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Special issue on the International Maritime Organization

Proceedings

of the Marine Safety Council

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Special issue on the IMO

Cover Photographs

Front: Double-hull oil carrier Eagle under construction in Japan. Photo courtesy of Mobil Oil Corporation.

Rear: Marine simulator provides full panorama ship's bridge. Photo courtesy of American Maritime Officers.

IMO and Coast Guard share common goals

By RADM A. E. "Gene" Henn

Since its establishment in 1948, the International Maritime Organization (IMO) has shared a common goal with the United States — to improve maritime safety and prevent marine pollution throughout the world. This goal has remained constant throughout the years.

Initially, the international maritime community approached marine safety and pollution prevention from a predominantly technical perspective. Improvements in materials, vessel design and construction methods, along with sophisticated navigational aids were emphasized to promote safety at sea. Engineering precautions, such as segregated ballast tanks, inert gas systems and dual radar have been adopted to improve ship safety and reduce oil pollution. These advances are important, but only part of the solution. During recent years, the IMO and the Coast Guard have recognized that many other aspects are just as important as technical improvements in promoting safer ships and cleaner oceans.

Interestingly, port state control research has demonstrated that most deficiencies found on vessels are easily correctable, and may well have been avoided altogether with an efficient maintenance program. This strongly suggests that many operational and equipment problems are the result of poor management practices on the part of vessel owners and/or operators.

The human element is another important aspect that both the Coast Guard and the IMO have recognized as needing attention. It is a fact that human error has played a part in the majority of most recent casualties. Not only do crew qualifications and training have to keep in stride with today's technologies, but age old common problems like fatigue and communication gaps must be solved.

Moreover, marginal flag administrations frequently assign substandard classification societies to conduct safety inspections which are lax in detecting deficiencies and negligent in correcting those they find.

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Enforcement of international standards through effective port state control programs plays a significant role in combating these problems. This alone, however, will not erase the conditions which foster the operation of substandard vessels. As long as there is a profit to be made, they will keep returning to our ports.

Recent actions by IMO, such as the development of the International Safety Management (ISM) Code and the creation of the Flag State Implementation Subcommittee could make substantial progress in eliminating substandard vessels. Operating companies that comply with the ISM Code (crewing, maintaining and sailing a vessel in accordance with internationally accepted safe management practices) will distinguish themselves as desirable firms with which to do business. Given the widespread global movement toward quality management as a prerequisite for economic competitiveness, I expect operators of substandard ships who do not subscribe to ISM principles will soon find themselves extinct.

The new Flag State Implementation Subcommittee drafted guidelines to assist flag states in enforcing IMO's regulations, as well as formed a permanent working group on casualty statistics and investigations, and developed guidelines on operational requirements concerning ship safety and pollution prevention. Further pursuing its goal to promote consistent implementation of international standards, the subcommittee also drafted guidelines establishing minimum standards for organizations authorized to act on behalf of flag states.

In addition, the IMO is working to update the Standards of Training, Certification and Watchkeeping for Seafarers. Bringing these standards in line with modern technology, while also addressing more conventional problems such as fatigue and communication skills are yet more building blocks toward ensuring marine safety.

These recent measures, developed with the cooperation of IMO's member states, will go a long way toward solving our problems. This issue of *Proceedings of the Marine Safety Council* deals with these and other maritime safety initiatives by the IMO, the Coast Guard and other organizations to realize these vital common goals. As we all look forward to the 21st century, I am confident that many of the measures we are working on now will produce a safer, cleaner maritime environment for generations to come.

RADM A. E. "Gene" Henn is the chief of the Office of Marine Safety, Security and Environmental Protection.

Telephone: (202) 267-2200.

A session is conducted in IMO's main assembly hall.

IMO headquarters, located at 4 Albert Embankment on the Thames River across from the House of Parliament, was opened in 1983 by her Majesty Queen Elizabeth II.

What is IMO?

By Mr. Joseph J. Angelo

The International Maritime Organization (IMO) is a special agency of the United Nations concerned with maritime affairs. Established by a 1948 United Nations convention that entered into force on March 17, 1958, the IMO is headquartered in London, England and has 144 member states and two associate members (Hong Kong and Macao).

The IMO's governing body is the Assembly, which includes all member states and meets once every two years. The executive body is the Council, which consists of 32 member states elected by the Assembly and supervises the work of the organization. The technical work is carried out by five committees and 11 subcommittees.

The IMO is headed by a secretary-general, who is appointed by the Council with the approval of the Assembly. Mr. William O'Neil from Canada is the current secretary-general. He is assisted by some 300 international civil servants.

The main objective of the IMO is to facilitate cooperation among governments on technical and legal matters affecting international shipping to achieve the highest level of maritime safety and environmental protection standards. This is accomplished by developing international conventions, protocols, codes and recommendations.

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Since IMO met for the first time in 1959, shipping has changed more radically than during any equal time period in history.

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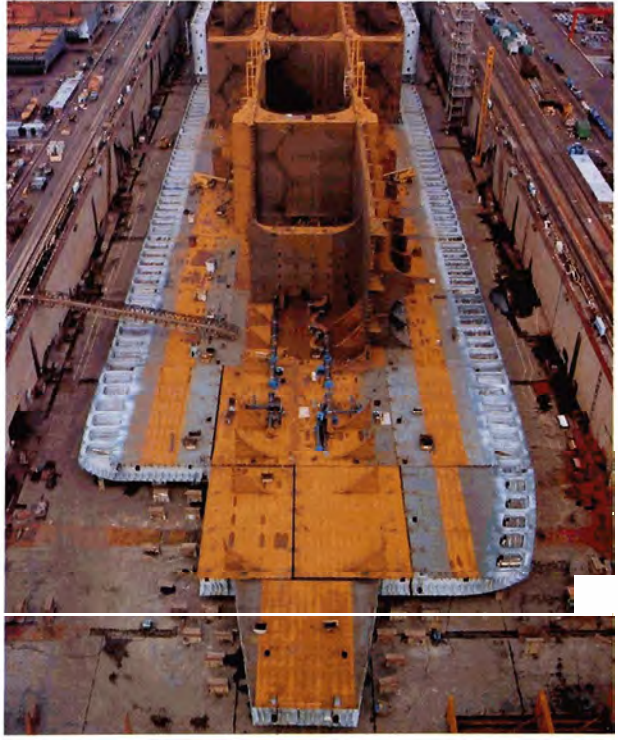


Mobil's double-hull oil carrier, Eagle, is being constructed in Japan.

IMO committees

Maritime Safety Committee — deals with all aspects of IMO activities relating to safety at sea;

Marine Environmental Protection Committee — coordinates IMO activities in the prevention and control of pollution of the marine environment from ships;

Legal Committee — considers all legal matters within the scope of the IMO;

Facilitation Committee — is responsible for IMO activities which smooth out international maritime traffic; and

Technical Cooperation Committee — provides technical assistance in maritime issues, particularly for developing countries.

Conventions

Currently IMO has adopted 33 conventions and protocols, which are mandatory for those countries that are party to them. Some of the better known conventions are:

Safety of Life at Sea (SOLAS);
Preventing Collisions at Sea;
Load Lines;
Standards of Training, Certification and Watchstanding for Seafarers;
Prevention of Pollution from Ships (MARPOL); and
Oil Pollution Preparedness, Response and Cooperation.

Codes

IMO has developed 18 codes of safe practice, which actually are recommendations, unless they are specifically mandated by a convention. They provide guidance in framing international regulations. Some of the codes deal with:

- **carriage of maritime dangerous goods;**
- **carriage of solid bulk cargoes;**
- **ships carrying dangerous chemicals in bulk;**
- **dynamically-supported craft;**
- **mobile offshore drilling units; and**
- **offshore supply vessels.**

The IMO has also adopted hundreds of recommendations and guidelines in the form of resolutions, circulars and manuals that supplement or help implement the conventions, protocols and codes.

U.S. objectives

United States objectives through the IMO are:

- *to upgrade the standards for maritime safety and environmental protection to a level consistent with United States standards; and*
- *to promote effective implementation of existing international standards.*

U.S. accomplishments

Since the late 1970s, the United States has taken the initiative to improve the international standards for ship safety and environmental protection. This has been accomplished through the IMO adoption of the 1978 Protocols to SOLAS and MARPOL to significantly improve tanker safety and pollution prevention, and the following amendments:

1. **1981 SOLAS amendments**, which completely rewrote the fire protection requirements for all ships;

2. **1983 SOLAS amendments**, which completely rewrote the lifesaving requirements for all ships;

3. **1988 SOLAS amendments**, which introduced a global maritime distress and safety systems, and upgraded international standards for the survey and certification of ships;

4. **1990 SOLAS amendments**, which introduced subdivision and damage stability requirements on cargo ships;

5. **1992 SOLAS amendments**, which upgraded the fire protection standards on passenger ships; and

6. **1992 MARPOL amendments**, which require double hulls on all tankers.

The United States was the driving force behind the successful completion of all these initiatives, of which the IMO itself actively supported. Other United States initiatives evolving in the IMO include:

1. the development criteria to address the human element factor in reducing maritime casualties and pollution incidents;

2. greater insistence that ship owners, classification societies and flag states carry out their responsibilities under IMO conventions; and

3. greater latitude for port states (like the United States) in inspecting foreign ships entering their ports to ensure that all responsible parties are properly carrying out their duties.

Summary

The success of the United States within the IMO is due largely to our strong leadership role in promoting maritime safety and environmental protection. This moral high ground combined with sound technical proposals from which we are willing to negotiate have been and will continue to be the key to our success in the future.

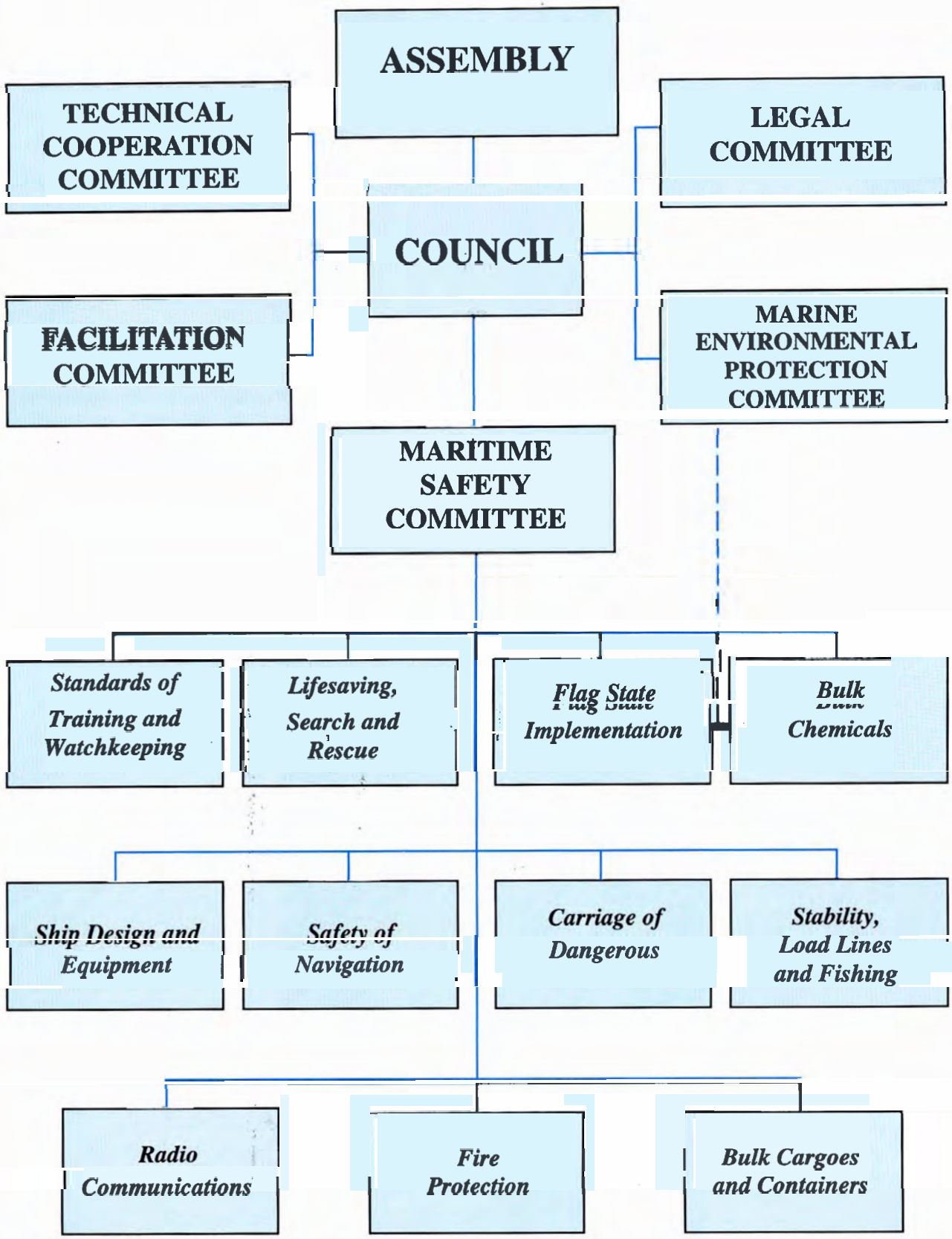
Mr. Joseph J. Angelo is the associate program director of the Office of Marine Safety, Security and Environmental Protection.

Telephone: (202) 267- 2970.

Photo courtesy of IMO.

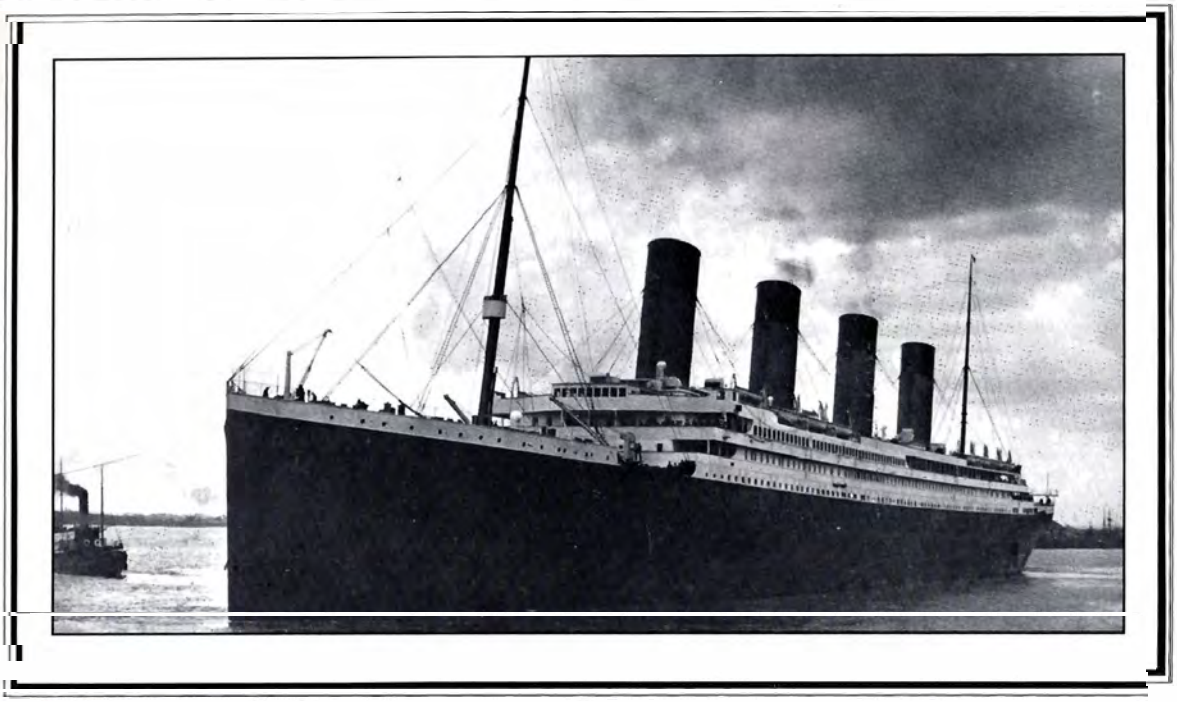
In the past three decades oil tankers and bulk carriers have increased enormously in size.

IMO Committee Structure



Looking back on IMO

By Mr. Daniel F. Sheehan



The story of IMO begins with the sinking of the Titanic on April 14, 1912, with the loss of more than 1,500 lives. It was this tragedy that generated the first international conference on marine safety by the two principal maritime nations in the world.

Held in 1914 in London, England, the conference addressed such issues as the adequacy of lifeboatage, and the subdivision and carriage of radio communications equipment on passenger ships.

The manner in which this conference was called was to be repeated several times over the next 50 years. It was traditional for a sovereign nation to call for a conference of plenipotentiaries to propose an international treaty. The country that called for the session normally established draft rules of procedure and prepared a draft text of the treaty.

The 1914 Safety of Life at Sea (SOLAS) Convention developed by the first conference never came into force due to World War I. It wasn't until 1929 that another conference was called to address changes in safety requirements for passenger vessels.

The United States was initially opposed to the 1929 convention, believing it to be too stringent. It wasn't until 1934, when the passenger ship Morro Castle burned off the New Jersey coast, causing 124 fatalities, that the United States ratified the treaty.

Mid-century

After World War II, the United States, the United Kingdom and France called for another SOLAS conference to update the 1929 convention and address lessons learned in the intervening years. Admiral Joseph F. Farley led the United States delegation, which traveled on the S.S. United States to London for the 30-day conference, the first with extensive Coast Guard participation. The 1948 International SOLAS Convention was produced at this session.

Also in 1948, the United Nations Maritime Conference agreed to form a special United Nations agency, the Intergovernmental Maritime Consultative Organization (IMCO) to develop internationally acceptable standards to improve safety at sea and prevent pollution of the oceans. Established by treaty in 1958, the IMCO was renamed the International Maritime Organization in 1982.

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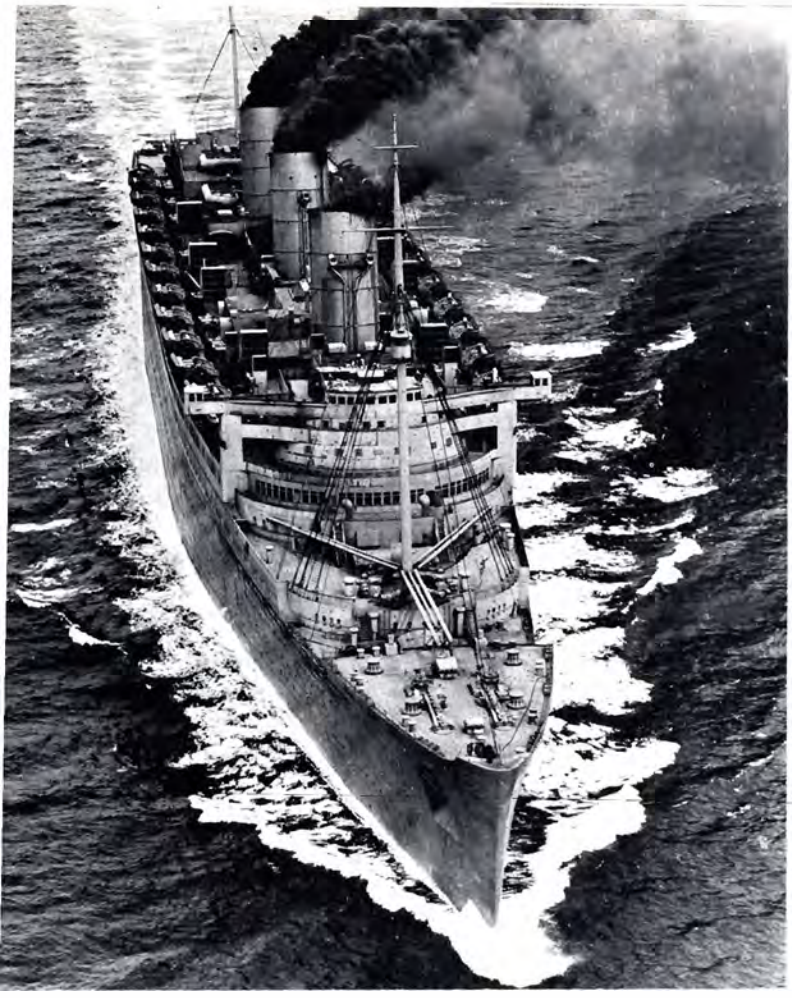

"... notable vessels including the ~~Queen Mary~~ ... went out of business."

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IMCO held its first SOLAS conference in 1960 to address issues arising from the collision of the ~~Stockholm~~ and the ~~Andrea Doria~~ in July 1956 off the island of Nantucket.

1960s

In the mid 1960s, some very serious passenger vessel fires on the ~~Yarmouth Castle~~, the ~~Viking Princess~~ and other ships produced a substantial public and congressional outcry over the loss of life and the inadequacy of safety standards. The United States called for a special diplomatic conference to address fire safety standards for existing passenger vessels. The 1966 Fire Safety Amendments to the 1960 SOLAS Convention were developed by the IMCO, but were not enforced internationally. The United States, however, adopted the standards in Public Law 89-777 for the safety of its citizens. The requirements had a substantial impact on passenger ships trading with the United States. They were so stringent that several notable vessels including the Queen Mary and the Queen Elizabeth went out of business.

At this time, international treaty law required that each amendment be subject to explicit action by a nation's legislature. This stipulation prevented any amendments to SOLAS 1948 or 1960 from coming into force. As more countries became members of IMCO, it became more and more difficult to get action on amendments.

1973

The 1973 Conference on the Prevention of Marine Pollution from Ships resulted in the MARPOL Convention. It also introduced two revolutionary changes in the way maritime treaties were developed. (Both were incorporated into SOLAS 1974.)

The first was the tacit amendment procedure for purely technical amendments. If a certain number of countries did not object within a specified period of time, the amendment came into force. The explicit process was still required for amendments impinging on national sovereignty or obligations.

The second was the "no more favorable treatment" clause. This states that parties to a treaty will not treat non-parties more favorably than themselves. In other words, if a non-party shows up in your ports, you are obligated to enforce the treaty on them.

1974

The 1974 SOLAS conference incorporated all previous amendments to SOLAS 1960 which had never come into force. It also adopted a number of important measures which addressed safety requirements for cargo ships and tankers.

The most recent SOLAS convention of 1974 has been adopted by more than 100 countries, controlling more than 95 percent of the world's merchant tonnage. This convention was amended in 1981, 1983, 1988 and 1989.

1982

In 1982, the Council decided on the name change from IMCO to IMO. Some members preferred the acronym IMO without saying the letters. However, it was decided to use all the initials because IMO means small potatoes in Japanese.

Photographs accompanying this article are courtesy of the Steamship Historical Society, University of Baltimore.

Mr. Daniel F. Sheehan is the director of the Coast Guard National Pollution Funds Center at 4200 Wilson Boulevard, Suite 1000, Arlington, Virginia 22203-1804.

Telephone: (703) 235-4700.

U.S. and IMO

By Mr. Gene F. Hammel

IMO standards have substantial impact on the seafarer, the ship owner and/or operator, and flag and port states throughout the world. All are potentially at risk from the operation of substandard ships, and all benefit from design and operational standards that improve international fleet performance.

It is essential that the United States participate actively in the development of international safety and environmental protection standards through the IMO. Because most merchant ships visiting our ports are under foreign flags, our country has a great deal to gain by playing a leading role in designing international guidelines, instead of following those developed by other nations.

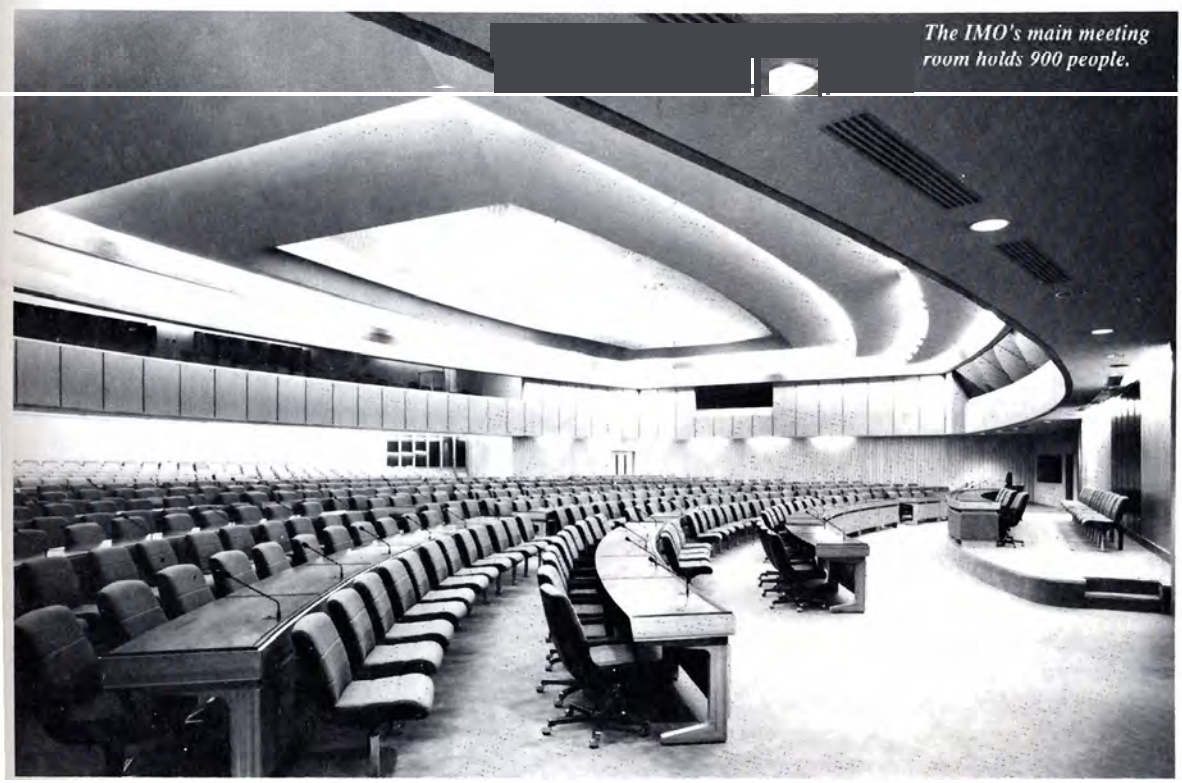
Indeed, the United States participates in all levels of the IMO. Most of this responsibility has been given to the Coast Guard by the Department of State. The Coast Guard leads United States delegations to IMO Assembly meetings, as well as Maritime Safety Committee, Marine Environmental Protection Committee and Legal Committee sessions, and those of all subcommittees. In this role, the Coast Guard coordinates all preparatory work for IMO meetings.

To ensure private sector involvement in developing United States positions at the IMO, the Department of State formed a federal advisory group, the Shipping Coordinating Committee in 1958. To obtain a representative cross section of public opinion concerning maritime safety issues, this group conducts open forums before IMO committee and subcommittee sessions. These forums are announced in advance in the Federal Register. Invitations are also issued directly to maritime industries, labor organizations, government agencies and other interested groups. Active public participation in the forums is encouraged.

The United States has been able to ensure that the majority of IMO standards developed to date are compatible with domestic goals, policy and public aspirations as voiced through open forums of the Shipping Coordinating Committee. This certainly justifies the Coast Guard's involvement in the IMO.

Mr. Gene F. Hammel is the assistant director of International Affairs for the Coast Guard.

Telephone: (202) 267-2280.



The IMO's main meeting room holds 900 people.

Shifting the focus to people

IMO to moderni

By Mr. Christopher Young

The IMO plans to review and revise the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW), 1978, by the middle of 1995. In an effort to focus on personnel and training issues to the same extent as ship construction and equipment standards, in May 1993, the IMO Maritime Safety Committee agreed to accelerate the preparation of revisions to the convention.

Moreover, the Subcommittee on Standards of Training and Watchkeeping will meet three times during 1994, instead of just once, which is normal. The subcommittee also is authorized to hold three intersessional meetings to help meet the 1995 deadline.

IMO Secretary General William O'Neil of Canada, urged the Maritime Safety Committee to take these actions due to the fact that most recent maritime casualties were attributed to human error.

The convention

The STCW Convention is the only international treaty to establish minimum standards for training and qualifying crew members for seagoing duty. Adopted at a 1978 IMO conference, the convention now has 99 member countries, including the United States, which became a party in 1991.

The convention is organized in two parts: articles and an annex. The articles set forth the legal obligations of each state-party to certify seafarers' competence on ships flying its flag, and to respect certificates of competence issued by other state-parties, except under strictly limited circumstances. The articles also establish procedures by which the convention can be amended.

The annex is divided into six chapters, containing specific technical regulations applying to training, certification and watchkeeping for seafarers. They consist of:

(I) general provisions,
(II) deck department,
(III) engine department,
(IV) radio personnel,
(V) special tanker requirements, and
(VI) proficiency in survival craft.

The 1978 conference also adopted 23 resolutions with recommendations on a variety of subjects related to the convention, but not incorporated as mandatory provisions.

The convention was amended slightly in 1991 to account for new training requirements, such as those associated with the Global Maritime Distress and Safety System, and to provide for controlled trials with automated and integrated systems. One-man bridge arrangements are an example.

Marine simulation reveals intricate docking maneuvering from full ship's b

afarer standards

Modernization

In 1992, the Subcommittee on Standards of Training and Watchkeeping recognized that substantial revisions would be needed to ensure that the convention reflected recent industrial developments. At its 23rd session, the subcommittee concurred in general with a suggestion by the International Shipping Federation to ask the Maritime Safety Committee to include in its work program a new item entitled, *"Incorporation of modern training and certification arrangements in the STCW Convention."* This item was understood to consider dual deck/engine room certification, as well as the use of simulators in training, and a "modular" structure by which competence standards would be based on the skills necessary to perform certain shipboard tasks.

In an effort to clarify and expand the terms of reference, the United States proposed to the 61st session of the Maritime Safety Committee in December 1992, that it instruct the Subcommittee on Standards of Training and Watchkeeping to change the work item to a *"Comprehensive review of the STCW Convention and a consolidation of proposed amendments."* This not only would discourage piecemeal revisions, but would allow the subcommittee to account for such critical matters as the criteria for ensuring the fitness of watchstanders, the manning implications of convention changes and necessary improvements in port state control procedures.

The committee agreed to the United States proposal and added that the subcommittee should also take due account of the human element and the requirements of conventional ships with traditional deck/engine room arrangements.

About a month after the December 1992 committee meeting, the tanker *Braer* went aground in the Shetland Islands. New demands were then placed on the IMO to try to prevent marine environmental damage. The secretary-general called on IMO members to act quickly in reviewing and revising the STCW convention.

The secretary-general proposed a timetable to the 24th session of the Subcommittee on Standards of Training and Watchkeeping (March 1993) for completing the revisions by 1995. The subcommittee then formed a special working group to review and revise the convention.

Revision principles

As a starting point, the working group agreed on certain principles for a general framework for its task. The subcommittee and committee both endorsed these principles, which could have significant implications for the revision process.

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"The integrity of the present convention as regards the ability to operate under conventional shipboard practices for so long as required should be retained, while accommodating any new requirements deemed to be necessary."

In other words, certificates issued under the present convention remain valid. Also, although the current provisions may be improved, this will not imply that shipboard arrangements complying with existing convention are unsafe or unsuitable on modern ships.

"As an alternative to the requirements for certification embodied in the present convention, the revised convention should provide for the 'functional approach' to certification, which should ensure that the required standards of professional competence are being attained."

According to this principle, the revisions are to provide options by which administrations can issue certificates of competency based on skills actually needed to perform specific functions or duties, whether or not they are aligned with traditional shipboard job titles or departmental organizations as described in the existing convention.

"The effective use of simulators and other modern training techniques and equipment should be further developed in the review and possible revision of the convention, including provisions and guidance on their use, such as the assessment of standards of competence and the remission of seagoing requirements."

This principle is consistent with the Maritime Safety Committee's position in December 1992 (MSC Circular 579), which called on administrations *"to encourage all types of simulator training for seafarers, and taking into account the additional benefits to, and expertise provided by, such special training to those who attended approved courses involving the use of simulators, where appropriate, to favorably consider such training when assessing seatime requirements for the issue of certificates under the STCW Convention."*

An important motivation behind the original proposals to review the convention was to ensure that the maritime industry could take advantage of new simulator technology and training for ship handlers, just as the aviation industry has done for many years.

Timetable

The convention review and revision is to progress according to the following timetable:

In September 1993, the subcommittee's working group will have conducted an intersessional meeting to explore such matters as:

(1) a systematic approach to reviewing existing provisions,

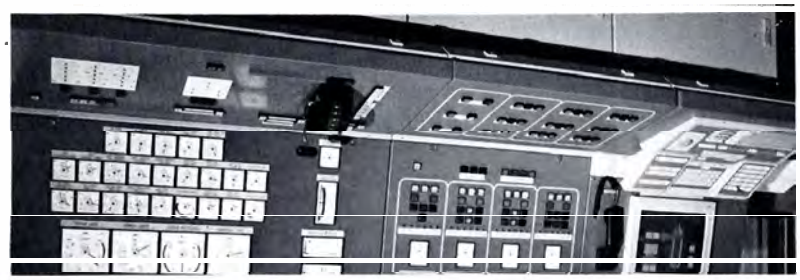
(2) the meaning of a "functional approach" to certification,

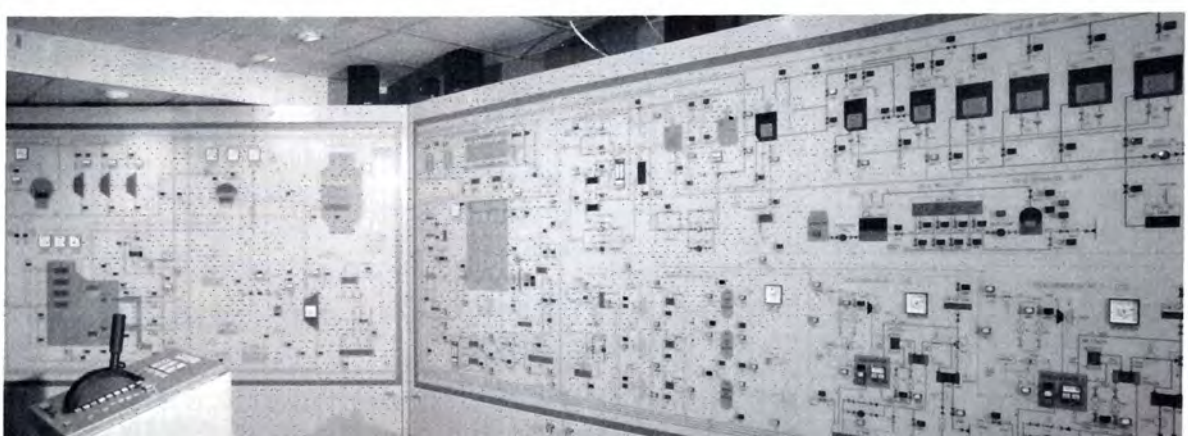
(3) the factors to be considered in providing for the use of simulators, and

(4) measures to reduce the risk of casualties caused by human error.

Taking the results of these efforts, the subcommittee should be able to agree on a general framework for a revised convention at its 25th session in January 1994. This would permit the submission of proposals and draft texts for amendments for consideration by the next intersessional meeting of the working group in July 1994. Also, any decisions made by the subcommittee in January would be subject to review and revision by the Maritime Safety Committee at its 63rd session in May 1994.

Hopefully, by its July 1994 session, the subcommittee will focus on specific areas where revisions are contemplated and on issues which need to be resolved. A proposed draft text of amendments to the convention should be finalized by December 1994.





(Right) Control panel. (Below) Engine room.

Issues of concern

The following issues will be of particular concern to the United States:

Human factors

- *human error (as a major cause of casualties*
- *criteria for establishing fitness for duty*
- *fatigue and workhour limitations*
- *safe operational practices*
- *communications/language skills*

Structural factors

- *Interpretation of the present convention*
- *definition and identification of "Functions" under the functional-based certification system, and how they relate to training requirements and modules*
- *relationship of present system to functional approach*
- *relationship between the revised convention and IMO or conference resolutions*
- *relationship to International Tonnage Convention*
- *amendment process*

Control factors

- *certificates and endorsements*
- *manning implications*
- *compliance monitoring*
- *port state control measures*

Training and experience factors

- *use of simulators for training, assessment and remission of seagoing service*
- *training program accreditation/reciprocity*
- *instructor accreditation*
- *training for specific ship classes*
- *application of STCW to non seafarers*
- *assessment of competence (use of training modules linked to functions, and skills required to perform functions effectively, including modules on fire fighting, shipboard maintenance, bridge resource management, etc.)*
- *documentation of training*
- *continued proficiency assessment and certification*

(Top) Control room for bridge simulator.
(Above) Bridge of 360-degree simulator.

Photographs accompanying this article are courtesy of American Maritime Officers.

For additional information, contact Mr. Christopher Young, Vessel Manning Branch, of the Merchant Vessel Personnel Division.

Telephone: (202) 267-0229.

Are there alternatives to double hulls?

By LCDR Marc Cruder

Regulations

On August 12, 1992, the Coast Guard published the Oil Pollution Act of 1990 (OPA 90) implementing regulations requiring vessels carrying oil in bulk to have double hulls when trading in United States waters. Effective September 11, 1992, these regulations apply to new vessels contracted on or after June 30, 1990, or delivered after December 31, 1993. Existing single-hull vessels must be phased out, according to a schedule beginning in 1995.

Alternatives

On January 4, 1993, the secretary of transportation submitted a report to Congress mandated by OPA 90 titled, *"Alternatives to Double-Hull Tank Vessel Design."* **This Coast Guard report concluded that no other designs are presently available which provide equal or greater protection to the marine environment than double hulls.**

To prepare this report, the Coast Guard commissioned a study by the National Academy of Sciences, participated in a comparative study on tanker design sponsored by the IMO, and contracted an independent study by the Herbert Engineering Corporation.

The findings of the report included:

- double hulls are unmatched in preventing the majority of spills due to groundings, particularly in United States waters;
- there are no generally accepted criteria for evaluating the equivalency of different tanker designs, particularly in terms other than projected oil outflow resulting from groundings and collsions;
- environmental performance standards are not fully developed; and

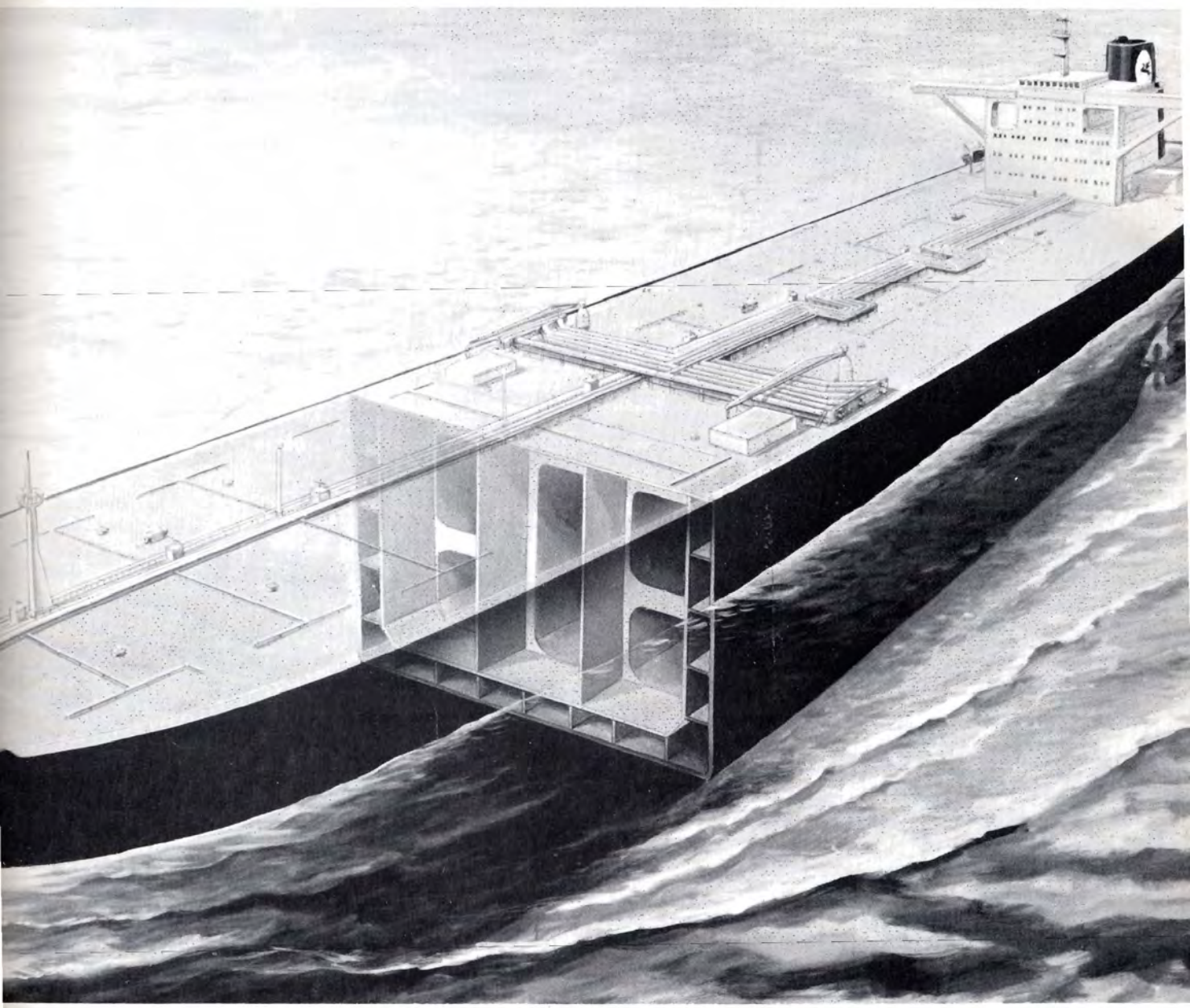
computer modeling, based on the probability of specific tanker accidents, is a useful tool for evaluating future designs.

The report recommended supporting research to find a way to more accurately evaluate and predict oil outflow from damaged tankers, defining environmental performance standards and completing international guidelines for evaluating alternative designs.

No recommendations were made to change OPA 90 by accepting other tanker designs, but the Coast Guard would continue evaluating novel designs and reporting suitable alternatives to Congress.

IMO action

International standards for new and existing tanker designs were adopted by the IMO in March 1992. Included were double-hull requirements introduced by the United States as a result of OPA 90. In addition, the IMO recognized the mid-deck configuration as equivalent to the double hulls under amendments to Annex I of the International Convention for the Prevention of Pollution from Ships, 1973, as



An artist's conception of Mobil Oil Corporation's double-hull large crude oil carrier, Eagle, now under construction in Japan. Photo courtesy of Mobil Oil Corporation.

modified by the protocol of 1978 (MARPOL 73/78). (The mid-deck concept uses the hydrostatic pressure balance of horizontally segregated lower tanks to minimize oil loss from bottom damage, and wide wing tanks to minimize oil loss through side damage.)

Due to technical differences in the content of OPA 90 and the proposed MARPOL 73/78 amendments, as well as the IMO's acceptance of the mid-deck, the United States declared to the IMO that its government would have to approve these amendments before they would enter into force in the United States. This means that foreign tank vessels calling at United States ports must document compliance with the OPA 90 double-hull standards. Compliance with the MARPOL standards alone will not be sufficient to trade in the United States.

Refining standards

The Coast Guard is working to refine international guidelines for alternative tanker designs. Our goal is to ensure that future alternative designs meet or exceed performance criteria acceptable to the United States before being accepted internationally.

LCDR Marc Cruder is a project manager with the Standards Development Branch of the Merchant Vessel Inspection and Documentation Division.

Telephone: (202) 267-1181.

Captain William Kidd (1645?-1701) was probably the best remembered of all the pirates who sailed the seas. In the background is a seventeenth century French ship with 108 guns.

Since navigation of the seas began, the forces of nature have conspired to thwart the unwary mariner. Through the ages, violent storms, mountainous waves, tricky currents, and hidden rocks and shoals have claimed countless vessels and their unfortunate crews.

The forces of nature, however, have not been the only dangers on the sea. Piracy and violence have also plagued mariners since the earliest trading vessels embarked more than 2,000 years ago.

The term "piracy" is likely to conjure up vivid images of swashbucklers and buccaneers, Captain Kidd, Blackbeard and treasures of the Spanish Main. These legendary characters now create a romanticized perception of stateless individuals, cruising the high seas and attacking their victims indiscriminately.

Modern day piracy and the IMO

By LCDR David Scott

Piracy today

Precisely because of our romanticized visions of outlaw brigands plundering on the ocean deep, the popular perception is that maritime piracy is a thing of the far distant past. The traditional form of piracy, robbery and violence against merchant vessels at sea, however, is alive and well, particularly in specific locations around the globe.

In the past ten years, attacks by pirates have been reported off the coasts of West Africa, Brazil, Colombia and Ecuador. In the South China Sea, historically a hot bed of piracy, such activity is especially prevalent, particularly in the vicinity of the Anambas, Natuna and Spratly Islands, as well as in the so-called "Hong Kong-Hainan-Luzon Triangle."

In recent years, many well publicized attacks have taken place within the Straits of Malacca and Singapore. As in the past, geography and economics have combined to make piracy an attractive occupation here. As the famed British pirate hunter, Captain Henry Keppel, observed nearly 150 years ago, *"As surely as spiders abound where there are nooks and crannies, so have pirates sprung up wherever there is a nest of islands offering creeks and shallows, headlands, rocks and reefs — facilities in short for lurking, for surprise, for attack, for escape."* The heavily vegetated shorelines and small islands in these areas provide ample cover for attack, and the subsistance level economies of these developing regions make the practice of piracy very rewarding.

Law of the sea

Historians have traced the practice of piracy back to the Homeric age around 850 B.C., when it was regarded as a "creditable means of enrichment," and "a common trade." Piracy flourished there because there was no organized maritime power strong enough to put it down. However, as the Roman empire expanded throughout the Mediterranean, widespread pirate communities took an ever increasing toll on commerce, which could not be ignored.

In what was perhaps the first organized action against pirates, the Roman senate in 68 B.C. dispatched Pompey the Great to "take the seas away from the pirates." Rome justified its action, not on a military basis, but rather on the notion that pirates were "the common enemies of mankind," against whom the conventional laws of war did not apply.

By the 17th century, the perception that pirates were "the common enemies of mankind" would provide the foundation for the concept of universal jurisdiction against piracy. During this era, the maritime powers began to accept the idea that freedom of the seas was necessary to enjoy the economic benefits of trade in the New World.

Because pirates preyed on all merchant vessels indiscriminately, they were perceived as a threat to the freedom of navigation, which was necessary for international commerce to survive. Since pirates were considered stateless persons, no nation could be held res-

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ponsible for their actions. Thus, it became acceptable that jurisdiction over pirates was universal, and that any nation could apprehend them and punish them under their laws, irrespective of the fact that the crimes were committed on the high seas.

Law problems

As the international law of piracy evolved, the offense itself was broadened to include not just sea robbery, but the intent to rob, as well as the commission of other violent acts at sea. However, one constant has remained — the requirement that the offense must occur on the "high seas."

This requirement, included in the anti-piracy articles of the 1958 Geneva Convention on the High Seas (and the as yet unratified 1982 Law of the Sea Convention) has rendered the international law ineffective in dealing with contemporary piracy, which occurs mostly closer to shore. Also, the expansion of territorial seas and the introduction of exclusive economic zones have greatly reduced the extent of what was once considered the "high seas."

Consequently, without the "high seas" requirement, enforcement authority now often falls under the jurisdiction of littoral states, which may not have the necessary economic or technical resources to deal effectively with the problem.

Captain of a French privateer in the 1790s.

Malacca Strait

The shortcomings of international piracy laws are perhaps best illustrated in the Malacca Strait region, where more than 200 attacks by pirates were reported in 1991. Connecting the Indian Ocean on the west to the South China Sea on the east, the Strait of Malacca and the Singapore Strait are extremely vital commercial waterways. The straits are particularly important routes for the international petroleum market. As the economies of the so-called "four tigers" — Singapore, Taiwan, Hong Kong and Thailand — have grown in the 1980s, there has been a corresponding increase in the region's container traffic. In fact, Singapore became the world's busiest container port in 1991. The area now attracts the heaviest concentration of merchant shipping in the world. Nearly 200 vessels over 1000 gross tons (excluding fishing and military vessels) transit these straits every day. In addition, at any given time, hundreds of vessels lay by in anchorage areas off Singapore, awaiting berths, receiving supplies, bunkering and making repairs.

"Pirate Alley"

The majority of pirate attacks have taken place in the reef and island strewn Phillip Channel. Piracy has long been associated with this area. The islands of the Riau Group are densely vegetated with numerous narrow passages and reefs, providing excellent hiding places. Also, the pirates can operate in anonymity and relative safety among the indigenous population of fishermen.

Laden oil tankers with low freeboards, traveling at reduced speed to maintain adequate steerage in the densely trafficked channel, present inviting targets of opportunity. The pirates usually approach under cover of darkness in speed boats or ubiquitous fishing craft, ascending the vessel by tossing a grappling hook over the stern railing. They typically operate in groups of two to five men, and are armed with axes, knives and, now with disturbing frequency, small arms and automatic weapons. They seize the vessel master and force him to open the safe, which usually contains substantial cash and valuables, the principal booty. The attacks are usually completed in about 15 minutes by the boarders who have been described by victims as "quiet, swift, serious and professional."

Until recently, the Straits states dismissed the piracy problem as an economic nuisance not significantly affecting their national flag shipping or coastal zone interests. Fortunately, this naiveté is fast disappearing.

It has been reported that the latest technique being used by pirates is to divert the crew's attention by starting a fire aboard the target vessel, then plundering it while the crew fights the fire. Given the amount of hazardous cargo transported through the crowded, narrow Phillip Channel, the potential for an environmental catastrophe is alarmingly apparent in this scenario.

Equally disturbing is the increasing level of violence associated with pirate attacks. In December 1992, an attack on the *Baltimar Zephyr* resulted in the shooting deaths of the vessel master and first officer.

International action

In the past ten years, there have been a variety of international efforts addressing the piracy problem. Pursuant to resolution A.545(13) adopted on November 17, 1983, the IMO urged governments, as a matter of highest priority, to take all necessary measures to prevent and suppress acts of piracy and armed robbery against ships in or adjacent to their waters. In 1991, the assembly adopted resolution A.683(17), which called on governments to report to the IMO all acts of piracy against ships flying their flag and any actions taken to carry out resolution A.545(13). Nearly 400 attacks all over the world have been reported to IMO's Maritime Safety Committee between 1985 and March 1993.

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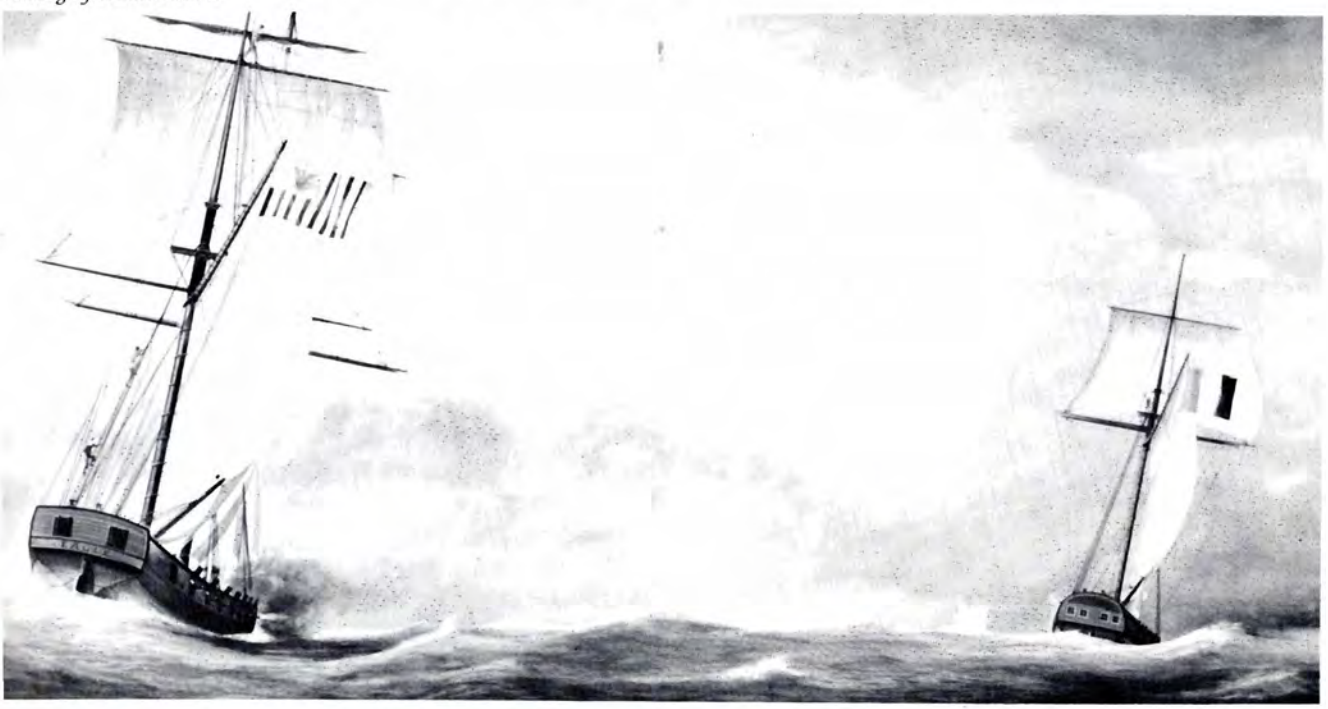
Eagle, a brig of the Revenue Cutter Service, the forerunner of the Coast Guard, chases the French privateer sloop Bon Pere in 1799.
Painting by Wendell Minor.



Captain "Calico Jack" Rackham was hanged at Gallow's Point, Jamaica in 1720.

Pirate from the Spanish ship Emilia, which in 1832 captured the United States brig Mexican, shown in background.

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These international measures have generated reliable statistics concerning the scope of piracy and maritime terrorist activity all over the world. Other actions have produced a variety of shipboard security guidelines and anti-piracy measures intended for ship operators.

In November 1971, Indonesia, Singapore and Malaysia issued a joint statement expressing a common position on matters relating to the Straits of Malacca and Singapore. They stated that the safety of navigation in the straits is their responsibility, and that a body of representatives from the three states be established to coordinate efforts for navigation safety.

The January 6, 1975, grounding of the 244,000 deadweight-ton Japanese tanker *Showa Maru* near Buffalo Rock in Indonesian waters three miles south of Singapore resulted in a spill of some 844,000 gallons of crude oil. This incident set the stage for tripartite action, in concert with IMCO, in developing a traffic control scheme for the straits.

Environmental concerns provided the impetus for the development of a traffic separation scheme by the International Maritime Consultative Organization (IMCO), the IMO's predecessor, in 1977. This resolution was based on the straits states' awareness of the environmental disaster which could result from the uncontrolled navigation of very large crude carriers through the narrow, congested Philip Channel.

In response to prompting from local ship owners associations, the strait states are now beginning to come to grips with the piracy problem. An anti-piracy agreement between Singapore and Indonesia in mid-1992 addressed the ticklish issue of hot pursuit by Singapore forces into Indonesian territorial waters and vice versa, and led to coordinated sea patrols in the straits. In addition, Indonesian and Malaysian customs officials began joint patrol operations in the Riau area in September 1992. There has been a marked decline in piracy attacks in the area since then.

Despite noble intentions, inadequate personnel training and insufficient funding for a long-term operation may cause the straits states' anti-piracy program to fall short of its goals. Since navigation safety in this area is a matter of international concern, some participation beyond the immediate regional states is appropriate. This is where the IMO has begun to play an important role.

IMO acts

By April 1992, the IMO's Maritime Safety Committee had become very concerned about the escalating frequency and changing operations of pirate activity worldwide. In particular, committee members were alarmed at the increasing propensity for personnel injury during attacks, the potentially dangerous effects upon maritime traffic in congested waterways and the environmental devastation that could result from such activity.

Pursuant to the committee's circular #597 issued in August 1992, the IMO invited member governments to take such measures as using search and rescue actions, mobilizing appropriate maritime authorities to provide assistance to ships under attack, and to pursue the attackers promptly.

In late 1992, the IMO convened a working group of representatives from Australia, Greece, Japan, the Netherlands, Norway, the United Kingdom and the United States. In early [illegible], the group traveled to the Malacca Strait area, visiting Malaysia, Singapore and Indonesia, to address the piracy problem. Members analyzed statistical data to determine patterns, methods and locations of incidents; evaluated the effectiveness of coastal states' law enforcement and security efforts; identified preventive measures to be taken by ship owners, operators and crews; and examined the need to improve navigation safety in the area by modifying or extending existing traffic separation schemes and vessel traffic services.

The working group adopted a four-point philosophy to counter piracy and sea robbery in coastal waters. It incorporates:

- intelligence, statistics and assessment;
- neutralization of pirates and armed robbers;
- protective security of merchant vessels; and
- contingency planning.

Data analysis

According to the IMO, the collection, collation, assessment and dissemination of accurate information and statistics on piracy attacks is essential for effective countermeasures. Efficient reporting is vital to determine the precise amount of activity in an area, thereby evaluating the actual risk to vessels and the effectiveness of countermeasures. However, this has not been an easy task. In a September 1992 survey, the Department of Energy reported:

"Analysts agree that the incidence of piracy is under reported by ship masters and owners by at least a factor of two. Several reasons are proposed for this, including:

- *fear that a successful act of piracy will reflect on the master's competence;*
- *concern that a report of piracy will embarrass the state in whose territorial waters the act occurred;*
- *concern that an investigation will disrupt the vessel's schedule; and*
- *the possibility that the ship owner's insurance rates will increase."*

Rapid, accurate incident reporting is still critical to the success of any anti-piracy initiative. Vessels under attack should make an immediate radio report to the nearest rescue coordination center or coast radio station. Upon receipt, the center or station should inform local security authorities immediately and warn other ships in the vicinity of the attack.

Because piracy is a criminal offense, ultimately countermeasures become a law enforcement matter. The security forces of the littoral state may include the military, marine police, coast guards, customs and immigration agencies, fisheries management agencies and other domestic law enforcement bodies, capable of apprehending perpetrators and conducting criminal investigations.

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The terror of the Caribbean Sea, Tortuga pirates board a merchantman (commercial ship) around 1665.

English privateersman fights with dagger and rapier at Valparaiso, Chile, in 1594. The ship is a late sixteenth century English vessel.

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A major difficulty for security forces in the Malacca Strait region has been identifying pirate vessels at night in the crowded waters. The IMO suggested that security forces consider using modern night vision equipment to better locate and identify the small, fast-moving pirate craft.

To assist in identifying the victim vessel, the IMO suggested that ships under attack flash their "not under command" lights. Such action would alert appropriate security forces as to the precise location of the victim.

Multilateral cooperation

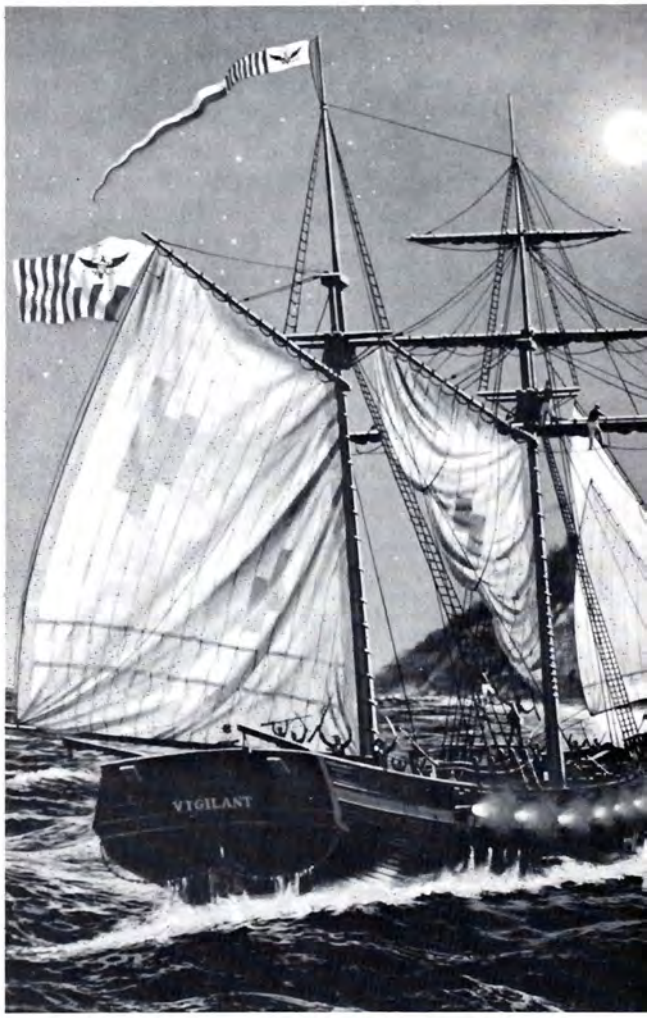
The most effective deterrent to piracy attacks in the Phillip Channel and Singapore Strait has been coordinated patrol operations between forces of the littoral states. Continued liaison between appropriate governments and their law enforcement agencies is strongly encouraged.

Detecting and apprehending pirates are only part of a successful enforcement effort, however. Prosecution and conviction are also important elements in an anti-piracy strategy. While such activities are solely within the purview of the state in whose territorial waters the attack occurred, there is usually an international component involved, provided the attack occurred against a vessel of another flag state. This aspect often frustrates the legal process.

In the highly competitive environment of international shipping, time is money. The Department of Energy notes:

"(vessel) masters and the owners they work for do not want schedules interrupted. . .Investigation of an act of piracy could tie up a (vessel) in port long after it was due to depart to deliver a cargo or to pick one up. The (vessel) owner could lose money in penalties for late delivery, or because the cargo was missed. . . Because of a reluctance to remain in port for an investigation of piracy, there are in the great majority of cases no witnesses to the crime, the vessel and crew having left port, and any physical evidence aboard the (vessel) is also elsewhere and unavailable."

Thus, to ensure the success of any anti-piracy action, all reporting and investigating must be carried out without unnecessary delays. Also, standardized incident reporting forms and procedures, improved ship-to-shore radio communication, and closer cooperation between coastal state maritime security forces could expedite the legal process.



The revenue cutter Vigilant captures the British privateer Dart off Block Island, Rhode Island, on October 4, 1813. Painting by Dean Ellis.

The International Maritime Bureau's Regional Piracy centre in Kuala Lumpur, Malaysia, can assist these endeavors. Established in September 1992, the industry-funded center is staffed 24 hours a day to receive messages on piracy and armed attacks in the area, and transmit them to law enforcement agencies as appropriate. The center also collates and analyzes information, and issues a regular piracy status report to interested groups, including the IMO, and provides all possible assistance to law enforcement agencies.

Pro-active approach

The IMO also promotes protective security aboard merchant vessels and contingency planning for possible attacks. Advance preparation and planning by ships' crews are essential. Vessels operating in waters where piracy is common should develop anti-attack plans, which take into account potential risks, available crew members, their training and capabilities, establishing secure areas aboard ship, and any surveillance or detection equipment on board.

It should be noted that early detection is the most effective deterrent to pirate attacks. Therefore, vigilance is essential, especially in piracy-prone waters. The IMO states:

"All too often the first indication of an attack has been when the attackers appear on the bridge or in the master's cabin. Advance warning of a possible attack will give the opportunity to sound alarms, alert other ships and the coastal authorities, illuminate the suspect craft, undertake evasive maneuvering or initiate other response procedures. Signs that the ship is aware it is being approached can deter attackers."

In addition, all possible access points to the ship and any key areas on the vessel must be secured and controlled in port, at anchor and while underway. Consistent with crew safety and operational requirements, access doors to the bridge, engine room, steering gear compartment, and officers' and crew accommodations should be secured, controlled and regularly inspected while passing through high threat areas.

Seizing and threatening crew members is a common means of gaining control over a ship. There should be designated muster locations within a ship's secure areas where the crew can report during an attack, and communicate their location and situation to the bridge. Qualified radio operators should always be on duty in high threat areas and be prepared to transmit appropriate distress alerts on all available radio communication systems.

Ship's lighting can also be used effectively. Bow and overside lights, as well as wide-beam floodlights astern can illuminate approach paths, thereby removing the advantage of stealth from attackers. Similarly, strategically placed deck fire hoses can be an effective deterrent, when properly energized and crewed.

A particularly controversial area is the use of firearms aboard merchant vessels. At present, many United States-flag vessels provide the master access to a handgun, which is usually kept in the vessel safe in the master's cabin. In most cases, this has been a long-standing procedure for internal shipboard security more than in response to piracy threats. The wholesale arming of merchant vessels to address piracy is another matter. Most security experts do not recommend arming crews. A February 1993 United Kingdom merchant shipping notice stated:

"The carrying and use of firearms for personal protection or protection of a ship is strongly discouraged and will not be authorized. . .Carriage of arms on board ship may encourage attackers to carry firearms, thereby escalating an already dangerous situation, and any firearms on board may themselves become an attractive target for an attacker. The use of firearms requires special training and aptitudes, and the risk of accidents with firearms carried on board ship is great. In some jurisdictions, killing a national may have unforeseen consequences, even for a person who believes he has acted in self defense."

Practically speaking, introducing firearms aboard merchant vessels would tend to create more problems than it would solve. The development of an effective shipboard contingency plan emphasizing vigilance, early detection and rendering the vessel a less attractive target, coupled with prompt reporting of suspicious activities to appropriate radio communication centers and appropriate law enforcement agencies is the preferred approach.

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Gun crew of an American privateer in the mid-eighteenth century.

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Conclusion

While the nature and scope of piracy has changed over the ages, its international character has remained. A modern ship is likely to be owned by a corporation in one country, flagged in another, and staffed with a multinational crew. An attack by armed pirates while passing through international straits, which are wholly within the territory of a single littoral state, involves considerable international interests.

While the maritime industry's self-help measures, including security awareness, preventive measures and avoiding high threat areas when economically practical, are an important part of an overall enforcement strategy, ultimately international problems require international solutions. In ages past, it may well have been acceptable for the dominant maritime powers of the day to engage in repressive unilateral enforcement action against pirates. However, today's international relations and conventional notions of the law of the sea are unlikely to permit a modern Pompey the Great or Captain Keppel to be unleashed against the maritime security threats facing today's international maritime community.

Safe navigation is of vital interest to the maritime community worldwide. Consequently, it should not be the sole responsibility of coastal states to police pirates from their waterways themselves. A greater degree of international participation and cost sharing is warranted. An equitable program should be adopted under the auspices of the IMO.

A highly respected international organization, the IMO is especially well prepared to accept the challenge of coordinating an anti-piracy enforcement program, which would respect the territorial sovereignty of coastal states, while meeting the needs of the international maritime community. The implementation of the working group's recommendations will be an important first step in that direction.

Cautious optimism now prevails in the straits' region. After more than a decade of denial, evasion and inaction due to jurisdictional squabbling, it now appears that the straits' states acknowledge the gravity of the piracy problem and are taking some meaningful enforcement action to eliminate it. International support of these efforts, along with shipboard security measures adopted by the maritime community, should significantly reduce the threat of traditional piracy attacks in the modern world.

Line drawings accompanying this article are by Peter E. Copeland from Pirates and Buccaneers Coloring Book, Dover Publications, Inc., 1977.

LCDR David Scott is on the staff of the Compliance and Enforcement Branch of the Merchant Vessel Inspection and Documentation Division.

Telephone: (202) 267-1464.

International management code changes ship safety approach

By CDR John Holmes

In May 1993, an IMO working group concerned with the human element in marine casualties completed the International Management Code for the Safe Operation of Ships and for Pollution Prevention. Developed for both the Maritime Safety and the Marine Environmental Protection Committees, the code aims to improve ship safety and decrease substandard ships by placing the burden of safety on owner/operators, and ensuring that the human element is fully considered in safety management.

The Maritime Safety Committee approved the code and it will be submitted to the IMO assembly in October 1993 for final approval for voluntary application. Approval will later be sought for mandatory application through an amendment to the SOLAS convention. The latter could occur as early as 1996.

This code requires ship owner/operators to use and document a safety management system which outlines policy and procedures for:

1. **safety and environmental protection;**
2. **company responsibilities and authority;**
3. **shipboard and shoreside monitors;**
4. **masters' responsibility and authority;**
5. **personnel duties, responsibilities and necessary resources;**
6. **shipboard operation plans;**
7. **emergency preparedness procedures and drills;**
8. **reports and analysis of non-conformities, accidents and hazardous events;**
9. **ship and equipment maintenance and reports;**
10. **system documentation;**
11. **company verification of compliance, review and evaluation; and**
12. **certification, verification and control by administrations.**

The United States supports this code and currently is developing guidance for our flag vessels to comply with its regulations. Procedures are also being outlined for companies and vessels to be certified by the United States under the code.

Regulatory reform

The United States has adopted this international management code as a cornerstone of a maritime regulatory reform program under development. This program will examine the Coast Guard's role in ship safety, and improve areas of inspection, plan review and standards development for greater efficiency.

Shipboard drills are an important focus of safety management.

Companies that demonstrate a commitment to safety by obtaining certificates under the code will have the option to participate in a self-inspection program, which will apply to some systems now regularly inspected by the Coast Guard. Subject to oversight and verification, the self inspections will merit Coast Guard credit. Companies choosing this option should save significant time now taken up by regular inspections.

The Coast Guard intends to extend this option to vessels not subject to the SOLAS convention. This will include United States documented vessels that are either not self-propelled, weigh under 500 gross tons, do not travel internationally (for cargo vessels), and carry less than 12 passengers or do not travel internationally (for passenger vessels). This will include barges, mobile offshore drilling units and other domestic vessels.

Conclusion

This code represents a significant step forward in international efforts to reduce the number of substandard vessels and marine casualties. It will achieve this through training and documentation to reduce human error, the cause of more than 85 percent of all marine casualties. The code is also in full accord with the Coast Guard position of focusing the responsibility for safety on the vessel owner/operator.

CDR John Holmes is the chief of the Compliance and Enforcement Branch of the Merchant Vessel Inspection and Documentation Division.

Telephone: (202) 267-1464.

How standards protect the environment

By Mr. Frank Wood

Requirements and standards are inextricably linked. Without adequate standards, legislative compliance cannot be measured, enforcement is inconsistent and requirements that are intended for all, are unfairly burdensome to some.

Because international maritime standards, particularly those dealing with the environment, have been unavailable, the Coast Guard carried out statutory requirements through the normal regulatory process.

There is growing interest now, however, in developing and enforcing international requirements and standards. This interest is generated by the rapid globalization of commerce and communication, and driven by the belief that protecting the ocean environment is a universal responsibility.

The Coast Guard is a leader in this process through the IMO, the International Standards Organization (ISO) and the American Society for Testing and Materials (ASTM).

A large oil spill in the Persian Gulf in 1991 presented the first major test for IMO's 1990 convention. Quick and effective action saved many sensitive areas from serious damage. Photo courtesy of IMO.

IMO and the environment

The International Convention on Oil Pollution Preparedness, Response and Cooperation was adopted by the IMO in 1990, and ratified by the United States Senate in 1992. Article 8 of this convention specifically encourages the development of international standards for equipment and techniques to combat oil pollution.

During a seminar on marine environmental protection in May 1993, the chairman of the IMO's Marine Environmental Protection Committee strongly supported the international standardization of marine environmental technology.

The Coast Guard played a key role in adopting the International Convention on Oil Pollution Preparedness, Response and Cooperation, the International Convention for the Prevention of Pollution from Ships (MARPOL) in 1974, and the 1978 MARPOL amendments.

ISO and the environment

In 1990, the legislature of the European Community required that companies wishing to do business in Europe must document compliance with an environmental management system by 1995. In response to this action, the ISO formed the Strategic Advisory Group on the Environment in 1991 to assure international consensus in developing standards that would be accepted in economies in and out of Europe. The objectives of this group were to determine the need for standards to promote sustainable industrial and market development, and to recommend an overall strategic plan for developing standards on environmental performance and management.

Upon the advisory groups recommendation, the Technical Committee on Environmental Management Systems was established. At its first meeting in Toronto, Ontario on June 1, 1993, this committee organized itself into six subcommittees and one working group.

The subcommittees are concerned with:

(1) environmental management systems,
(2) environmental auditing,
(3) environmental labeling,
(4) environmental performance evaluation,
(5) life cycle analysis, and
(6) terms and definitions.

The United States is represented on the technical committee with a large delegation headed by the American National Standards Institute and administratively supported by ASTM. The United States has representatives on each subcommittee, and chairs the Subcommittee on Environmental Performance Evaluation.

The technical committee will develop international standards for environmentally friendly products, services and managerial systems to minimize waste and pollution, and protect the natural environment. These standards are likely to have a profound effect on international commerce.

ASTM and the environment

The two ASTM committees most concerned with marine environmental protection are Committee F20 on Hazardous Substances and Oil Spill Response, and Committee F25 on Shipbuilding. The Coast Guard actively participates in both groups.

When the Oil Pollution Act of 1990 (OPA 90) imposed stringent requirements on vessel and facility owners to remove specific volumes of discharged oil, Committee F20 took immediate action. The development of standard practices, guidelines, test methods and measures of response equipment effectiveness for oil removal was quickly begun. Published standards are referenced in the vessel and facility response plan regulations (33 CFR, parts 154 and 155).

Since OPA 90 was passed, three additional subcommittees have been formed within Committee F20, meeting attendance has increased fivefold and 17 standards are in varying stages of initial development or renewal.

A new subcommittee dedicated to marine environmental protection was formed in early 1993 under Committee F25. The following topics were assigned to members for research and reporting: gray water/black water treatment, emergency lightering and transfer systems, emissions control, response training for shipboard personnel, incineration/solid waste management, shipboard damage assessment and response to operational discharges.

". . . the maritime industry can protect the marine environment with responsible behavior that is good for both the environment and business."

At a May 1993 meeting of Committee F25, several speakers presented national and international views on marine environmental protection by the shipbuilding and other maritime industries. Representatives from IMO and ISO stressed the need for requirements and standards with international applications. Several private sector representatives spoke of "clean ship" technology and shipboard waste stream management.

Conclusion

While it is clear that the bulk of marine pollution is generated by non-marine sources, it is equally apparent that the maritime industry can protect the marine environment with responsible behavior that is good for both the environment and business.

Throughout its history, the Coast Guard has helped develop standards for such responsible behavior. It is in the best interests of the United States that ASTM standards be accepted internationally. By actively participating in ASTM, IMO and ISO, the Coast Guard is in a unique position to promote the international adoption of responsible standards to protect the marine environment.

Mr. Frank Wood is the environmental advisor to the chief of the Marine Environmental Protection Division.

Telephone: (202) 267-6603.

Pros and cons of international approval for lifesaving equipment

By Mr. Kurt J. Heinz

At the 23rd session of IMO's Subcommittee on Lifesaving, Search and Rescue in January 1992, the United States made a revolutionary proposal: to provide an alternative to the current long-standing system, whereby each flag administration is responsible for prototype and production testing for all approved lifesaving equipment used on its ships. The proposed system could result in significant savings for administrations, manufacturers and ship owners.

Why not?

There are several reasons why equipment approvals are not generally accepted reciprocally, even though all signatory nations are technically following the same IMO equipment design and performance requirements.

- IMO requirements are purposely "watered down," made vague or left to the satisfaction of the administration in order to obtain consensus on technical subcommittees. Such bare minimum rules are often open to interpretation by administrations who develop their own sets of national requirements over and above the SOLAS minimums for equipment on their ships. The end result is that testing performed to one administration's requirements generally does not satisfy those of another administration.

- Some administrations have large, well financed inspection systems to impose stringent quality control over approved products. Others have little or no such oversight. Because of this inconsistency of oversight, administrations frequently don't accept approvals granted by other national authorities.

- Some administrations design approval programs to aid their own industries by discouraging approval of foreign products.

Problems

This current system is costly in time and money for all concerned. A manufacturer seeking equipment approval usually pays for an administration surveyor to witness required tests. Many such approval tests are burdensome, destructive and/or environmentally unfriendly, sometimes having to be repeated in different ways to meet varying requirements. Consequently, the manufacturer's personnel and facilities are tied up, administration representatives' time is often wasted, and the costs are passed on to the consumer (the shipowner).

The present system complicates the purchase of lifesaving equipment. An international approval system would make it easier for shipowners to purchase equipment worldwide with confidence that it meets flag administration approval.

Specific SOLAS design and performance standards for lifesaving equipment were developed to establish a consistent minimum level of safety applicable to all administrations. However, as administrations keep adding more individual requirements, the system gets further away from its goal.

U.S. code system

At the last subcommittee session in February, 1993, the United States proposed an "equipment code," to establish agreed common standards for various equipment, including the minimum SOLAS requirements along with those imposed by different administrations. This code would consist of a main body of general and administrative matters relating to approval, and multiple annexes, each containing specific requirements for a particular type of equipment. The annexes, which would be developed by the subcommittee, could be accepted by administrations optionally on an item-by-item basis. The IMO would maintain and publish a list of annexes with the administrations that accept them.

Prototype testing would be supervised by small groups of surveyors from different administrations. Those administrations accepting a particular code annex would agree to accept equipment approved under its provisions. Detailed production testing requirements would be a part of the annexes, and the administration within whose borders the manufacturer is located would be responsible for production oversight.

The "righting test" for lifeboat approval is a difficult and expensive proposition.

This code system would promote consistency of requirements between administrations, and reduce the burden of redundant prototype testing on manufacturers. It would conserve inspector resources by enabling administrations to accept results of tests witnessed by groups of inspectors from other administrations. In addition, it would establish detailed production quality assurance and oversight procedures lacking in present SOLAS requirements.

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Swamp testing a large inflatable buoyant apparatus requires careful planning and logistics.

Liferaft canopy closure tests like this usually require the assistance of the local fire department.

Continued from page 31

Opposition

Despite positive reaction to the general concept at the previous session, the detailed United States proposal faced considerable opposition from various administrations.

- Time and expense to the IMO in producing and administering the equipment code was cited. (The code system, however, would most likely be self-sustaining in terms of funding by the sale of publications, and the code annexes would be developed at a compatible pace with other subcommittee work items.)

- There were fears that the code could be used as a trade barrier. (The existing system appears to be used similarly in many cases.)

- The current system was maintained by some as satisfactory. (Those administrations that are least likely to be affected by shortcomings of the existing system would not be obligated to participate in the code system.)

- Some felt that the development of detailed test procedures should be left to the International Standards Organization (ISO). (Participation in ISO standards activities is not universal.)

- It was considered by some that many goals of the proposed system could be met by sharing test data. (This would be true if a standard format for complete test reports were established. Presently, test reports are often so incomplete that they are unusable. The code would standardize them.)

EFTA system

A similar system in concept and practice operated regionally by the European Free Trade Association was discussed as a possible alternative. The "Scheme for the Reciprocal Recognition of Tests and Inspections Carried Out on Ships' Equipment," currently with 10 members, has been operating successfully for more than 20 years, and incorporates many features of the proposed systems in some form.

Prospects

Although it is apparent that in its present form, the proposed equipment code system is unacceptable to the subcommittee, it was useful in generating frank and open discussions regarding the shortcomings of the present equipment approval system.

The subcommittee agreed to keep the subject of international approval procedures on the work schedule for another two years for further consideration. Future discussions will most likely include the European scheme as a possible model.

It is anticipated that continuing negotiations at IMO will improve the equipment approval systems for shipowners, manufacturers and administrations.

Mr. Kurt J. Heinz is an engineer with the Survival Systems Branch of the Merchant Vessel Inspection and Documentation Division.

Telephone: (202) 267-1444.

New guidelines set for cargo ship surveys

By CDR John Holmes

In an effort to decrease the number of substandard vessels, on July 9, 1993, a working group for IMO's Marine Safety Committee and Marine Environmental Protection Committee completed new international standards for enhanced oil tanker and bulk carrier surveys. Both committees approved these guidelines, which were submitted to the IMO assembly in October 1993.

Tougher inspection standards were sought after studies of several bulk carrier sinkings revealed that many could have been avoided by more thorough examinations of the vessels. Enhanced surveys for tankers were included because section 13G(3) of the 1992 amendments to Annex I of MARPOL 73/78 requires that crude oil tankers of up to 20,000 deadweight tons and oil product carriers of up to 30,000 deadweight tons be subject to periodic, intermediate and annual inspections.

Two similar sets of guidelines were developed, one specifically tailored to bulk carriers and the other to oil tankers. If adopted by the IMO assembly, they will be voluntary until July 6, 1995. At this time, they would become mandatory for only those tankers covered by the MARPOL amendments. The survey program would remain voluntary for oil tankers not covered by the amendment and all bulk carriers.

If proposed SOLAS amendments requiring enhanced surveys for all bulk carriers and oil tankers of 500 tons and over are adopted, the program will be mandatory for these vessels. These amendments have been approved by both the Marine Safety and Marine Environmental Protection Committees, and should be considered by a special IMO conference in 1994. If adopted, they could be effective as early as 1996.

The survey program is already required for all bulk carriers and oil tankers certified by any of the 11 members of the International Association of Classification Societies, which classifies more than 92 percent of the world's tonnage.

Standards

The guidelines set base-line standards for all bulk carrier and oil tanker inspections, including requirements for close-up surveys within hand reach of vessel structures.

The standards include requirements or definitions for:

A) periodical thickness measurements;
B) tank testing;
C) critical structural areas, coating conditions and corrosion standards;
D) tests and inspections at each regularly scheduled survey;
E) overall and close-up surveys; and
F) planning and documentation of surveys.

The enhanced survey guidelines require close-up tank surveys such as this.

A provision is included to invalidate a vessel's SOLAS or International Oil Pollution Prevention certificates if they do not submit to the surveys.

The guidelines stipulate that the requirements intensify as vessels age, and become more vulnerable to cumulative stress and corrosion. They can be amended as technical developments occur, such as risk assessment procedures for survey standards which the IMO has requested.

The Coast Guard fully supports the enhanced survey program, its implementation by the classification societies and mandatory application for all bulk carriers and oil tankers through the SOLAS amendment.

CDR John Holmes is the chief of the Compliance and Enforcement Branch of the Merchant Vessel Inspection and Documentation Division.
Telephone: (202) 267-1464.

Damage stability standards take new direction

By Ms. Patricia Carrigan and LCDR Robert Holzman

The IMO has begun a new era in ship subdivision and damage stability requirements. Acceptable safety levels for all ship types will, in the foreseeable future, be based on standards of probability. This is essentially measuring a ship's ability to survive a collision through international ship casualty statistics.

Traditional standards

Under traditional stability requirements, it is possible for two ships with the same subdivision factor (distance between watertight bulkheads) to have significantly different levels of safety. This is because the traditional standards fail to account for the effects of many factors directly relating to a ship's level of safety. These factors include the relationship between the range of damage lengths and the probable extent of flooding for a given placement of the bulkheads, operation at less than full load draft, permeability variations, reserve stability when flooded and the effect of ship proportions (mainly the depth to draft ratio).

New standards

All of the above factors are included in the evaluation of a ship's ability to survive damage, using the new standards. Taking into account the probable location of damage and resulting extent of flooding taken from casualty statistics, the new standards determine by comparison if a ship can survive the flooding.

In general, regulations based on concepts of probability offer greater flexibility in ship arrangements. (Designers can use longitudinal, transverse and even horizontal subdivision to their best advantage.) The comparative measure or "attained index" generated by the new method quantifies the safety level of a particular ship design. This allows various design alternatives to be evaluated, arriving at an objective comparison of ship designs.

History

The first international rules based on standards of probability were the equivalent regulations to part B of chapter II-1 of the SOLAS 1974 Convention for passenger ships. These rules were adopted by the IMO on November 20, 1973.

Although they are 20 years old and have long been available as an optional equivalent to traditional requirements in United States regulations for passenger ships, they are seldom used by ship designers. This can be attributed to the fact that the traditional rules are familiar with "cookbook" formulas, while the new standards are a marked departure, requiring numerous calculations.

The IMO again used the probability methods to develop subdivision and damage stability standards for dry cargo ships in the 1980s, which were adopted by the Maritime Safety Committee in 1990. These nontraditional methods have since been used to evaluate the need to upgrade existing ro-ro passenger ferries.

Subcommittee action

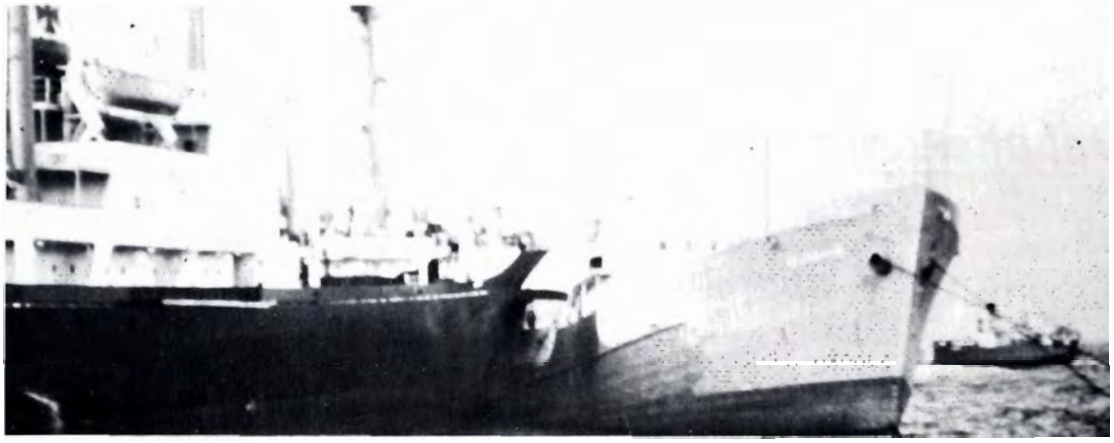
In May 1991, the Maritime Safety Committee directed the Subcommittee on Stability, Load Lines and Fishing Vessel Safety to develop subdivision and damage stability regulations based on probability for all ship types. This process will begin by comparing and combining the two existing IMO standards for passenger and cargo ships into one that can be applied to each different ship type.

Several proposals on how this could be achieved were presented at the last session of the subcommittee in January 1993. One proposal, worthy of note, would allow consideration of vessel size, number of people on board, unique operational conditions and environmental risks of ships carrying cargoes that pose a pollution threat, when establishing the safety level required for a specific vessel design.

A correspondence group has been set up to evaluate the proposals. Group members will present a report at the next subcommittee session in March 1994, and the process will move forward. Completion of this effort is expected within five years.

Ms. Patricia Carrigan and LCDR Robert Holzman are naval architects in the Stability and Subdivision Section, Naval Architecture Branch, Marine Technical and Hazardous Materials Division.

Telephone: (202) 267-2988.



Accurate hull damage data should be recorded on collisions such as this.

DAMAGE CARDS
DATA PIPELINE TO IMO

By Mr. William Hayden and Mr. Michael Dyer

Documenting marine accidents yields vital information for national and international authorities to develop effective safety regulations. The IMO relies on a form called a "damage card" to collect important data on the size and shape of hull breaches after collisions or groundings. This data is used extensively in formulating international damage stability criteria.

Background

The IMO began collecting this information in the early 1960s to validate stability criteria and damage assumptions being developed. By the early 1970s, this database included several hundred records and was used by the IMO as a basis for new damage stability criteria for passenger vessels. This revolutionary use of statistics to define performance criteria was extended to dry cargo ships in 1985 and will soon be used to evaluate tanker designs.

A major stumbling block in amassing this data for the IMO is obtaining timely, accurate records of damage areas following casualties. Many important details such as the location of damage along the length of a ship, inward penetration, and the height above or below the water line must be gathered before damaged hull portions are cut away in the shipyard to insert new structure and before any repairs are made to existing structures. Attempting to reconstruct details of a casualty from shipyard and/or surveyor reports months or years later results in incomplete information and inaccuracies, which call the whole database into question.

However, while member IMO nations strongly supported this data collection effort during the 1960s and early 1970s, interest waned during the 1980s and the flow of damage data flowed to a trickle.

New impetus

Recognizing the necessity of collecting up-to-date reports on hull damage in order to create strong, relevant safety standards, IMO is renewing efforts to gather new data, particularly on tanker casualties.

It is important that the database include up-to-date, accurate reports on all casualties, not just those that create headlines, such as the *Exxon Valdez* and *Queen Elizabeth 2*. Without information on the small day-to-day bumps and fender benders, the database would be imbalanced toward longer and deeper damages on large vessels, which would present a false statistical picture on which to build solid criteria.

Coast Guard field personnel, marine surveyors and shipyard officials are strongly encouraged to record accurate hull damage data on every casualty they encounter. The resulting statistics can be used by IMO and other international and national authorities to save lives and ships in the future.

Mr. William Hayden is chief of the Structures and Load Lines Section of the Naval Architecture Branch of the Marine Technical and Hazardous Materials Division.

Telephone: (202) 267-2988.

Mr. Michael Dyer is an engineer with the Office of Systems Engineering of the VOLPE National Transportation Systems Center, 55 Broadway, Kendall Square, Cambridge, Massachusetts 02142-1093.

Telephone: (617) 494-2233.

Triethylamine

An important commercial hydrocarbon, triethylamine is derived from ethyl chloride and ammonia under heat and pressure, and is produced as a liquid. It is colorless with a strong fishy odor.

Triethylamine has many commercial applications, including that of a catalytic solvent in chemical synthesis, as well as in the production of rubber. In addition, it is used as a corrosion inhibitor and propellant, for curing and hardening of drilling resins, and to produce amine-based waterproofing agents.

Hazards

Triethylamine is a flammable liquid, which is stored at an ambient temperature and is relatively stable during transport. It usually is shipped in one- to five-gallon cans, 55-gallon drums and in tank cars.

The chemical floats on water without reacting. It is incompatible with strong acids and oxidizers, and can ignite on contact. It may also be ignited by heat, sparks or flames. When fire occurs, there may be a flashback along the vapor trail and the vapors can explode if ignited in a closed area. The heat of a fire can also explode triethylamine containers, which should be cooled with water.

Discharge of the chemical into the environment can cause water pollution, as well as fire and health hazards.

Contact of the liquid with skin causes first- to second-degree burns. Liquid and vapor will irritate eyes and respiratory systems.

Responses

In case of a triethylamine discharge, a warning of high flammability should be issued, the area should be evacuated and the spill mopped up with absorbents, diluting it with running water and directing it into the waste water system. The chemical should be disposed of through incineration with proper precautions to reduce NO_x emissions.

A small triethylamine fire can be extinguished with dry chemicals and carbon dioxide, and a large conflagration should be fought with alcohol foam. Water is ineffective on fire, but a water spray can "knock down" vapors.

Precautions

Goggles, self-contained breathing apparatus and rubber overclothing should be worn during fire-fighting operations.

Appropriate clothing, including air-supplied masks, goggles or face shields, and rubber gloves should be worn when exposed to the chemical in liquid or vapor form.

First aid measures include moving the victim to fresh air and immediately flushing affected areas with water.

Regulations

Coast Guard regulations for bulk shipment of triethylamine are in subchapter O of 46 CFR (parts 150, 151 and 153). Department of Transportation regulations, which cover all other modes of transportation, are found in subchapter C, 49 CFR (part 172). The Environmental Protection Agency regulations are in title 40 of the Code of Federal Regulations.

Triethylamine is designated under the International Maritime Dangerous Goods (IMDG) Code as a class 3.2 flammable liquid with a class 8 corrosivity subsidiary hazard, and packaging group II.

Triethylamine

Chemical name: Triethylamine
Formula: $(C_2H_5)_3N$
Synonyms: N, N-diethylethanamine
Description: Colorless liquid with strong fishy odor

Physical properties:

Boiling point:	89.5°C (191.8°F)
Freezing point:	-114.7°C (-175°F)
Vapor pressure:	54 mm Hg @ 20°C (68°F)
Reid vapor pressure:	2.3 psia

Threshold limit values:

Time-weighted average:	10 ppm (41 mg/m^3)
Short-term exposure limit:	15 ppm (62 mg/m^3)

Flammability limits in air:

Lower flammability limit:	1.2% by volume
Upper flammability limit:	8.0% by volume

Combustion properties:

Flashpoint:	25°F (open cup)
Autoignition temperature:	842°F

Densities:

Vapor (Air=1):	3.5
Specific gravity at 20°C:	0.73

Identifiers:

CHRIS code:	TEN
Cargo compatibility group:	7 (Aliphatic amines)
CAS registry number:	121-44-8
U.N. number:	1296
IMDG Code:	3.2, Flammable liquid, subsidiary 8, Corrosive

Julie Mehta was a first class cadet at the Coast Guard Academy when this article was written as a special chemistry project under LCDR Thomas Chuba.

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

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. The end joint formed by adjoining plates in a hull plating stake is properly identified as a _____.

A. bracket
B. scarph
C. butt
D. seam

2. One end of a cylinder is sealed by the cylinder head and the other end by the _____.

A. crankcase
B. piston
C. cylinder liner
D. crank cheek

3. Your vessel is departing at 1800 hours on a voyage of more than 48 hours duration. Coast Guard regulations (46 CFR subchapter D) require that the steering gear be examined and tested no earlier than _____.

A. 0600 hours
B. 0900 hours
C. 1200 hours
D. 1500 hours

4. Kilowatt load is divided between two air conditioning generators operating in parallel by _____.

A. adjusting the governor controls
B. varying the excitation voltage
C. increasing both prime mover speeds simultaneously
D. decreasing both prime mover speeds simultaneously

5. The compression ratio of a diesel engine refers to the ratio of the _____.

A. piston area to connecting rod length
B. cylinder volumes at top dead center and at bottom dead center
C. engine cylinder size to piston size
D. the number of compression strokes for a given horsepower

6. You are paralleling two alternators. The synchronizing lamps grow dim and are totally darkened as the synchroscope pointer approaches the 0 position. This indicates that the _____.

A. alternator voltages are 180° apart
B. circuit breaker should be closed
C. incoming alternator is running too slowly
D. synchroscope is defective or broken

7. How is the axial clearance indicator used on a turbine?

A. It is inserted in the depth gauge well until it rests on the reference boss, and the reading is noted.
B. After it is screwed into contact with the rotor, shims are placed in the clearance well, and the thickness is measured.
C. Its arm is pushed so contact is made with a rotor, and the reading on the scale is noted.
D. It measures the gap between bridge and rotor after a bridge gauge is placed across the bearing.

8. Low velocity water fog is used in fire fighting as a _____.

A. cooling agent
B. smothering agent
C. barrier against radiant heat
D. all of the above

9. What factor has the greatest effect on the mechanical efficiency of a diesel engine?

A. Temperature of the intake air.
B. Friction within the engine.
C. Mechanical condition of the supercharger.
D. Mechanical condition of the turbocharger.

10. Coast Guard regulations (46 CFR subchapter F) require that the design pressure of an economizer integral with the boiler and connected to the boiler drum without intervening stop valves shall be at least equal to _____.

A. the feed pump shut off head pressure
B. 110% of the drum safety valves highest set pressure
C. 125% of the boiler hydrostatic test pressure
D. 150% of the boiler design test pressure

DECK

1. How should you signal the crane operator to raise the boom?

A. Extend arm with the thumb pointed up and flex the fingers in and out.
B. Place both fists in front of the body with the thumbs pointing upward.
C. With forearm vertical and forefinger pointing up, move hand in a small horizontal circle.
D. Extend arm with fingers closed and point thumb upward.

2. Which type of line would best be able to withstand sudden shock loads?

A. Polypropylene.
B. Nylon.
C. Dacron.
D. Manila.

3. The maximum length allowed between main, transverse bulkheads on a vessel is referred to as the _____.

A. floodable length
B. factor of subdivision
C. compartment standard
D. permissible length

4. A design modification of an anchor chain which prevents kinking is the_____.

A. detachable link
B. stud link
C. Kenter link
D. connecting link

5. On a cargo vessel, fire and boat drills must be held within 24 hours of leaving port if the percentage of the crew replaced was more than _____

A. 5%
B. 10%
C. 25%
D. 40%

6. Which 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.

7. You are arriving in port and are assigned to anchor in anchorage circle B-4. It has a diameter of 700 yards and your vessel's LOA is 600 feet. If you anchor in 11 fathoms at the center of the circle, what is the maximum number of shots of chain which can be used and still remain in the circle?

A. 4 shots.
B. 5 shots.
C. 6 shots.
D. 7 shots.

8. The purpose of a preventer as it is used on a conventional yard and stay cargo rig is to _____

A. allow greater than normal loads to be handled by the gear
B. act as an inboard guy in the event it parts during cargo handling
C. assist the outboard guy in supporting stresses during cargo handling
D. prevent the inboard guy from parting due to stresses during cargo handling

9. The GHA of a star _____

A. increases about 15 degrees per hour
B. increases about four degrees per hour
C. decreases about 15 degrees per hour
D. decreases about four degrees per hour

10. Which of the following would give the best radar echo?

A. The beam of a three-masted sailing vessel with all sails set.
B. A 110-foot fishing vessel with a radar reflector in its rigging.
C. A 300-foot tanker, bow on.
D. A 600-foot freighter, beam on.

ANSWERS

Engineer

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

Deck

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

If you have any questions concerning "Nautical Queries," please contact the Coast Guard (G-MVP-5), 2100 Second Street, S.W., Washington, D.C. 20593-0001.

Telephone: (202) 267-2705.

Notice of study

CGD 93-044, Port access routes off the coast of California: vessel traffic regulations for offshore California national marine sanctuaries (33 CFR parts 935, 936, 942 and 944) (August 24).

The Coast Guard and the National Oceanic and Atmospheric Administration are conducting a study to evaluate the need for vessel routing measures in the approaches to California ports, and the need for measures to regulate vessel traffic in the offshore California national marine sanctuaries to protect sanctuary resources. As a result of the study, new or modified vessel routing measures or traffic regulations for the sanctuaries may be proposed in the *Federal Register* if they are found necessary. This notice invites information and comments from persons who have an interest in the safe routing of vessels and protection of environmental resources in the study area.

DATE: Comments must be received by November 22.

Addresses: Comments may be mailed to the executive secretary, Marine Safety Council (G-LRA/3406) (CGD 93-044), Coast Guard headquarters, 2100 Second Street, SW, Washington, D.C. 20593-0001, or may be delivered to room 3406 between 8 a.m. and 4 p.m., Monday through Friday, except for federal holidays. Telephone: (202) 267-1477.

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

For further information, contact: Ms. Margie G. Hegy, project manager, Short Range Aids to Navigation Division (G-NSR-3), telephone: (202) 267-0415; LTJG Walter Grudzinski, Eleventh Coast Guard District, telephone: (310) 980-4300, Ext. 501; CDR Larry F. Simoneaux, NOAA Corps Sanctuaries coordinator, telephone: (206) 526-4295; or CDR Terry D. Jackson, sanctuary manager, Monterey Bay National Marine Sanctuary, telephone: (408) 647-4201.

Final rule

CGD 93-041, Domestic passenger vessel damage stability standards (46 CFR part 171) RIN 2115-AD33 (August 27).

The Coast Guard announces a six-month suspension of 46 CFR 171.080(e) in the stability design and operational regulations published on September 11, 1992 at 57 FR 41812 for all vessels not requiring a SOLAS Passenger Ship Safety Certificate. These regulations (CGD 89-037) became effective on December 10, 1992. This section is being suspended for six months to allow completion of further research and other investigation based on new information presented during a public meeting held August 5, 1993, on passenger vessel damage stability standards and the application of Coast Guard regulations in 46 CFR 171.080 (e) to domestic passenger vessels. The information presented during this meeting indicated that some difficulties not originally envisioned were being experienced as vessel designs entered preliminary plan review.

DATES: As of August 27, 1993, 46 CFR 171.080(e) in the final rule published at 57 FR 41812 is suspended until February 23, 1994, for all vessels not requiring a SOLAS Passenger Vessel Safety Certificate. Comments must be received by November 26, 1993.

Addresses: Comments should be submitted in writing to the executive secretary, Marine Safety Council (G-LRA 2/3406) (CGD 93-041), Coast Guard headquarters, or may be delivered to room 3406 between 8 a.m. and 4 p.m., Monday through Friday, except for federal holidays. Telephone: (202) 267-1477.

For further information, contact: Ms. P.L Carrigan, Marine Technical and Hazardous Materials Division (G-MTH-3), room 1308, Coast Guard headquarters. Telephone: (202) 267-4816.

Notice of temporary rules

CGD 93-050, Safety, security zones and special local regulations (33 CFR parts 100 & 165) (September 1).

This document provides required notice of substantive rules adopted by the Coast Guard and temporarily effective between April 1, 1993, and June 30, 1993, which were not published in the *Federal Register*. This quarterly notice lists temporary local regulations, security zones and safety zones, which were of limited duration and for which timely publication in the *Federal Register* was not possible.

Addresses: The complete text of these temporary regulations may be examined in room 3406, Coast Guard headquarters.

For further information, contact: Ms Sheri deGrom, executive secretary, Marine Safety Council at (202) 267-6233 between 8 a.m. and 3:30 p.m., Monday through Friday.

Final rule

CGD 92-015b, Temporary deviations for drawbridge operation requirements (33 CFR part 117) RIN 2115-AE30 (September 1).

The Coast Guard is amending its drawbridge operation regulations to allow for temporary deviations for up to 90 days. Under current regulations, a Coast Guard district commander may authorize a temporary deviation from drawbridge operation requirements for a maximum of 60 days. The additional 30 days will better accommodate seasonal testing and public response surveys, and will provide additional time for a test regulation to be in effect before comments are due on the proposed change and its effectiveness.

DATE: This rule was effective on October 1, 1993.

Addresses: Documents referenced in the preamble are available for inspection and copying at the office of the executive secretary, Marine Safety Council, room 3406, Coast Guard headquarters, Monday through Friday, except for federal holidays. Telephone: (202) 267-1477.

For further information, contact: Ms. Diane Schneider, project manager (G-NBR-1) at (202) 267-0377.

Final rule

CGD 90-052, Requirements for cargo lightering operations (33 CFR part 156) RIN 2115-AD68 (September 15).

The Coast Guard is amending the applicability sections of its safety and pollution prevention regulations to make it clear that regulations issued under section 311(j) of the Federal Water Pollution Control Act apply to offshore lightering operations. This rulemaking also establishes what constitutes acceptable evidence of compliance with these requirements. This rule will clarify the applicability of Coast Guard pollution prevention regulations to offshore lightering.

Effective date: October 15, 1993.

Addresses: Unless otherwise indicated, documents referenced in this preamble are available for inspection or copying at the office of the executive secretary, Marine Safety Council (G-LRA/3406), Coast Guard headquarters between 8 a.m. and 3 p.m., Monday through Friday, except federal holidays.
Telephone: (202) 267-1477.

For further information, contact: LT Jonathan Burton, Office of Marine Environmental Protection (G-MEP). Telephone: (202) 267-0426.

Proposed rule

CGD 91-211, Five-year term of validity for certificates of registry and merchant mariner's documents (46 CFR parts 10 and 12) RIN 2115-AD92 (September 16).

The Coast Guard is proposing regulations to implement the provisions of the Oil Pollution Act of 1990 (OPA 90) that require certificates of registry and merchant mariner's documents to be renewed every five years. A five-year renewal period will allow the Coast Guard to ensure that vessel personnel continue to be qualified to operate a vessel safely. A schedule is proposed for renewing existing certificates and documents. Proposed user fees for renewals also are included.

DATE: Comments must be received by November 15, 1993.

Addresses: Comments may be mailed to the executive secretary, Marine Safety Council (G-LRA/3406) (CGD 91-211), Coast Guard headquarters, or may be delivered to room 3406 between 8 a.m. and 3 p.m., Monday through Friday, except for federal holidays.
Telephone: (202) 267-1477.

Comments on collections of data requirements must also be mailed to the Office of Information and RegulatoryAffairs, Office of Management and Budget, 725 17th Street, N.W., Washington, D.C. 20503, ATTN: Desk Office, U.S. Coast Guard.

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

For further information, contact: Mr. James W. Cratty, project manager, OPA 90 staff, between 7 a.m. and 3:30 p.m., Monday through Friday, except federal holidays. Telephone: (202) 267-6742.

Correction

In the last issue of *Proceedings*, the telephone number for CDR Adan Guerrero (G-MVI) should have been listed as (202) 267-1094 for information on the National Offshore Safety Advisory Committee (NOSAC).

IMO committee and subcommittee
REPORT CARDS

IMO at work.

Maritime Safety Committee

By Mr. Joseph J. Angelo

After the ceremonial bell ended the 62nd session of the Maritime Safety Committee of the IMO on May 28, 1993, various delegation members informally summarized the accomplishments of a week of long, intense hours of negotiations. Despite many disagreements during the session, everyone considered it to be one of the most productive IMO meetings in recent memory.

A major focus was on increasing the awareness of ship owners, operators, classification societies, flag and port states of their responsibilities to improve ship safety. During the session, committee deliberations resulted in the approval of resolutions, guidelines, circulars and one code in eight major areas. Many of these actions were United States initiatives coming to fruition, which made the session most rewarding for the head of our delegation, RADM A. E. "Gene" Henn.

Major accomplishments Significant actions of the session included:

1) A resolution on guidelines to assist flag states, which was proposed by the United States. One of its main objectives is to ensure that senior maritime officials in developing countries are aware of the guidelines, so they can better carry out their flag-state responsibilities.

2) A resolution on guidelines authorizing organizations acting for administrations. Developed by the new Flag State Implementation Subcommittee, the resolution provides flag states with guidelines in delegating their convention responsibilities.

3) A resolution of guidelines for improved oil tanker and bulk carrier surveys. This was generated by concern on behalf of committee members for existing aging tanker and bulk carrier fleets, and the need for more thorough inspections of these ships.

4) A resolution on guidelines for port-state control of operational convention requirements. This will significantly strengthen IMO port-state control procedures to a level more comparable to that of the Coast Guard.

5) The International Safety Management Code aimed at ensuring that shipowners take their full share of responsibility for safe ships. This code will eventually be mandatory under SOLAS.

6) A code for the carriage of irradiated nuclear fuel, plutonium and high level radioactive wastes in flasks on board ships provides recommendations for the safe carriage of these materials.

7) A secretary-general's working group report on the problems of piracy in the Strait of Malacca between the Malay peninsula and the island of Sumatra in Southeast Asia. The United States was a key player in the working group, which developed specific recommendations to curb piracy in this area as well as in other locations around the world.

8) A proposal by the secretary-general to convene a one-day joint session of the Maritime Safety Committee and the Marine Environmental Protection Committee to review current safety and pollution issues.

Other issues

The committee approved a number of other important issues, including:

1) an intact stability code for all types of ships;

2) resolutions on tonnage measurements;

3) recommendations for entering cargo tanks;

4) resolutions on requirements for emergency position indicating radio beacons (EPIRBs);

5) interim standards for ship maneuverability;

6) draft SOLAS amendments on emergency towing arrangements for tankers;

7) draft amendments to the International Convention on Standards of Training, Certification and Watchstanding for Seafarers on special training requirements for tanker personnel; and

8) guidelines for low-location lighting on passenger ships.

Future issues

Major issues to be addressed during sessions to come include:

1) revisions to the Convention on Standards of Training, Certification and Watchstanding for Seafarers to update it with recent technologies and procedures;

2) adoption of SOLAS amendments to:

a) make the International Safety Management Code mandatory,

b) introduce a new chapter on high-speed craft,

c) make the enhanced program of survey for tankers and bulk carriers mandatory, and

d) add operational requirements for port-state control;

3) closer examination of the human element factor in reducing maritime casualties;

4) monitoring IMO convention enforcement; and

5) improving the implementation of existing IMO conventions.

Cargo operations are safer due to IMO actions.

Photographs courtesy of IMO.

Summary

The 62nd session of the Maritime Safety Committee took significant strides forward to improve many important aspects of ship safety. We expect future sessions to be equally productive.

Mr. Joseph J. Angelo is the associate program director of the Office of Marine Safety, Security and Environmental Protection.

Telephone: (202) 267-2970.

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Marine Environmental Protection Committee

By LCDR Mark McEwen

Harmful organisms carried in ballast water, draft codes on the carriage of irradiated nuclear fuel and guidelines for the construction of double-hulled oil tankers were among the topics addressed by the Marine Environmental Protection Committee at its 34th session, July 5 to 9, 1993.

This session

Major committee achievements included:

- approval of a draft code on the carriage of irradiated nuclear fuel, plutonium and high-level radioactive wastes in flasks aboard ships. This code became the subject of heated controversy because of a shipment of plutonium from France to Japan in 1992. A Japanese vessel transported a cargo of irradiated nuclear fuel to be used in domestic electricity production, and concerns were raised about shipping such a deadly cargo. A joint IMO/International Atomic Energy Administration work group developed new guidelines which were adopted by the committee.

  agreement to consider drafting a new MARPOL annex to cover the introduction of harmful marine organisms in ballast water. The introduction of non-native species can devastate a country's environment and economy. (Damage estimates resulting from the introduction of zebra mussels into the Great Lakes go as high as $5 billion. Also ballast water infected with cholera was introduced into shellfish beds in Mobile, Alabama.) IMO has approved guidelines for controlling the problem, but no final solution has been arrived at.

MARPOL 73/78 aims to stop accidental oil pollution.

- approval of guidelines for tougher inspection standards for existing oil tankers and bulk carriers.

- endorsement of a three-day workshop at the 35th session of the committee to promote ratification of the International Convention on Oil Pollution Preparedness, Response and Cooperation. This convention would provide for a worldwide oil spill response network through which nations could share training, technical expertise, personnel and resources. The workshop will inform potential parties to the convention of its requirements and benefits.

Next session

The 35th session of the committee will be held from March 7 to 11, 1994, at IMO headquarters. New topics to be addressed include

- the IMO implementation of agenda 21, a blueprint for international environmental protection into the next century, which was developed at the United Nations Conference on Environment and Development held in Rio de Janeiro, Brazil, in June 1992.

- whether new measures should be adopted to control the use of tri-butyl tin, an extremely toxic additive to certain types of anti-fouling paints, which has been documented as a source of developmental defects in some shellfish.

- the final approval of a comprehensive manual on ship-generated waste reception facilities.

Photograph courtesy of IMO.

LCDR Mark McEwen is a policy analyst in the Environmental Coordination Branch of the Marine Environmental Protection Division.
Telephone: (202) 267-0423.

New Flag State Implementation Subcommittee

By CDR John Holmes

Faced with a public outcry concerning vessels seeking flags of convenience, irresponsible classification societies and substandard ships, the IMO knew that the time for business as usual had passed. Member countries realized that to maintain credibility, the organization must ensure that the standards it develops are enforced. IMO must also address issues affecting countries as registrars of vessels (flag state responsibilities), and also as enforcement authorities for foreign vessels in their ports (port state responsibilities).

Consequently, the new Flag State Implementation Subcommittee was established at the 61st session of the IMO Maritime Safety Committee in December 1992 to:

A) decrease substandard ships;
B) raise standards of flags of convenience and substandard classification societies;
C) increase and standardize port state enforcement efforts and surveyor training; and
D) collect and analyze data identifying new areas needing attention.

The first meeting of the new subcommittee took place from April 19 to 23, 1993, at IMO headquarters in London. The following actions were taken:

- Written guidelines were developed for flag states to follow when enforcing international treaty obligations concerning ship safety and pollution prevention. They provide procedures for program administration, delegation of authority to classification societies and other entities, and program oversight and accountability. The guidelines also provide procedures for countries to follow to establish, administer and document an enforcement program for vessels registered under their flags.

- Other written guidelines set minimum standards for classification societies and other organizations authorized by countries to fulfill survey responsibilities under international treaties. These guidelines provide evaluation standards to measure training, structure and technical capabilities of an organization to determine its ability to assume these delegated responsibilities.

- A group was established to develop the IMO's data and casualty analysis program, and approval was requested for the IMO to set up an international data base.

This new subcommittee will develop international standards for inspections.

- Detailed written guidelines set minimum standards for operational testing to be conducted as a part of port-state control boardings of foreign flag vessels.

- A correspondence group was established to combine existing international guidance on port state control into a manual for countries to follow in program administration and surveyor training.

The next subcommittee meeting is scheduled for January 31 through February 4, 1994.

The creation of this subcommittee demonstrates IMO's willingness to involve itself in policy issues and to provide a forum for open discussion of flag and port state matters. It is also indicative of the critical role IMO will play in the future of maritime safety and environmental protection.

CDR John Holmes is chief of the Compliance and Enforcement Branch of the Merchant Vessel Inspection and Documentation Division.

Telephone: (202) 267-1464.

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Subcommittee on Bulk Chemicals

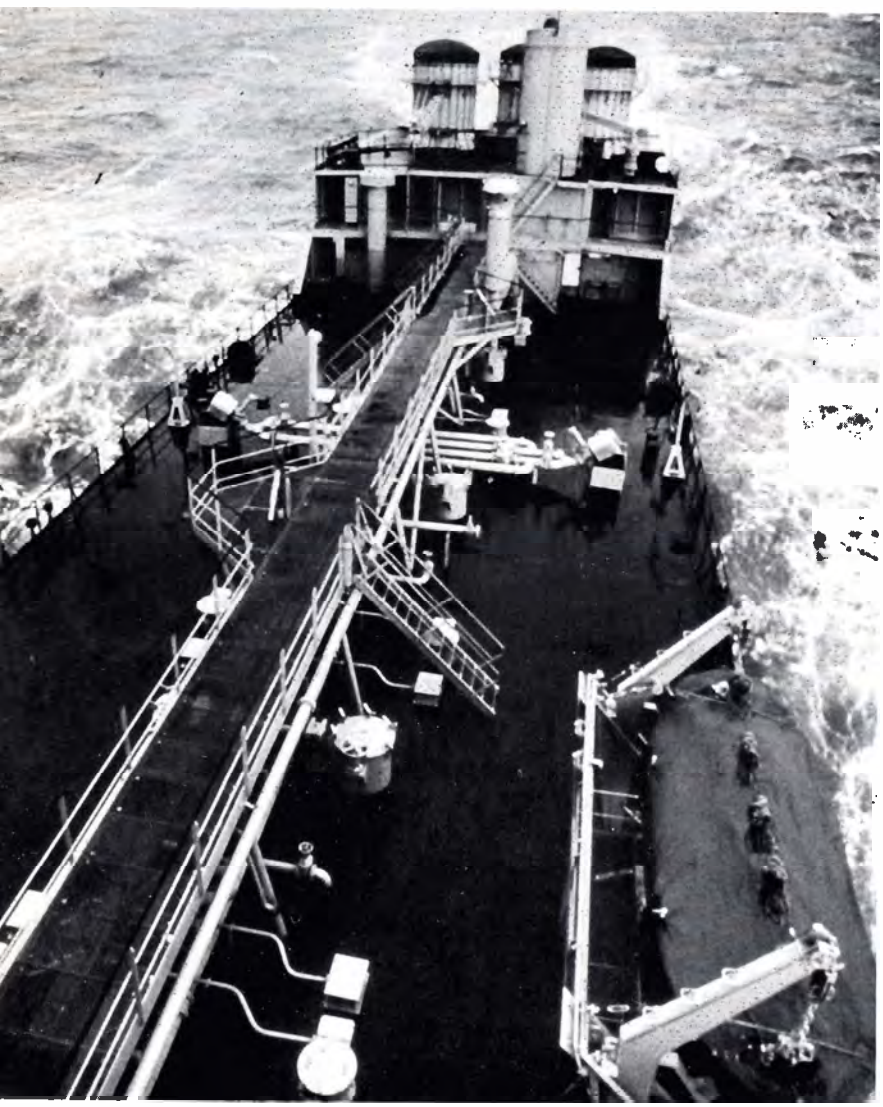
By Dr. Michael C. Parnarouskis and CDR Kevin J. Eldridge

Established by the IMO in 1976, the Subcommittee on Bulk Chemicals considers safety measures regarding the handling and transport of hazardous liquid and liquefied gaseous substances in bulk in tankers, barges and other vessels; and develops standards and recommendations to ensure the safe transport of these substances.

Accomplishments

The subcommittee accomplished the following at its 22nd session in September 1992.

A bulk liquid chemical carrier.



1) Safety and pollution hazards.
A working group evaluated and classified a number of chemical cargoes which were forwarded to and approved by the Maritime Safety Committee for listing in the Chemical Codes. The same group also updated the Marine Environmental Protection Committee's circular on tripartite agreements of provisionally classified new cargoes and revised guidelines for assessing the cargoes. (Cargoes are provisionally classified before all necessary data is received for a final assessment.)

2) Air pollution from ships.
The subcommittee was granted two years to develop what is envisioned as a new annex to MARPOL 73/78 that will address the prevention/minimization of air pollution from ships. The subcommittee set up two correspondence groups; one to evaluate whether a regional or global approach should be applied for sulfur oxide emissions, and the other to focus on technical requirements for new engines to deal with nitrogen oxides.

3) Tank washing standards.
A working group was convened to consider papers on prewash procedures under Annex II of MARPOL 73/78. Agreeing to use an approach proposed by Norway, a correspondence group was formed to develop guidelines to determine the effectiveness of prewash procedures proposed by Norway.

4) Cargo tank filling limits.
A drafting group was convened to consider papers on new gas carrier tank filling limits. A United States proposal to revise chapter 15 of the Gas Code to allow an increase in filling limits for certain types of tanks was accepted by the subcommittee and sent to the Maritime Safety Committee for adoption.

5) Expansion of Oil Pollution Preparedness, Response and Cooperation Convention.
The subcommittee agreed that the convention should be expanded to include chemicals covered in Annex II of MARPOL 73/78 and the chemical codes.

Residues from tank cleanings must be discharged into reception facilities, according to MARPOL 73/78.

Future items

The following will be addressed at the next session of the Subcommittee on Bulk Chemicals to be held from September 13 to 17, 1993.

1) Annex II to MARPOL 73/78.

Discussions on interpretations of the amended annex will aim at ensuring that the level of protection it established against marine pollution is maintained.

2) Chemical safety and pollution hazards.

The subcommittee will continue to review the safety and pollution hazards of chemicals proposed for bulk shipment and set appropriate requirements for their transportation. When substances have not been evaluated by the IMO, Annex II regulations specify an interim method for individual countries to agree on shipping requirements (tripartite process). To reduce the need for this time-consuming procedure, the subcommittee strives to update the various chemical lists and tables at each session.

3) Solvent washing and recycling hazards.

The subcommittee will continue to review chemical tanker solvent washing and recycling techniques that have increased due to Annex II of MARPOL to determine potential hazards and assess the need for industry standards or more formal IMO recommendations.

4) Oil Pollution Preparedness, Response and Cooperation Convention.

The subcommittee will continue efforts to expand the scope of this convention to include hazardous and noxious substances carried in liquid bulk form. This should result in a draft amendment to Annex II of MARPOL 73/78 to require ships carrying hazardous and/or noxious liquid cargoes to have marine pollution emergency plans similar to those required for the carriage of oil.

5) Air pollution from ships.

A work group will address issues dealing with regional versus global control of emissions, methods to reduce nitrogen oxide and sulfur oxide emissions from marine engines, and fuel oil quality as it relates to air pollution.

Photos courtesy of IMO.

Dr. Michael C. Parnarouskis is the chief of the Bulk Cargo Section of the Hazardous Materials Branch of the Marine Technical and Hazardous Materials Division. CDR Kevin J. Eldridge is chief of the Hazardous Materials Branch.

Telephone: (202) 267-1217.

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Subcommittee on the Carriage of Dangerous Goods

By Mr. Emmanual P. Pfersich and LCDR Phillip C. Olenik

The primary responsibility of the Subcommittee on the Carriage of Dangerous Goods is the International Maritime Dangerous Goods Code, which is used throughout the world by shippers and carriers of dangerous goods and marine pollutants.

Amendment 27

At its last session in October 1992, the subcommittee finalized Amendment 27 to the code. Expected to be effective on January 1, 1995, this amendment is extensive, affecting provisions throughout the code. It is especially important because it is consistent with the United Nations recommendations on the transport of dangerous goods, which facilitates transportation as well as safety.

Deck of a product carrier.

Significant changes reflected in Amendment 27 include:

- clarification and expansion of the provisions for dangerous goods in limited quantities;
- more flexible mechanism for dealing with marine pollutants;
- new provisions for transporting solid dangerous substances in portable tanks; and
- new entries for transporting motor vehicles and fumigated freight containers.

Other measures

Other measures developed by this subcommittee include the Emergency Procedures and the Medical First Aid Guide. The Emergency Procedures provide ship masters advice on immediate actions to be taken when an incident involving dangerous goods occurs. Recommendations on special emergency equipment are also included. The first aid guide provides advice on the diagnosis and treatment of chemical poisoning within the limits of shipboard facilities.

The subcommittee also works with other IMO groups on guidance on reporting procedures, packing of cargo transport units, the use of pesticides in ships, port safety recommendations and guidelines for open-top container ships.

Issues to be addressed at the subcommittee's next session in January 1994 include revisions to port recommendations on the transportation, handling and storage of dangerous goods, risk analysis of on-deck stowage of marine pollutants, revision to SOLAS regulations II-2/53 and 54, development of a circular dealing with hazardous ships' stores, amendments to the Emergency Procedures and the Medical First Aid Guide, and amendments to the provisions for portable tanks.

Mr. Emmanual P. Pfersich is chief of and LCDR Phillip C. Olenik is a chemical engineer with the Packaged Cargo Section of the Hazardous Materials Branch, Marine Technical and Hazardous Materials Division.

Telephone: (202) 267-1577.

The Morro Castle burned at sea in 1934. . . long before IMO's fire protection measures were passed.

Subcommittee on Fire Protection

By Ms. Marjorie Murtagh

The Subcommittee on Fire Protection first met in December 1964. It was established to collect, analyze and design fire-test procedures; to make recommendations on internationally applicable safety measures for tankers; to analyze information on shipboard casualties caused by fire; to study research results to develop international standards; and to review fire protection on existing passenger ships to recommend simple, practical steps to improve fire safety on these ships.

One of the subcommittee's most significant achievements was the passage of the fire safety amendments for existing ships in May 1992 and for new passenger ships in December 1992. The new requirements will begin to take effect on October 1, 1994. Ultimately, all passenger ships will have to meet these requirements, which include sprinkler systems, smoke detectors, improved fire monitoring and reaction methods, and better ways to guide and protect escaping passengers.

The 39th session of the subcommittee will meet in June 1994. Important issues to be addressed include: fire test procedures, the role of the human element, tanker safety, halon alternatives and uniform interpretation of regulations.

Uniform interpretations

In chapter II-2, of SOLAS, the term "to the satisfaction of the administration" or similar language appears more than 200 times. The subcommittee concurred that the vast majority of vague phrases should be replaced by agreed on international interpretations.

Human element

The reaction of crews and the condition of equipment ultimately determines the outcome of an emergency. Only by thorough advance preparation, will people be able to do their jobs effectively with reliable equipment. A working group has drafted guidelines on the maintenance of fire detection, alarm, fire-fighting and suppression systems.

Fire test procedures

Having established test procedures for fire safety divisions, deck coverings and interior finish, the subcommittee working group is now focusing on smoke and toxicity, heat radiation through glass partitions, minimum fire load criteria, plastic pipe test methods, requirements for fire-restricting materials aboard high-speed craft, tests for alternative water-based fire-fighting systems, and an international network of test laboratories.

Tanker safety

Although amendments have been passed requiring inert gas dearation of ballast tanks and double hull spaces on ships built after October 1, 1994, the Maritime Safety Committee recognized the need to further study safety aspects of alternative arrangements for existing oil tankers. The subcommittee is now considering fire safety aspects of inert gas dearation, vapor recovery systems, and human factors concerned with tanker operation and maintenance.

Halon alternatives

Because of their detrimental effect on the ozone layer, no new installations of halon will be permitted aboard SOLAS vessels after October 1, 1994. Seeking alternative systems, a working group has drafted a fire-test method for water-based fire-extinguishing systems for machinery spaces and cargo pump rooms of oil tankers.

Ms. Marjorie Murtagh is chief of the International Fire Protection Section, Ship Design Branch, Marine Technical and Hazardous Materials Division.
Telephone: (202) 267-2997.

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Subcommittee on Lifesaving, Search and Rescue

By Mr. Robert L. Markle and Mr. Kurt J. Heinz

Unlike the other IMO subcommittees which focus on ways to prevent casualties at sea or reduce their impact, the Subcommittee on Lifesaving, Search and Rescue is concerned with what happens when everything goes wrong and the ship must be abandoned. The subcommittee brings together experts on merchant ship lifesaving systems, and representatives of the world's major search and rescue organizations to develop the best possible methods of saving lives during and after emergencies at sea.

The subcommittee is responsible for Chapter III of the SOLAS Convention, "Lifesaving Appliances and Arrangements." SOLAS was initiated in 1914, two years after the sinking of the *Titanic*, and ship lifesaving system requirements have always been a part of this treaty.

The subcommittee also prepared an IMO Recommendation on Testing of Lifesaving Appliances, which unified many different national approval requirements for equipment. The first edition was approved in November 1983.

A standing work group on search and rescue developed the 1979 International Convention on Maritime Search and Rescue, which establishes a global maritime plan and covers ship reporting systems, search and rescue services, and rescuing individuals at sea.

The subcommittee also maintains the IMO Merchant Ship Search and Rescue Manual, and the IMO Search and Rescue Manual. The former contains search and rescue guidance for mariners, and the latter provides information on the operation of search and rescue services.

A free-fall lifeboat is launched over the stern of a ship during installation testing.

Recent accomplishments

The following measures were accomplished at the last session of the Subcommittee on Lifesaving, Search and Rescue in February 1993.

Recommendation revisions

Several technical revisions were made to the Recommendation on Testing of Lifesaving Appliances. One will reduce the time required for production inspections of inflatable liferafts by shortening the leakage test from six hours to one.

Chapter III amendments

A number of proposed amendments to SOLAS Chapter III were agreed upon, including those dealing with the development of performance requirements for the following: marine evacuation systems; anti-exposure work suits for rescue boat crews and marine evacuation system parties; and single-fall versus multiple-fall davit-launching gear. Another requirement to evaluate the compatibility of lifejackets with lifeboat seating arrangements was also agreed upon. The amended Chapter III will be completed during the subcommittee's next session in April 1994.

Free-fall lifeboat circular

A Maritime Safety Committee circular on evaluating free-fall lifeboat launch performance was prepared by the United States and cosponsored by the Netherlands, Germany and the United Kingdom. This comprehensive document should promote uniformity in certification testing of free-fall lifeboats.

All new inflatable liferafts undergo leakage tests.

EPIRB resolution

A resolution was completed on the establishment, updating and retrieval of information contained in registration databases of satellite Emergency Position Indicating Radio Beacons (EPIRBs). This information allows search and rescue authorities to find out which ship's beacon is sending distress signals. It also helps the authorities to decide whether a signal is a false alarm or a real emergency. A requirement was also agreed on for a 121.5 MHz homing frequency on these beacons so that they can be located more easily.

SAR services

Progress was made on ensuring that search and rescue services are provided in ocean regions worldwide. There are still small "holes" in their coverage.

IMO/ICAO meeting

Plans got underway for the first meeting of the new IMO/International Civil Aviation Organization joint working group on the harmonization of aeronautical and maritime search and rescue procedures.

Emergency instructions

United States proposals to provide ship passengers with simple yet complete emergency instructions was adopted by the subcommittee. The instructions would provide clear definitions of muster and embarkation stations, and a simplified escape scenario guiding passengers to muster stations for assistance to survival craft embarkation stations. Pictorial symbols were also developed for further clarification.

Approval system

An international equipment approval system was discussed which could save time and money for ship owners, equipment manufacturers and national maritime safety administrations, such as the Coast Guard.

Liferaft servicing

The United Kingdom, Denmark and Germany made a joint proposal to transfer responsibility for inflatable liferaft servicing approval and oversight from a ship's flag state to the country where the servicing facility is located. The United States opposes this measure because low standards of some foreign facilities could result in liferafts that don't work properly in emergencies. The matter will be raised again at the subcommittee's next session.

Mr. Robert L. Markle is chief and Mr. Kurt J. Heinz is a staff member of the Survival Systems Branch of the Merchant Vessel Inspection and Documentation Division.

Telephone: (202) 267-1444.

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Subcommittee on Ship Design and Equipment

By CDR James A. Stamm

The Subcommittee on Ship Design and Equipment is involved in all actions affecting the design and maneuverability of ships, shipboard engineering systems, new technology emphasizing safety and a clean environment, new piping system and ship structure materials, and technology to reduce oil spill potential.

Recent accomplishments

Significant actions taken at the last subcommittee session in February 1993 included:

Ballast tank coating

Draft amendments to SOLAS 1974 concerning coating requirements for ballast tanks was approved and submitted to the Maritime Safety Committee for adoption. A correspondence group will prepare guidelines on the selection, application and maintenance of protective coatings of dedicated seawater ballast tanks.

Emergency towing requirements

It was agreed that emergency towing requirements for tank ships be changed so that towing equipment would be pre-rigged and capable of rapid deployment from both the bow and the stern of tank ships above 20,000 deadweight tons. The current Assembly resolution only applies to tank ships above 50,000 deadweight tons. It was recommended that the Maritime Safety Committee treat this as an urgent matter.

Human element in casualties

A correspondence group to consider the role of the human element in marine casualties was set up. One aspect is the technical physical design and layout of the vessel and its equipment. The other is the role of proper documentation and adherence to appropriate operation, maintenance and repair procedures in relation to training and watchstanding.

Construction standards

Discussions continued regarding the adoption of a standard for vessel construction. Host flag states refer to or require compliance with the structural requirements of a classification society. However SOLAS regulations do not address the suitability of the various structural standards used by the societies. Minimal structural standards are considered important.

High-speed craft passenger ferry passes under the Tower Bridge on the Thames River, London.

High-speed craft code

A new high-speed craft code is being developed. In addition, it was agreed to pursue the option of establishing a new SOLAS chapter to provide basic regulations referring to the high-speed craft code. SOLAS 1974 will serve as the benchmark for the level of safety to be achieved.

Maneuverability standards

A draft of new maneuverability standards was forwarded to the Maritime Safety Committee as a recommended Assembly resolution.

Future agenda

The next session of the Subcommittee on Ship Design and Equipment will be held from February 14 to 18, 1994.

Continuing topics of discussion will include maneuvering standards, the high-speed craft code and the role of the human element in marine casualties.

New topics will include the use of compressed air systems for buoyancy and the structural aspects of on-board use of composite materials.

CDR James A. Stamm is chief of the Engineering Branch of the Marine Technical and Hazardous Materials Division.

Telephone: (202) 267-2206.

ıving a safety net through vessel inspection

'he surface-effect ship Super Mexico. **Photograph by Ensenada Express.**

By LCDR Michael de Bettencourt and CDR George F. Wright

This article describes the process used by Marine Safety Office (MSO) San Diego in examining two unusual passenger ships, along with some technical problems encountered. The Coast Guard inspection of these ships required an inordinate amount of coordination with the flag state, classification society, vessel owners and crew. This comprehensive approach in effect placed a complete "safety net" around the operation of these ships.

Background

Known as "surface-effect ships," these passenger vessels are unique combinations of catamaran ıulls and hover craft. A rubber seal aft and rubber fingers" forward keep a cushion of air trapped between he catamaran hulls. The trapped air causes the vessel ɔ rise up, placing less hull surface below the water, llowing for greater speed.

The vessels are Norwegian with an eight- erson American and Norwegian crew. Operating etween San Diego, California, and Ensenada, Mexico, ney each carry 310 passengers. The 60-mile route akes about two hours to cover, at between 37 and 3 knots offshore, and slower in the harbors.

The surface-effect ships are built light, vith the hull structure, machinery, structural fire rotection and lifesaving equipment all constructed vith weight conservation in mind. Because of this, ertain trade-offs are accepted in lieu of built-in afety features.

The IMO's rules for dynamically-sup- orted craft permit a departure from the traditional uilt-in protection in favor of operational controls, vailability of rescue resources and the ability to apidly evacuate the craft. The ships are only required to carry enough liferafts for all passengers and crew. No lifeboats are required. In addition, the structural fire protection around the machinery spaces allows for 30 minutes, instead of the traditional 60 minutes, resistance to fire, permitting lighter vessel "scantlings."

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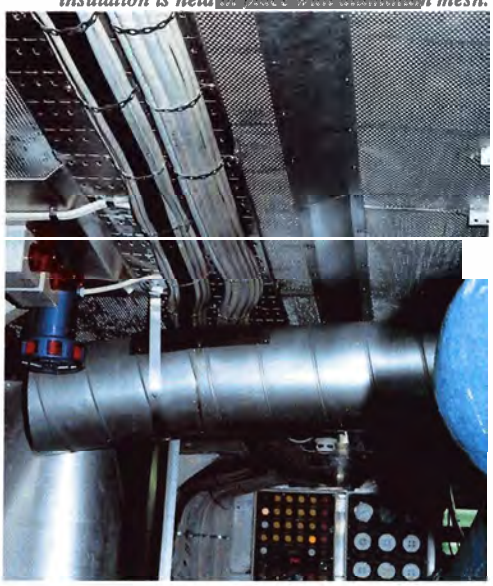
When on the air cushion, there is only about 18 inches of hull in the water. There is little wake at high speed.

Operating compartment for navigating crew and chief engineer.

Main passenger seating area.

Machinery space overhead. Fire resistant insulation is held in place with aluminum mesh.



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To account for the lesser level of inherent safety built into the vessel, these ships must:

- **be able to be evacuated quickly;**
- **operate on short routes with rescue resources nearby;**
- **have extremely reliable communications and distress signaling ability; and**
- **have a comprehensive management scheme addressing machinery maintenance, crew training and vessel operations.**

Constructed of aluminum, these two nearly identical surface-effect ships were built in Norway by Westamarin in 1989. They are powered by two diesel engines with controllable pitch propellers, with lift provided by four diesel powered fans.

Neither vessel had been operated after construction, having been placed in storage. This means that they are essentially prototypes with no history of operation by which to evaluate hull or machinery performance.

The hazards inherent in a light-weight, high-speed vessel are unique. In addition to the usual risks of fire and flooding, the designers and operators must contend with rapid deceleration, hull damage from striking floating debris, and hull stresses associated with a high-performance, high-speed vessel. It doesn't take much imagination to visualize the disastrous consequences of a surface-effect ship colliding with another vessel at 40 knots.

The problem

MSO San Diego realized that the unusual nature of these ships required a different approach to compliance. The dynamically-supported craft code is confusing, vague and often open-ended with terms such as "suitable" or "satisfactory" used to describe compliance standards. It was decided to approach the problem systematically, dividing the task into three parts.

1- The history of the vessels was researched and discussed with other Coast Guard personnel experienced in high-speed craft and key areas of concern were identified.

2- All other key players involved in the vessels' safety were identified including the owners, crew, classification society and the flag state. Concerns were discussed with each informally, building a framework for cooperation and open communication.

3- Several meetings were held to discuss collective concerns and to set the examination schedule.

MSO San Diego coordinated the efforts of the flag state (Norwegian Maritime Directorate), the vessel owners, the port state (Coast Guard) and the classification society (Det Norske Veritas). Weaving such a management and regulatory safety network including all vital players in the operation and oversight of the vessels required a good deal of effort. Logistics involving widely spaced geographic locations of some of the key players to addressing each entity's specific interests had to be resolved. The Coast Guard also had to understand the needs of the owners in terms of examination scheduling, crew requirements and financial limitations.

Coast Guard perspective

The Coast Guard Marine Safety Center in Washington D.C. completed the preliminary plan review for the vessels in 1992. The center was particularly interested in the structural fire protection construction and the ability of the crew to evacuate the passengers quickly.

MSO San Diego was concerned with the condition of the vessels, their operating procedures, machinery maintenance schedule and management. In addition, assurance was needed that:

- the ships were maintained properly;
- the crew was trained adequately;
- the company had rescue capabilities; and
- the vessels could communicate effectively

while in operation.

Examination

A key part of the examination was the evacuation test. The length of time it takes to evacuate determines the amount of fire protection built into the vessel structure. The regulations for dynamically-supported craft specify that a vessel with a 30-minute structural fire protection rating must be evacuated in seven minutes and 40 seconds. Should the test take longer, the vessel would have to be redesigned for quicker egress, or the fire rating would have to be increased.

The top priority was set on assuring that the evacuation procedure be completed safely. Steps involved in the evacuation test included an elaborate safety plan, crew job descriptions, passenger loading and departure, liferaft deployment and a video record of the event.

The emergency escape test was conducted in March 1993. The Coast Guard marine inspectors witnessed a demonstration that simulated a fully-loaded condition, using 50 percent of the passenger capacity. The test procedure limited the egress routes, crew participation, liferaft deployment and other variables to lend realism and assure safety for the participants.

The abandon ship signal started the clock. Seven minutes and 40 seconds later, all 155 passengers and six crew members were in the liferafts. The passengers had four inflatable liferafts which were launched shortly after the abandon ship signal. The clock was stopped when the last crew member had entered a liferaft.

The next major obstacle for the inspectors was to verify that the structural fire protection of the vessels was satisfactory. The owner submitted certificates for structural fire testing stating that the bulkheads and decks met international standards for fire resistance. This certification alone did not demonstrate full compliance with United States standards. The international standards do not consider the condition of the test structure after exposure to fire, but only measure the ability of the structure to withstand the spread of flame. United States standards require some level of structural integrity after the test.

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Wide aisle leads to evacuation door.

Liferaft is released by releasing hold-down straps.

Rafts are deployed.
Small floats ease recovery of case halves.

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The difficulty was in identifying the test method, and then applying the quantified results against an acceptable United States aluminum structure standard. The technical data on the test specimens (material thickness, insulation construction materials, testing methods and results) were compared with the standards found in the Society of Naval Architects and Marine Engineers Aluminum Fire Protection Guidelines (SNAME Technical and Research Bulletin 2-21).. Several machinery space insulation panels were removed to verify condition, insulation thickness, and assure that the structural fire plans matched actual conditions.

Fuel piping was verified as double-wall construction, and lubrication oil piping was evaluated for fire safe installation. Inspectors looked for fire hazards normally associated with piping systems, including vibration-dampened mounting, expansion loops and hard attachment points which might damage the pipe.

Another area of concern unique to high-speed vessels is the ability of the passenger accommodations to withstand dynamic deceleration forces. A few years ago, a European surface-effect ship hit a reef while going 36 knots. In that accident, two people were killed and 74 injured. Many injuries were sustained when the seats, cabinets, shelves and glass in accommodation spaces came loose at the time of impact.

Because of this concern, substantial securing measures were required for some cabinets. Additionally, cabinet glass had to be shown to be safety glass. Mirrors (not made of safety glass) mounted on columns were removed to evaluate the mounting methods and secure a reasonable expectation that the glass would not break loose and injure a passenger.

Crew proficiency in assuring passenger safety was extensively tested. Crew performance during fire, man-overboard, abandon-ship and machinery casualty drills was carefully evaluated. Any problems were corrected until all drills were completed effectively.

Because the safety of the vessels relies so heavily on communication over their entire routes, the owner was required to install a radio base station which is attended at all times the vessels are underway. The vessels were equipped with two VHF radios, a single side-band radio and a cellular phone. The Coast Guard also required portable radios for each crew member to facilitate fire fighting and abandon ship procedures.

A comprehensive operations manual, a management plan for the company and the ships, was thoroughly reviewed. Vessel operation, emphasizing equipment maintenance schedules, crew training, standing orders for the crews and contingency plans for most conceivable problems were studied closely.

Three of four rafts inflated in about a minute. The fourth took about two minutes to fully inflate.

Although ladders were available for boarding, many test volunteers jumped down about four feet to the raft floor.

All personnel were in the liferafts in seven minutes and 40 seconds after the abandon ship signal.

Ongoing process

Once the Coast Guard was satisfied that the vessels were safe to operate and that all elements of the safety net were intact, an ongoing process of safety performance evaluation was begun. Each interested party has a critical role in assuring that vessels, crews and the management company all perform as expected.

The MSO outlined plans for quarterly examinations of the vessels, emphasizing hull integrity, communications capabilities at sea and crew proficiency. The flag state, classification society, vessel owners, crew members and the Coast Guard all participate in the process.

Conclusion

The examination process for the surface-effect vessels does not follow the traditional inspection approach. Instead of focusing on material conditions, the Coast Guard acts as a facilitator, ensuring that all aspects of vessel operation are considered, and that the government agencies and vessel owners work together weaving a strong safety net around the vessels.

The inspection process is dynamic, with new issues being addressed as they arise. Much is accomplished through ongoing dialogue, which should pay handsome dividends in increased safety for passengers and crews.

LCDR Michael de Bettencourt is chief of inspections and CDR George F. Wright is the commanding officer at MSO San Diego, 2710 N. Harbor Drive, San Diego, California 92101-1064. Telephone: (619) 557-5860.

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