiliary generator room. The auxiliary diesel generator will be able to support the vessels' in-port electrical loads. Also, to reduce the logistical burden of ensuring that adequate supplies of nitrogen are available for the purging, inerting and gas detection systems, Argent plans to install a state-of-the-art air-nitrogen separator. When necessary, this will be supplemented by reserve nitrogen carried on board in existing liquid nitrogen storage tanks.

Another modification which only applies to the *Gamma* is the reduction of stack height by 18 feet to permit passage under the Mystic River Bridge in Boston, Massachusetts. The mast and other equipment, such as communication antennas, will also be modified to facilitate temporary lowering for the transit to the Everett facility.

Both Cabot and Argent are hoping to incorporate a propulsion and auxiliary automation system to allow for periodically unattended machinery space operations. This will emulate a system that has been used successfully by a number of similarly designed LNG vessels trading in the Far East. If approved, the system would permit several required watchstanders to be reassigned to maintenance duties.

The reactivations are progressing even though the major shipyard contracts for the work

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Trunk deck of ~~SIS Gamma~~.
Photo courtesy of Alexander, Starr and Kersey.

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have not yet been awarded. All three ships have crews on board who are involved in maintenance and "ships force" type projects. Inspectors from MSO Hampton Roads have begun internal inspections of the cargo and ballast tanks, and void spaces of all three liquefied natural gas tankers.

Both owners have been in regular contact with the Coast Guard Marine Safety Center in Washington, D.C., and have had plans for several modifications approved. The owners are also corresponding with the Marine Technical and Hazardous Materials Division of the Office of Marine Safety, Security and Environmental Protection regarding key technical issues.

In-service issues

One issue under active discussion concerns the frequency required for in-service testing of the secondary barrier for "tightness." Typically, for vessels engaged in United States service, this has been accomplished at drydocking. Current Coast Guard policy allows for up to three years between tests, which is consistent with both the maximum interval for drydocking United States flag ships and the maximum period between renewal and intermediate surveys under the IMO gas carrier codes.

However, both companies are planning to take advantage of the changes in drydocking requirements, which will allow a five-year drydocking interval when an intermediate underwater hull survey is conducted. Testing of the secondary barrier at the intermediate underwater survey will not be possible unless the tanks are warmed to ambient temperatures. This would require that the vessels be out of service, which the owners wish to avoid. The Marine Technical and Hazardous Materials Division is working with the owners on this issue.

Another in-service issue, which will surface at MSO Hampton Roads as firm reactivation dates are established, is the extent of pre-arrival boardings. Typically, all liquefied gas tankers receive pre-arrival inspections by the Coast Guard before the ship is permitted to enter the port. To minimize any delays caused by pre-arrival inspections, Argent is considering installing a system to relay data regarding the current condition of cargo, containment, machinery and auxiliary systems for evaluation by the MSO in advance of the arrival of the vessel. Consideration of such a system, once formally proposed, will be coordinated with MSO Baltimore (in whose zone the Cove Point facility is located) and the Marine Safety Division of the fifth Coast Guard district.

Conclusion

Until formal shipyard reactivation contracts are awarded and, thereafter, if a yard in the Hampton Roads inspection zone is selected, the MSO will continue to conduct all necessary inspections of the LNG tankers. The office will also maintain communication with the owners' representatives, the Merchant Vessel Inspection and Documentation Division, the Marine Technical and Hazardous Materials Division and the Marine Safety Center to ensure the successful reactivation of the tankers.

LCDR Kevin S. Cook is the assistant chief and CWO2 Brian T. Fisher is a senior inspector for coordination and review for the Inspections Department, MSO Hampton Roads, Norfolk, Virginia.

Telephone: (804) 441-3287.

MSO Puget Sound faces new challenges

By LTJG Brad F. Smith

The vessel documentation department of the Marine Safety Office (MSO) Puget Sound in Seattle, Washington, recently took responsibility for the United States documented vessel fleet within the fourteenth Coast Guard district of Hawaii, Guam, Saipan and other remote areas of the Pacific. This added the documentation work for about 1,700 vessels to a fleet of nearly 11,000 vessels homeported in Washington and Montana.

This increased work load arrived in January 1992, with the closing of the vessel documentation office in Honolulu. A recent study determined that the Coast Guard could serve its customers more efficiently by combining the work load and the staff of the Seattle and Honolulu documentation departments, according to Wilbur A. Yoast, chief of the Seattle department.

"The amount of correspondence we receive has greatly increased since fourteenth district owners and brokers are not yet familiar with working with Seattle," reports Yoast. "We are trying to provide the best service possible to these new customers."

Before 1983, when documentation functions were consolidated, there were approximately 70 Coast Guard documentation offices. There are now about 130 documentation specialists working at 14 Coast Guard offices.

Documentation

Federal documentation is a kind of national registration which establishes a vessel's nationality and qualifications to work in a specific trade. The documentation staff issues official

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Certificates of documentation are required for commercial fishing vessels.

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numbers and certificates, and maintains active files on all documented vessels in the zone. The staff also supervises the recording of bills of sale and mortgages, and maintains numerous paper files on each documented vessel in their fleet.

Any vessel of at least five net tons, engaged in the coastwise trade or fisheries must be documented. Also any vessel under United States ownership of at least five net tons is eligible for documentation. Most recreational vessels must be either federally documented or registered by their states.

Those seeking federal documentation for their vessel may apply at the Coast Guard vessel documentation office designated as the home port, or the office nearest where the vessel is located. The office will endorse a vessel's certificate of documentation for specific commercial trades, including fisheries, coastwise (domestic trade), registry (international trade) or recreational use.

A recent issue affecting the department arises from the Commercial Fishing Industry Vessel Anti-Reflagging act of 1987, which addresses foreign investment in United States fishing corporations.

Legislation requires that for a vessel to be documented, it must be owned by a United States citizen.

Recreational surge

About half of Puget Sound's documented fleet consists of recreational vessels. This percentage is on the rise. "Since January, we have experienced an incredible surge in recreational vessel transactions, ownership changes and refinancings," notes Yoast. "Input to us is now three times what it was a year ago." He believes this is due to current low interest rates.

In dealing with each of his department's challenges, Yoast maintains that service to the public is of utmost importance.

LTJG Brad F. Smith is a marine inspector at MSO Puget Sound, 1519 Alaskan Way S., Seattle, Washington 98134-1192. Telephone: (206) 286-5589.

Fishermen's Terminal, Seattle, Washington. *Photo by LTJG Brad F. Smith*

How inspectors are trained

By LTJG Brad F. Smith

Throughout the 20th century, advancing technologies have produced a variety of new seagoing vessels including mobile offshore drilling units and passenger-carrying submarines, which have become subject to Coast Guard inspection. Maritime tragedies have led to stiffer inspection regulations for passenger, cargo and tank vessels.

As Coast Guard inspection activities have increased in scope and complexity, marine inspector training has become more comprehensive and exacting in detail -- not like the old days when an individual was trained by shadowing a senior inspector who determined when his student had learned the ropes.

Training program

In the early 1980s, a training port concept was developed to train Coast Guard officers with diverse backgrounds as qualified marine inspectors. There are now five offices designated as training ports. They are: MIO New York, MSO Hampton Roads, MSO New Orleans, MSO Los Angeles/Long Beach and MSO Puget Sound.

The training process at these ports has become more uniform and formalized during the past decade. Junior officers and warrant officers are assigned to two-year training billets in an MSO/MIO inspection department under a full-time training officer.

Before becoming qualified inspectors, trainees must acquire knowledge and skills in engineering, ship construction, non-destructive testing, as well as in locating and interpreting federal regulations, international accords and conventions. They must also become versed in shipboard operations and procedures; commercial vessel documents; maritime industry organizations; federal, state and local government agency roles and responsibilities; and inspection policies and procedures.

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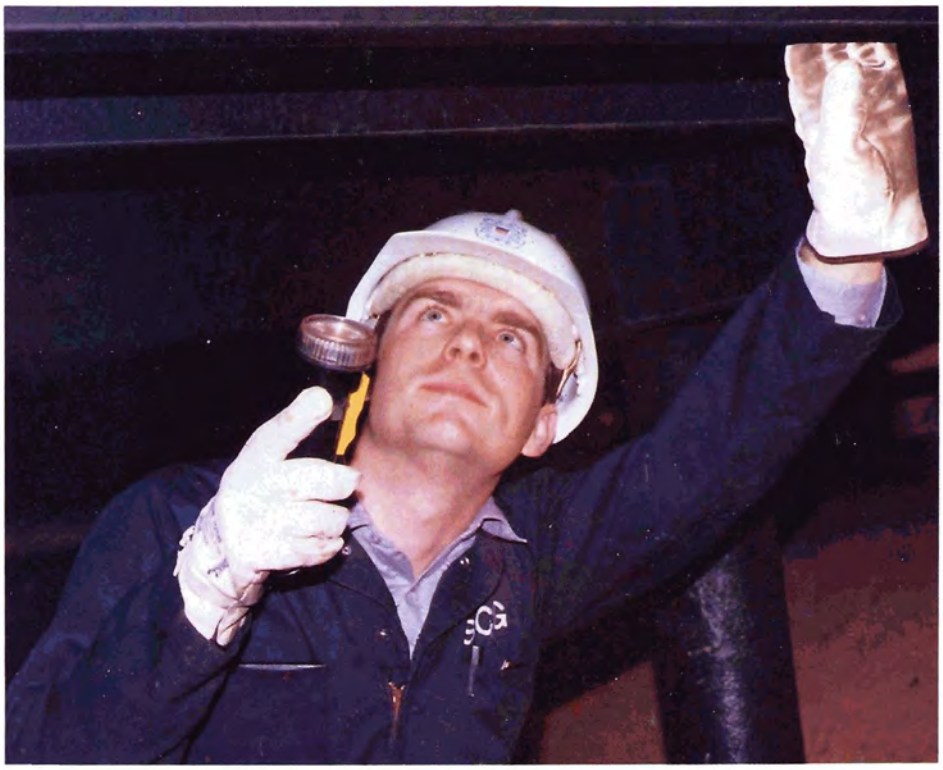

Vessel inspection photos accompanying this article are by LTJG Brad Smith.

Continued from page 55

After reporting to their unit, trainees attend an eight-week inspection course at the Coast Guard Reserve Training Center in Yorktown, Virginia. When they return to their units, they receive additional classroom training along with on-the-job training from qualified inspectors conducting field inspections.

Trainees are required to familiarize themselves with commercial shipping vessels common to their areas. For example, trainees at MSO Puget Sound are required to ride a TAPS tanker, observe drydock work on deep-draft vessels and also spend two weeks at a shipyard. Occasionally, small groups of trainees participate in field trips, observing weld procedure testing, propeller fabrication, boiler and safety valve repair, or other vessel inspection activities.

Once a trainee has completed a specific number of inspections on a particular vessel type, he or she requests a verification inspection, during which a qualified inspector witnesses him or her conducting an inspection. The trainee then is interviewed by a qualification board, which determines his or her level of knowledge and skills. If the trainee is successful before the board, a letter is issued designating him or her as an inspector for the particular vessel type.

During their training program, trainees are expected to qualify as inspectors for several vessel types, including barges and small passenger vessels, as well as drydock and hull or machinery inspections.

Upon completion of their training, the "new" inspectors are assigned to inspection billets at other offices, where they can put their training to use.

LTJG Brad F. Smith is a marine inspector at MSO Puget Sound, 1519 Alaskan Way S., Seattle, Washington 98134-1192. Telephone: (206) 286-5589.

Opposite page

The Maltese freighter Eldia was underway in ballast after dropping off its cargo at New Brunswick, when it was caught in hurricane-force winds off Cape Cod on March 29, 1984. Gale-driven seas lifted the Eldia over a sand bar onto Nauset Beach off Pochet. The Coast Guard H-3 helicopter picked up the crew of 23.

Photo by William P. Quinn, Orleans, Massachusetts.


ELDIA
ELDIA