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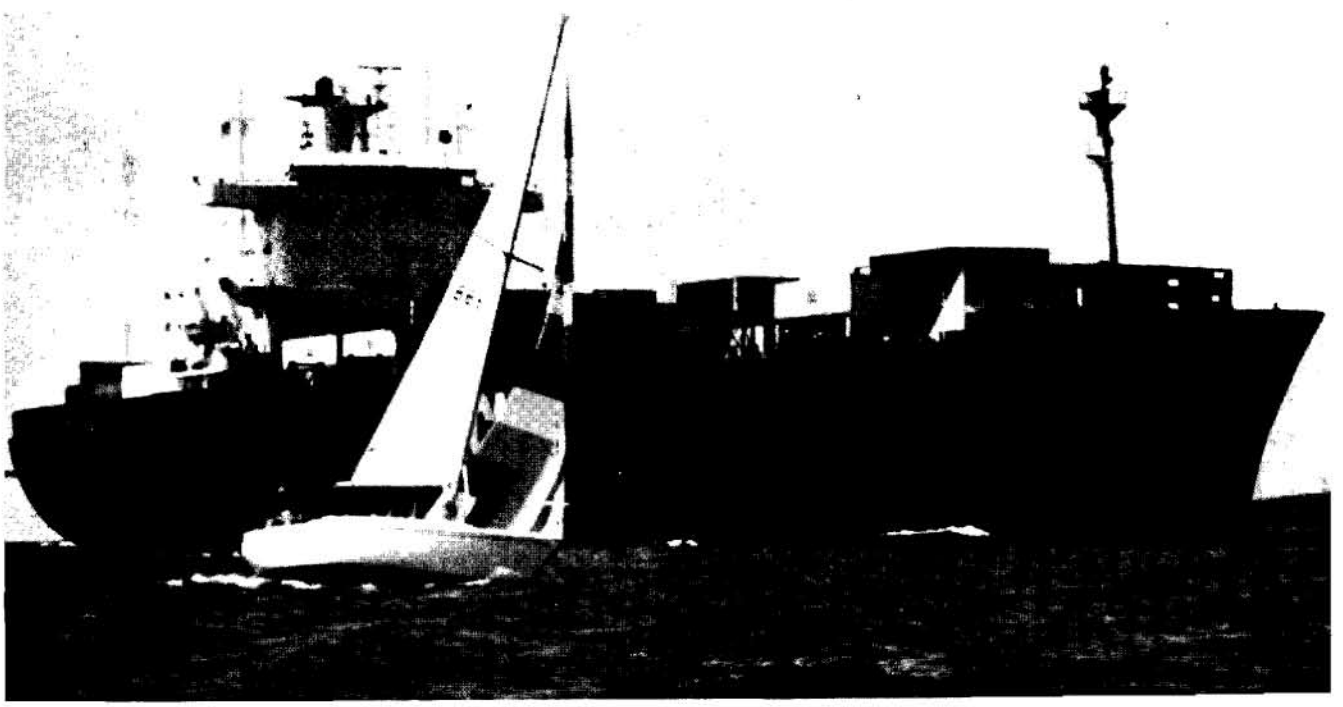

U.S. Department of Transportation
U.S. Coast Guard

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Proceedings
of the Marine Safety Council

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When you have finished reading this issue, please pass it on.

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Pleasure boaters not aware of how fast and under what conditions tows, barges, and ships are traveling can create serious hazards. "Close encounters . . . of a Dangerous Kind" begins on page 185.

Maritime Sidelights

Letters to the Editor

I do believe there is an error in the article on fishing vessels in your May 1981 issue. On page 71 the authors state that there is no formal training program for fishing personnel in the United States. The University of Rhode Island has operated a two-year Associate Degree program in its Department of Fisheries and Marine Technology since 1967. A number of other schools at both the secondary and college level have commercial fisheries training programs as well.

There are also substantial numbers of people operating commercial fishing vessels who have merchant marine, military, or other formal maritime training. I agree that there is a need for increased personnel training, but I also believe that any attempts to accomplish this should start from an adequate understanding of the existing situation.

Richard B. Allen
Wakefield, Rhode Island

Reference is made to the item found in the January/February 1981 issue of "Proceedings of the Marine Safety Council" (page 5, Column 3) regarding SOLAS Regulations Available from Commercial Suppliers. In this article, two vendors are listed.

It was brought to my attention that a third vendor, Baker-Lyman & Co., 308 Magazine Street, New Orleans, Louisiana 70130, also maintains a complete stock of these publications.

Richard A. Block
Houma, Louisiana

MarAd Transferred to Department of Transportation

On August 6, 1981, President Reagan signed H.R. 4074, a bill transferring the Maritime Administration (MarAd) from the Department of Commerce to the Department of Transportation. This organizational change, said the President, will make it possible to see the maritime industry as part of a comprehensive national transportation system. The change is of particular importance in view of the recent innovations in marine transportation that have resulted in greater integration of land and water transportation modes.

Along with the transfer, the President designated the Secretary of Transportation, Drew Lewis, as the Administration's spokesman on maritime matters. This was done so that the problems of the industry might be effectively addressed and in response to a desire frequently expressed by Congress and the industry for a single focal point for maritime matters within the Executive branch.

Municipal Services Take to the Seas

The Maritime Administration has released a two-volume report on the use of "Floating Vessels for Municipal Services."

This study analyzes the future market for floating facilities which could provide or support municipal services and, at the same time, provide potential construction opportunities for private U.S. shipyards. Included are case studies on five concepts which appear to be the most feasible applications. These are:

- waterborne liquefied natural gas regasification terminals
- coal-fired power plants
- trash recycling facilities
- fossil fuel-based desalination plants
- ocean thermal energy conversion (OTEC) power plants

This report covers the second phase of a study on industrial plant vessels prepared by Global Marine Development Corp., Newport Beach, California. A report on the first phase, "Floating Vessels for Industrial Plants," was released in January. In each case, Vol. 1 consists of an executive summary and Vol. 2 of a detailed study. Both reports are available from National Technical Information Service (NTIS), Springfield, Virginia 22161 as follows: Phase I: Vol. 1 (PB-81-154049), $5.00; Vol. 2 (PB-81-154056), $12.50. Phase 2: Vol. 1 (PB-81-209884), $5.00; Vol. 2 (PB-81-209892), $17.00.

A Reminder on Collision Avoidance Equipment Requirements (33 CFR 164.38)

Beginning July 1, 1982, all self-propelled vessels 10,000 gross tons and larger carrying oil or hazardous materials in bulk as cargo or in residue on U.S. waters must be equipped with an Automatic Radar Plotting Aid (ARPA). The purpose of this requirement is to minimize the occurrence of collisions which might result in harm to the environment. The ARPA must meet either the U.S. Maritime Administration's (MarAd's) "Collision Avoidance System Specification" or the Inter-Governmental Maritime Consultative Organization's (IMCO's) "Operational Standards for Automatic Radar Plotting Aids." In the latter case, the U.S. will depart from the IMCO standard by requiring both audible and visual alarms. (IMCO requires audible "and/or" visual signals.) The final rule on ARPA was published in the August 14, 1980, issue of the Federal Register. As the requirement was mandated by Congress in the Port and Tanker Safety Act in 1978, no exemption will be granted for delay past the July 1, 1982, implementation date. Copies of the final rule, including both the MarAd and IMCO specifications, may be obtained by writing Commandant (G-WWM-2), U.S. Coast Guard, Washington, DC 20593.

OCS Safety Project Being Transferred

The Coast Guard's Outer Continental Shelf (OCS) Safety Project, currently under the direction of Captain Peter J. Cronk, will terminate on August 31, 1981. The project was formed in 1977 to coordinate Coast Guard OCS programs with Federal and state agencies, industry, and other Coast Guard program directors. Additionally, the project has been concerned with research, regulations review, revision, and development as mandated by the Outer Continental Shelf Lands Act Amendments of 1978 (OCSLAA '78) and the formulation of Coast Guard policy for the administration of its OCS responsibilities. The project's functions will be transferred to the Merchant Vessel Inspection Division, Offshore Activities Branch, at Coast Guard Headquarters in Washington, DC. After August 31, 1981, information concerning the Coast Guard's role in OCS activities may be obtained by contacting: Commandant (G-MVI-4), U.S. Coast Guard, Washington, DC 20593; (202) 472-5160.

Electronic Position Fixing Equipment to be Required after June 1, 1982

All vessels 1,600 to 10,000 gross tons entering U.S. waters after June 1, 1982, will be required to carry on board either a Loran-C receiver or a hybrid satellite navigation system. Vessels 10,000 gross tons and larger have been required to carry this equipment since June 1, 1980. Loran-C receivers installed after May 31, 1979, must meet the Type I or Type II requirements of the Radio Technical Commission for Marine Services' (RTCM's) "Minimum Performance Standards (MPS) Marine Loran-C Receiving Equipment." Loran-C receivers installed before June 1, 1979, that do not meet the requirements of the MPS are acceptable until June 1, 1982. A copy of the MPS (RTCM paper 12-78/DO-100 dated December 20, 1977) may be obtained by writing RTCM at P.O. Box 19087, Washington, DC 20036. Stand-alone satellite navigation receivers installed before June 1, 1982, capable of automatic acquisition of satellite signals and position updates after each usable satellite pass will be acceptable until June 1, 1985. After June 1, 1985, satellite receivers will be required to have a continual tracking integrated complementary system that automatically provides position updates at intervals of one minute or less between satellite passes. Examples of acceptable complementary systems include satellite-OMEGA, satellite-Loran-C, and satellite-doppler hybrids. (The doppler tracking system used in the satellite-doppler hybrids must be two-axis and capable of tracking the ocean bottom to depths of up to 200 meters.)

The final rule on electronic position fixing equipment was published in the May 31, 1979, issue of the Federal Register and is found in Title 33 of the Code of Federal Regulations, Part 164.41 (33 CFR 164.41). Inquiries should be directed to Commandant (G-WWM-2), U.S. Coast Guard, Washington, DC 20593, Attn.: Tom Falvey.

Pamphlet Tells Whether Charts Have Changed

When shoals form, channels become deeper or shallower, or navigation aids are added or moved, navigation charts must be revised to reflect the changes. Hence, the charts being used by some mariners may be out of date. A free pamphlet published quarterly will tell you whether you have the most recent ones. Copies of "DATES OF LATEST EDITIONS, Nautical Charts & Maps" can be ordered from the following address:

Distribution Division (OA-C44)
National Ocean Survey
Riverdale, MD 20840

NFPA Releases New Handbook on Flammable and Combustible Liquids

The National Fire Protection Association (NFPA) announces publication of a new guide to one of its most significant fire codes, the Flammable and Combustible Liquids Code (NFPA 30).

Released this July, the Flammable and Combustible Liquids Code Handbook is the first reference of its kind to help users of NFPA 30 better understand and apply the Code to their operations. This 260-page reference has a two-color text designed to distinguish the actual Code from explanations and commentary.

The Handbook highlights the special considerations required to ensure proper application of NFPA 30 in tank storage, piping, valves and fittings, industrial plants, refineries, and chemical plants. Also included are four case histories providing practical solutions to common safety problems, as well as the safety rationale behind certain Code provisions.

The Code was revised at NFPA's 1980 annual meeting. Published in 1981, it is an up-to-date resource on fire protection for the processing, storage, and transportation of flammable liquids. Booklet editions of this Code are available from NFPA for $6.00 each (Order No. NFPA 30). The new Handbook, containing commentary as well as the text of the 1981 Code, is a hardbound book available for $15.00 (Order No. SPP-58). Both the Code and the Handbook may be purchased from the National Fire Protection Association, Batterymarch Park, Quincy, Massachusetts 02269; (617) 328-9230.

Extreme Loads Response Symposium Scheduled

An International Extreme Loads Response Symposium will be held at the Sheraton National Hotel in Arlington, Virginia, on October 19 and 20, 1981. The Symposium is being jointly sponsored by the interagency Ship Structure Committee and The Society of Naval Architects and Marine Engineers. This is the third in a series of symposia jointly sponsored by these two organizations and follows the 1975 Ship Structure Symposium and the 1978 Ship Vibration Symposium.

The purpose of the Symposium is to bring together various representatives of the maritime community, including shipowners, operators, builders, designers, researchers, government, and classi-

fication bodies, to discuss all aspects of structural response to extreme loadings. The program will cover a range of topics including load definition, response assessment, materials, properties, fabrication requirements, reliability, design criteria, design methods, and service performance.

Propeller Club to Hold Convention

The Propeller Club of the United States will be holding its 55th Annual National Convention and the 1981 American Merchant Marine Conference at the Baltimore Hilton Hotel on October 14, 15, and 16, 1981. The theme of the two events is "The American Merchant Marine—An Imperiled Lifeline." Discussions of both the economic and the military importance of the merchant marine are on the agenda, and addresses will also be given on such topics as the state of the nation's ports and inland waterways, the offshore marine industry, and maritime regulation.

SOS Offers Catalogue of Safety Films

Ships' Operational Safety, on behalf of the Marine Section of the National Safety Council, has compiled a list of safety films and video and slide presentations with their sources. Copies are available for $4.50 from:

Ships' Operational Safety, Inc.
284 Main Street
Port Washington, NY 11050

Individuals or organizations desiring to be listed as a source of marine films or wishing to have new films added to the catalogue should contact Elizabeth V. Stephens, PE, Chairman, Visual Aids and Posters Committee, Marine Section, National Safety Council, at the above address.

SARSAT Project Being Pushed

In the wake of the disappearance of the SS POET, the National Transportation Safety Board on July 14, 1981, urged the National Aeronautics and Space Administration (NASA) to expedite SARSAT, the Search and Rescue Satellite-Aided Tracking Project. No distress signal was heard from the POET before it disappeared without a trace in October 1980. While this could have been due to malfunctioning of the radio equipment or inexperience on the part of the radio operator, it is possible that the Vessel's Emergency Position Indicating Radio Beacon (EPIRB) was functioning properly and that the signal was not heard simply because there were no aircraft over the area in which the POET sank during the 48 hours the EPIRB would have broadcast.

Institution of a worldwide satellite system such as SARSAT should greatly improve the detection of ships in distress. The SARSAT project is being jointly conducted by NASA, the Department of Communication of Canada, and the Centre National d'Etudes Spatiales of France. Participating with NASA in the U.S. are the Department of Defense/Air Force, the National Oceanic and Atmospheric Administration (NOAA) and the Department of Transportation/Coast Guard. The objective of the project is to achieve international cooperation in search and rescue by demonstrating that equipment carried on satellites in low-altitude, high-inclination orbits can greatly facilitate the detection and location of distress signals. These signals are generated by the EPIRBs carried on some classes of marine vessels and by the Emergency Locator Transmitters (ELTs) carried on general aviation aircraft. Detection and location will be accomplished by relaying distress information via satellite to ground stations which will complete the information processing and transmit position location to rescue services.

The SARSAT system will have two modes of operation: 1) local or regional coverage for existing EPIRB/ELT equipment operating at the 121.5 and 243 MHz distress frequencies and 2) full-orbit or global coverage for new experimental 406 MHz ELTs and EPIRBs.

Installation of SARSAT's ground systems is scheduled for the last quarter of 1981. SARSAT spaceborne equipment has already been installed on a NOAA satellite. The spacecraft is presently being readied for launch, and launch will occur sometime in 1982.

AIREYE Test Completed

The Coast Guard's Office of Research and Development achieved another milestone in the development of the AIREYE airborne sensor system on June 23 with the successful completion of acceptance testing on the first of six RS-18C IR/UV Line Scanners. The line scanners, built by Texas Instruments Corporation, will be integrated into the multi-sensor AIREYE system now scheduled to become operational in the summer of 1983.

In the infrared mode, the line scanner produces thermal maps of the ocean surface which clearly show warmer objects, such as ships and sun-warmed oil spills, against the cooler ocean surface. The ultraviolet portion of the line scanner creates a map of the surface by recording the intensity of ultraviolet solar rays reflected off surface objects.

The AIREYE system, to be carried on six of the Coast Guard's new Medium Range Surveillance (MRS) aircraft, is being designed primarily as an ocean pollution sensing system. It will also provide unique capabilities in other mission areas such as search and rescue and enforcement of laws and treaties.

Where to Get a Diver

The International Association of Dive Rescue Specialists is an organization of water rescue and recovery professionals. The home office, located in Fort Collins, Colorado, maintains a "HELP LINE" which can provide the names of member divers that might be located in your area of responsibility. The "HELP LINE" number is (303) 482-0887. This is not exclusively an emergency number. You can call the "HELP LINE" now to check what local Diving Team members may be available to you in the event of an emergency.

The following items were published between June 26, 1981, and August 24, 1981:

Final rules: CGD 13-81-04 1981 Columbia Cup Unlimited Hydroplane Race; Regatta, Columbia River, Washington, July 2, 1981. CGD 81-003 Drawbridge Operation Regulations; Atlantic Intracoastal Waterway (AIWW), Charleston County, South Carolina, July 2, 1981. CGD 80-151 Drawbridge Operation Regulations; Caloosahatchee River, Florida, July 2, 1981. CGD 81-046 Drawbridge Operation Regulations; Puyallup River, Tacoma, Washington—revocation, July 2, 1981. CGD 80-123 Drawbridge Operation Regulations, Sheepscot River, Maine, July 2, 1981. CGD 80-092 Drawbridge Operation Regulations; Umpqua River, Oregon, July 2, 1981. CGD 80-010 Prince William Sound Vessel Traffic Service, July 2, 1981. CGD 80-104 Drawbridge Operation Regulations; Root River, Wisconsin, July 16, 1981. CGD 80-150 Drawbridge Operation Regulations; Savannah River, Cylo River, Georgia, July 20, 1981. CGD 80-099 Issuance of Bridge Permits; Delegation of Authority, July 27, 1981. CGD 13-81-03 1981 Seattle Seafair APBA Gold Cup Regatta; Lake Washington, Washington, August 3, 1981. CGD 81-046 Drawbridge Operation Regulations; Puyallup River, Tacoma, Washington—correction, August 3, 1981. CGD 80-115 Lights for Barges at Bank or Dock, August 13, 1981. CGD 80-131 Licensing and Certification of Seamen—correction, August 17, 1981. CGD 3-81-12-R Safety Zone: Arthur Kill, New York, August 17, 1981. CGD 2-81-01 Safety Zone, Upper Mississippi River, Mile 633.7 to 636.7, August 17, 1981. CGD 80-099 Issuance of Bridge Permits; Delegation of Authority—correction, August 20, 1981. CGD 81-063 Delegation of Authority Under the Regulatory Flexibility Act, August 20, 1981. CGD 81-066 Safety and Security Zones; Notice of Final Rules Issued, August, 24, 1981. CGD 9-81-09 Chicago Venetian Night—Regatta Regulation, August 24, 1981.

Notices of proposed rulemaking (NPRMs): CGD 81-044 Drawbridge Operation Regulations; Mystic River, Massachusetts, July 9, 1981. CGD 5-80-22R Drawbridge Operation Regulations; Stony Creek, Maryland, July 9, 1981. CGD 80-094 Snake Island, Texas City, Texas; Mooring and Fleeting of Vessels, July 13, 1981. CGD 81-008 Annex I to Inland Navigation Rules—Positioning and Technical Details of Lights and Shapes, July 16, 1981. CGD 81-006 Annex II to Inland Navigation Rules—Additional Signals for Fishing Vessels in Close Proximity, July 16, 1981. CGD 81-009 Annex III to Inland Navigation Rules—Technical Details of Sound Signal Appliances, July 16, 1981. CGD 81-007 Annex IV to Inland Navigation Rules—Distress Signals, July 16, 1981. CGD 80-158 Annex V to Inland Navigation Rules—Pilot Rules, July 16, 1981. CGD 80-155a Lifesaving Equipment; Revocation of Obsolete Specifications, July 20, 1981. CGD 80-155b Lifesaving Equipment, July 20, 1981. CGD 80-116 Portable Deadlights on Great Lakes Vessels, July 20, 1981. CGD 80-142 COLREGS Demarcation Lines, Savannah River, Georgia, to Amelia Island, Florida, July 27, 1981. CGD 5-81-07R Marine Event; Yorktown Bicentennial Celebration, York River, Yorktown and Gloucester Point, Virginia, August 6, 1981. CGD 76-053 Passenger Vessel Subdivision and Damage Stability, August 20, 1981. CGD 78-163 Exception from PFD Carriage Requirement for Sailboards; withdrawal of NPRM, August 20, 1981.

Advance notices of proposed rulemaking (ANPRMs): CGD 80-113 Lifesaving Equipment; Improved Standards for Stability of Inflatable Liferafts, June 29, 1981. CGD 80-032 Drawbridge Operation Regulations; Newark Bay, Passaic and Hackensack Rivers, New Jersey—withdrawal of ANPRM, July 2, 1981. CGD 80-134 Operational Visibility from Navigational Bridge of Commerical Vessels Operating in U.S. Waters—extension of comment period for ANPRM, August 3, 1981. CGD 78-098 Notification of Marine Casualties—withdrawal of ANPRM, August 20, 1981.

Notices: CGD 81-053 Qualification of Sohio Alaska Petroleum Company as a Citizen of the United States, July 13, 1981. CGD 81-060 Towing Safety Advisory Committee Meeting, July 30, 1981. CGD 81-064 Environmental Impact Statement, Proposed Bridge Construction Across Biscayne Bay (AIWW), Mile 1091.6, Rickenbacker Causeway, Miami, Dade County, Florida—notice of intent to prepare an environmental impact statement, August 6, 1981. CGD 81-050 Study of Electrical Hazard Protection of Tank Vessels Moored to Shore Facilities, August 6, 1981. CGD 81-060 Towing Safety Advisory Committee Meeting; correction, August 10, 1981. CGD 81-068 National Boating Safety Advisory Council Meeting, August 20, 1981.

Any questions regarding regulatory dockets should be directed to Commander A. D. Utara (G-CMC), U.S. Coast Guard Headquarters, 2100 Second St. SW, Washington, DC 20593; (202) 426-1477.

* * *

Revision of Electrical Regulations CGD 74-125A

These rules will constitute a general revision and updating of the electrical regulations to conform with the latest technology. They will include steering requirements for vessels other than tank vessels. The rules will apply to new Coast Guard-certificated U.S. vessels; no retrofitting will be required.

This revision is necessary because industrial standards for electrical engineering have changed in the past few years. The regulations must be brought up to date to reflect current industry practices.

An initial NPRM was published on June 27, 1977 (42 FR 32700). A supplemental NPRM was published on March 3, 1980 (45 FR Part VII). The earliest possible publication

date for the final rule is September 1981.

New Tank
Barge Construction
CGD 75-083
Upgrade of Existing Tank
Barge Construction
CGD 75-083a

This action comprises two regulatory projects centered on tank barge construction standards. These projects were the result of a Presidential initiative of March 17, 1977, directing a study of the tank barge pollution problem.

In July 1977 the Coast Guard began a reexamination of the tank barge construction standards. It was determined that new construction would be treated separately from existing barges. An ANPRM was then issued to gather additional data and assess impacts related to existing barges.

The new NPRM on tank barge construction and the ANPRM for existing tank barges were published as part VI of the Federal Register of June 14, 1979 (44 FR 34440 and 44 FR 34443, respectively).

Public hearings on the dockets were held as follows: August 2, 1979, Washington, DC; August 15, 1979, Seattle, Washington; August 23, 1979, New Orleans, Louisiana; September 5, 1979, Washington, DC; and September 7, 1979, St. Louis, Missouri. The comments made at the hearings have been incorporated in the docket.

On Thursday, November 8, 1979, a Federal Register notice extended the comment period on the project. This extension was based on the continued public interest and ran to December 1, 1979.

A Supplementary Notice was published as Part III of the Federal Register of March 13, 1980 (44 FR 16438). This notice informed the public of a deferment in the rulemaking process for these dockets. The comments received have raised significant questions concerning these proposals. It was decided that the entire tank barge pollution problem warranted a carefully-considered study by a recognized independent body. The National Academy of Sciences/ National Research Council was chosen to conduct the study. Part of the study, a two-day workshop, took place April 15 and 16, 1980. The study is to be completed soon. The Coast Guard will defer any further rulemaking on these proposals until completion of the study, and the dates in the proposals of June 14, 1979, are no longer valid. If the Coast Guard should pursue further action on these proposals, a new timetable will have to be developed.

Pollution Prevention,
Vessels and Oil Transfer
Regulations
CGD 75-124a

These rules will reduce accidental or intentional discharge of oil or oily wastes during vessel operations.

The basis of the rules is threefold. First, there is the need to reduce the number and incidence of oil spills. Second, the new rules will help clarify the existing rules. Finally, the new rules cover the additional requirement for oil-water separators under the 1973 International Convention for the Prevention of Pollution from Ships.

An NPRM was published on June 27, 1977 (42 FR 32670), and a supplemental NPRM was published on October 27, 1977 (42 FR 56625). Because of substantive changes in the rules, an additional NPRM is scheduled for publication in October 1981.

Construction and Equipment
Existing Self-propelled
Vessels Carrying Bulk
Liquefied Gases
CGD 77-069

These rules will amend the current regulations by including the substantive requirements of the "Code for Existing Ships Carrying Liquefied Gases in Bulk" adopted by the Inter-Governmental Maritime Consultative Organization (IMCO). As the use of liquefied gas has increased, so have the problems associated with it. These new rules take into account the unique properties and dangers associated with liquefied gas.

The environmental impact statement and regulatory analysis were completed in February 1979. An NPRM on the rules is tentatively scheduled for December 1981.

Licensing of Pilots
CGD 77-084

These rules take into account the problems caused by increased ship size and unusual maneuvering characteristics. The proposal will require recency of service for each route upon which a pilot is authorized to serve, licensing with tonnage limitations commensurate with pilot experience, and consideration of shiphandling simulator training for pilots of very large vessels. A regulatory analysis and work plan were completed in October 1978. The NPRM was published on November 28, 1980 (45 FR 79258), and corrected on December 8, 1980 (45 FR 80843). The following public hearings have been held in 1981: January 14 in Cleveland, Ohio, January 27 in Washington, DC, February 3 in New Orleans, Louisiana, and February 10 in San Francisco, California. Because of the public comments received, substantial revisions to the proposed rules are being considered.

Revision of 46 CFR 157.20-5
Division into Three Watch
Regulation
CGD 78-037

This revision will require an adjustment in vessel manning requirements to bring them into line with current legislation. It will change the requirements which identify personnel who must be used on the three watches and personnel who may be employed in a day working status. An NPRM formerly scheduled to be published on this docket in January 1980 has been deferred pending legislative action in Congress.

Tank Vessel Operations--
Puget Sound
CGD 78-041

These rules govern the operation of tank vessels in the Puget Sound area. They were initiated to reduce the possibility of environmental harm resulting from oil spills in Puget Sound. This is to be accomplished by governing the operation of tankers and reducing the risk of collision or grounding.

Former Secretary of Transportation Brock Adams signed a 180-day

interim rule on March 14, 1978, prohibiting entry of oil tankers in excess of 125,000 deadweight tons in Puget Sound; this appeared in the Federal Register of March 23, 1978 (43 FR 12257). An ANPRM was published on March 27, 1978 (43 FR 12840). An extension of the interim rule was published in the Federal Register in order to allow the Coast Guard adequate time to complete this rulemaking.

The public hearings scheduled for Seattle, Washington, Mt. Vernon, Washington, and Port Angeles, Washington, were completed, and all the comments received were entered in the docket files for consideration. The extension of the interim navigation rule was published on June 21, 1979 (44 FR 36174). This extension became effective July 1 and will be in effect until the Coast Guard prints notice of its cancellation. A supplemental NPRM was published on July 21, 1980 (45 FR 48827). Copies of documents or the transcripts of the hearings may be obtained by writing to the Marine Safety Council. A final rule on the docket is currently expected in December 1981.

Personnel Job Safety Requirements for Fixed Installations on the Outer Continental Shelf CGD 79-077

These rules will establish health and safety requirements for installations of companies engaged in oil field exploration and development. They will provide more comprehensive protection for personnel employed on oil industry vessels and installations on the Outer Continental Shelf (OCS). A great deal of controversy originally surrounded this project because of confusion over who was responsible for these operations, the Coast Guard or the Department of Labor's Occupational Safety and Health Administration (OSHA). The Outer Continental Shelf Lands Act of 1978 (P.L. 95-372) assigned the Coast Guard authority for promulgating and enforcing safety and health standards for working conditions on the OCS of the United States. The enactment of the aforementioned OCS Lands Act of 1978 and the signing of a Memorandum of Understanding (45 FR 9142) by the Coast Guard and OSHA have eliminated much of the controversy. As a result, the Secretary of Transportation has approved the Coast Guard's request to downgrade this project from "significant" to "non-significant." A target date has not yet been set for publishing an ANPRM.

Qualifications of the Person in Charge of Oil Transfer Operations, Tankerman Requirements CGD 79-116 and 79-116a

These rules will redefine and establish qualifying criteria for the certifying of individuals engaged in the carriage and transfer of dangerous cargoes in bulk.

It has been found that most pollution incidents are the result of personnel error; consequently, the minimum qualifications of persons involved in handling polluting substances should be specified.

New NPRMs have been approved by the Secretary of Transportation and were published on December 18, 1980 (45 FR 83268 and 83290). The following public hearings have been held in 1981: January 21 in St. Louis, Missouri, February 4 in New Orleans, Louisiana, February 18 in Long Beach, California, February 25 in Washington, DC, and April 1 in Washington, DC. Because of the public comments received on this project, substantial revisions are being considered. A target date for a supplemental NPRM has not yet been set.

Shipboard Noise Abatement Standards CGD 79-134

These standards will establish a maximum daily noise exposure level for shipboard personnel and industrial personnel on Outer Continental Shelf facilities. The standards will not restrict sound levels in specific compartments but only require that the personnel exposure during a 24-hour period not exceed a certain limit. An exception to this would be the specification of a maximum sound level in berthing spaces of 75dB(A), as envisioned. The limits would be more stringent for units contracted after 1988.

Development of this proposal has been aided by a Coast Guard-contracted study performed by the U.S. Naval Ocean Systems Center (NOSC), San Diego, California. The study evaluated sound levels aboard several U.S. merchant vessels along with other available information and made recommendations on standards to control and/or eliminate the noise hazard. Copies of the study are available through the National Technical Information Service (NTIS), Springfield, Virginia 22161; NOSC technical documents numbers 243, 254, 257, and 267 and technical report number 405 should be requested.

The Coast Guard is contemplating applying these regulations to "uninspected" vessels (e.g., towboats less than 300 G.T.). Although it is widely recognized that noise reduction on these vessels is quite complex, it is imperative that efforts be made to introduce current noise control technology on these vessels to begin to reduce noise exposure.

An NPRM is scheduled for September 1981.

Personnel and Manning Standards for Foreign Vessels CGD 79-081b

These rules, deemed necessary to reduce the probability of oil spills, will establish minimum manning levels for foreign tank vessels operating in U.S. navigable waters. They will also establish procedures for the verification of training, qualification, and watchkeeping standards. An NPRM was published in the Federal Register on November 17, 1980 (45 FR 75712).

The public comments on this project are currently under review. The Coast Guard anticipates the development of a resolution to the IMCO convention on "Standards of Training, Certification, and Watchkeeping for Seafarers, 1978" (STW). Since the resolution may affect this project, no further action will be taken until IMCO acts on the STW resolution.

Damage Stability and Flooding Protection Standards for Great Lakes Bulk Dry Cargo Vessels CGD 80-159

This project has as its primary objective the prevention of further loss of life or property on the Great Lakes as a result of loss of buoyancy on bulk dry cargo vessels. As the project is envisioned, this will be achieved mainly through design requirements. Other solutions are also being considered, however. The need for protection against flooding on bulk dry cargo vessels on the Great Lakes was noted as far back as 1928. Recent casualties, most notably the sinking of the SS EDMUND FITZGERALD in 1975 with the loss of all hands, have added new impetus to efforts to correct this problem.

Two ANPRMs were previously published under a different docket number (CGD 77-162), one on March 16, 1978 (43 FR 10946), and the other on August 14, 1980 (45 FR 54095). These advance notices proposed subdivision requirements as a solution to the safety problem. Public comments on the ANPRMs indicated that the costs of meeting subdivision standards might place bulk dry cargo vessels in an uncompetitive position vis-a-vis the railroad and trucking industries. The thrust of the project has thus shifted from subdivision requirements only to a more comprehensive scheme including methods of reducing flooding and providing for crew safety. Alternative approaches being considered include:

a. Bad-weather warning system
b. Vessel traffic service system
c. Inspection of hatch covers and clamps before each sailing
d. Increased freeboard (i.e., reduced draft)
e. Restricted shipping season
f. High-water alarms and dewatering pumps
g. Collision avoidance systems and/or improved maneuvering characteristics
h. Improved lifesaving devices.

In approving the work plan for this project in January, the Marine Safety Council agreed to label it "significant." Publication of an NPRM is tentatively scheduled for November or December 1981.

* * *

Actions of the
Marine Safety Council

Work plans for the following projects were approved:

July Meeting:

CGD 81-043 Licensing of Personnel on Vessels of Less Than 100 Gross Tons

This project would implement portions of Public Law 96-378 by establishing a Master/Mate concept for certain vessels under 100 gross tons. It will eliminate the "dead-end" status of persons possessing operator and ocean operator licenses. An NPRM is scheduled to be published in October.

August Meeting:

CGD 81-051 Charges for Coast Guard Aids to Navigation Work

The present listing of charges found in 33 CFR 74 has not been revised since 1976. To allow for timely updating in the future, the listing will be deleted from the Federal Register and made available by other means. An NPRM should be published this fall.

CGD 81-052 Foreign-flag Vessels Carrying Dangerous Cargoes in Bulk

This rulemaking would rescind the requirement that a foreign-flag vessel transporting bulk chemicals or liquefied gases obtain a Letter of Compliance. The NPRM is to be published in December.

CGD 81-057 General Bridge Permit Program

This project should simplify procedures for obtaining certain bridge permits, thus reducing costs and saving time for the public and Government alike. The NPRM is expected to be published this fall.

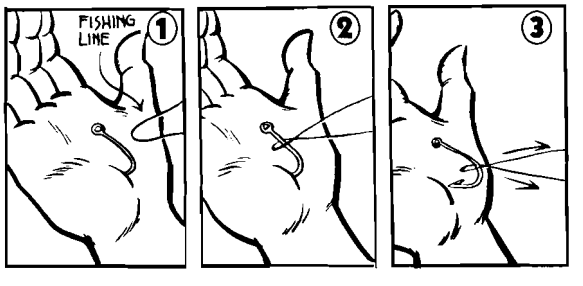
CGD 81-058 Boundary Lines

The various "boundary line" definitions will be reviewed, adjustments proposed to ensure compliance with Public Law 96-324, and delegation of authority to District Commanders to modify requirements for limited projects evaluated. November is the target month for publication of an NPRM.

CGD 81-059 Licensing

A comprehensive review of the present licensing restrictions will be conducted. The final result might be the elimination of many "trade-restricted" licenses as well as much of the redundancy between licenses. An ANPRM is to be published during October. ↕

How to Safely Remove A Hook



1. Use a piece of fishing line at least a foot long.
2. Loop the line around the shank of the hook.
3. Hold the ends of the line apart; grasp firmly and apply even pressure. The hook will slide free.

Striking a Balance: Regulations Put Coast Guard in "a Compromising Position"

by Bruce P. Novak
Deputy Executive Secretary
Marine Safety Council
Member, Department of Regulatory Philosophy

In the July issue of the Proceedings we looked at three reform measures designed to make the Federal regulatory agencies more accountable to the public. In this issue we will discuss how the Coast Guard is actually implementing the reforms and how it takes competing interests into account when making regulatory decisions. The measures, to refresh your memory, were: Executive Order 12291, the Paperwork Reduction Act of 1980, and the Regulatory Flexibility Act of 1980. These three measures have certain requirements that each Federal agency must meet.

Generally speaking, the aim of the requirements is to provide the public with more information on how an agency makes its decisions. Each of the reform measures requires an agency to consider such questions as the cost of the proposed regulation and its impact on small business. The agency must then document the fact that it has considered these questions and set forth its conclusions. For example, a regulation that requires a new piece of equipment may not have much impact on a large company that can easily absorb the cost, but, for a small company, the consequences may be disastrous. The magnitude of the impact of the regulation on all members of the regulated community must be carefully weighed by the agency. If the proposal will have a significant impact, the agency must justify going ahead with the requirement and document the information supporting its conclusion to continue. This documentation must be made available to the public. As I said in the July article, the Coast Guard has always kept these kinds of impacts in mind when regulating. The three reform measures, however, require us to document to an unprecedented extent the fact that we have considered the impacts.

The intent of these reform measures is applauded by all, but the true test of the value of any reform, if I may belabor the obvious, is how well it works. This, in turn, depends on how well an agency implements it, and successfully implementing a reform depends greatly on how the various impacts of a regulation are played off against each other. No regulation is totally good or totally bad. The disadvantages of a regulation for one segment of society might well be offset by a benefit somewhere else. Ideally, an agency strives to balance the various pros and cons for all segments so that the net result is a benefit to society as a whole (i.e., the public interest is served).

One of the difficulties of evaluating whether or not an agency is acting in the public interest is that in most cases there is no such thing as a single, clearly defined "public interest." Instead, there are many publics with many interests. Let me illustrate with a hypothetical rule requiring double hulls. The rule is intended by its drafters to reduce oil pollution. What factors come into play here? First, there is national policy, as set by law, which states that there shall be no pollution of the waters by oil. The Coast Guard, as a Federal agency, has an obligation to pursue that national goal. The Congress of the United States has decided that it is in the public interest to eliminate oil pollution. Now, the Coast Guard knows that Congress has set an impossible goal. There will be oil pollution of the water as long as oil is transported on the water. Our actual goal, then, is to reduce oil pollution of the waterways as effectively as possible at as low a cost as possible. The required Regulatory Analysis and review of existing regulations are based on this simple concept.

Right away our troubles begin. Different publics have different values. Environmentalists tend to place a high value on the purity of water, both for aesthetic reasons and out of concern over potential health problems. Vessel owners and operators want to keep costs down, not only to maintain their own profit margins but also to compete with alternate methods of transportation. Labor interests want to maintain employment levels. I'm not suggesting for a moment that either management or labor is not interested in keeping the waterways of America clean or that environmental groups are unconcerned with the problems of the marine industry. However, it is indisputable that these various groups place different values on clean water. The confusion factor is increased by conflicting interests within the various groups themselves. None of these groups is mutually exclusive of the others. All of us—environmentalists, labor, and

management alike—are consumers. As such, we are concerned not only with water quality but also with the cost of fuel. Pollution prevention requirements add to the cost of oil. What is more important to us, keeping our water clean or our energy costs down? In spite of these common bonds, the Coast Guard is inevitably petitioned by the unions not to throw people out of work, by the industry not to inhibit its ability to serve the public efficiently or make a living, and by the environmentalists not to poison the lifeblood of America.

I think that it is plain that the Coast Guard is in a no-win situation. No matter which way we decide, someone will be disappointed. In fact, we can sometimes judge how successful the rulemaking is by how many groups we disappoint. If everyone is equally unhappy, we can assume we drafted a pretty equitable compromise.

Now that we have discussed the intent of the reform measures and realistically assessed our chances of achieving universally satisfactory results, we can look a little more closely at the decision-making process itself. The Coast Guard's main tool for introducing as much objectivity into the evaluation process as possible is the Marine Safety Council. Rulemaking revolves around the Council, so it is impossible to appreciate the process without knowing what the Council is and how it operates. The Council has eight members who include the Chiefs of the major Offices in Headquarters that produce regulations or would have the greatest interest in regulated matters. It is a special advisory body which reports directly to the Commandant of the Coast Guard, who has final authority for promulgating Coast Guard regulations. The Commandant has vested complete administrative authority for all regulatory matters in the Council. The Council considers, with a few minor exceptions, all the regulatory projects sponsored by Headquarters. (Regulatory authority has been delegated in limited areas to District Commanders. The District Commander can sign and issue regulations for items of local interest such as security zones and regattas. The vast bulk of all regulations, though, is handled at Headquarters.)

The number of regulations considered by the Council is substantial. Where do they come from? The sources are many and varied. Some regulations are suggested by our constituents. Some are requested by field units. Others are the result of casualty investigations, National Transportation Safety Board recommendations, or recommendations from other bodies. Of course, a good percentage of our regulatory projects are aimed at updating or correcting existing regulations. In fact, most of the day-to-day regulating that the Coast Guard does is simply maintenance of existing material. However, on a regular if unpredictable basis Congress presents us with legislation which requires us to regulate in new areas. This last category of regulatory efforts is the one that attracts the most attention, as a rule. That is because these regulations are new, which means they will introduce costs and benefits which are as yet unknown. In addition, since they are the result of legislation, national attention is focused on them, and even the most casual observer wants an opportunity to become involved in their development. Ultimately, though, all regulations are handled the same way, regardless of how they originated.

Each regulatory project is assigned a manager. The project manager works up a preliminary document called a work plan. The work plan has a format which helps the project manager keep in mind all the multiple aspects of a regulatory proposal that he will have to evaluate before a project is finally completed. For example, the work plan asks the project manager to describe the need for the proposed regulation, the authority for it, how various public interests are going to be affected and how the different groups can participate in the rulemaking, what the major alternatives are, and so on. The purpose of this document is twofold: it helps the project manager organize his material before proceeding with a project, and it gives reviewers the information necessary to evaluate the justification for and the expected scope and impact of the regulation. The work plan is routed internally and finally arrives before the Marine Safety Council. The Council looks at the proposal from many angles. First, the members question the project manager about the need for the proposal. If they are satisfied that, in fact, there is a serious problem that must be addressed, they determine whether or not a regulation is the best solution. Throughout this process, the Council bears in its collective mind the major question of how best to reconcile competing interests.

To answer this question, different members of the Council assume different advocacy roles. The Chief of the Office of Boating, Public, and Consumer Affairs, for example, puts on his "Mr. Public" hat and asks the project manager to explain and defend the proposal from the point of view of what it will mean for the consumer. The Chief of the Office of Marine Environment and Systems asks the same kinds of questions on behalf of the environmentalists. The work plan is approved by the Council only if the members agree that it is the best possible compromise between all competing interests and, on balance, is in the public interest—that is to say, that after all positive and negative impacts are considered, there is a net benefit to society as a whole. If the Council is not totally satisfied with the justification for a proposal but not willing to vote it down altogether, it can request that the project manager report back as many times as necessary to notify the Council of new developments.

Clearance of a regulatory project by the Marine Safety Council is not necessarily a guarantee that there will be no controversy about it. In fact, with all the competing points of view that surround almost any proposal, a certain degree of controversy is almost certain. However, the Council does provide the Coast Guard with multiple perspectives from relatively impartial reviewers. Moreover, the constant review exercised by the Council keeps regulations on track. The Coast Guard believes that this comprehensive internal review process ensures that the regulations it issues are designed to satisfy the largest possible public interest. Stay tuned to this magazine for a discussion on how you, the regulated public, are factored into the regulatory equation.

If any reader would like to react to this series of articles in writing, I would be pleased to hear from him.

With Proper Training, Able Seamen Can Become Able Firefighters

Parts of the following article were taken from "They go to school to fight fires," by Gurney Williams, POPULAR MECHANICS, March 1976.

Each year fires cost industry a staggering amount, not only in death and personal injury but also in property losses, insurance premiums, and lost productivity.

Many fires can be prevented. Many more can be suppressed—if they are detected and attacked within the first two minutes. Statistics show that these are the "critical moments" of any fire. What firefighters do in this initial stage largely determines the extent and severity of fire damage.

Effective fire protection depends on two basic factors: the availability of the right fire suppression equipment and the availability of people who know how and are willing to use it. While fire and safety training cannot ensure the availability of equipment and people, it can make a crucial difference when it comes to a person's willingness (as well as his ability) to fight fires. This difference is evident regardless of how much experience he may have had with fires.

The training philosophy of The Ansul Company's Fire School *begins with the assumption that the best* fire suppression equipment in the world is of little value if people can't use it properly. Over the forty plus years Ansul has been conducting fire and safety training, seven basic principles have evolved. These principles must be understood by the trainee before he can be expected to react rationally in a fire emergency.

1) **Alarm.** When fire strikes, an employee must know the proper procedure for sounding the alarm. This is extremely important when it comes to life safety and the minimization of property damage.

2) **Fire.** An employee must understand the nature and characteristics of the fires he may encounter on the job. Some fires spread rapidly, demanding immediate action. Others are slow-burning. Some contain various toxins which could cause severe injury. Each fire is different and requires firefighters who are capable of recognizing its identifiable characteristics.

3) **Capabilities and Limitations.** A key objective of any training program is to provide the trainee with sufficient information and experience to enable him to evaluate the probability of suppressing a fire with the equipment at hand without endangering his personal safety. This objective is accomplished by teaching the trainee the capabilities and limitations of his equipment and his own abilities. He is thrust into actual or simulated fire situations where he experiences fire close up and learns to cope with the emotional reactions it produces. He succeeds in extinguishing some fires and fails on others, but, above all, he develops the confidence which leads to a willingness to attempt fire suppression.

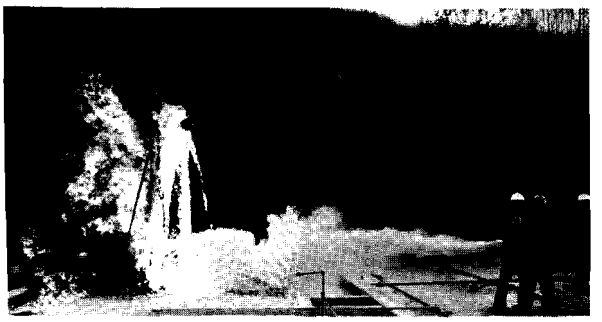
4) **Operation.** Even the most willing firefighter cannot successfully suppress a fire unless he knows how to actuate and control his equipment. Before he faces a real fire, he must know how to activate a large dry chemical extinguisher, how to carry a hand portable unit, or how to brace himself against the "kick" of a high-pressure hose. In an actual fire emergency there is no time to fumble with equipment. Seconds count and can spell the difference between suppression and disaster.

5) **Application.** Obviously, there's a knack to handling a piece of firefighting equipment—a right way and a wrong way to approach fire situations. Trainees must learn how to direct the extinguishing *agent stream, how to approach a fire safely,* how individual fires behave and how to avoid reflashes, how to use the extinguishing agent itself as a heat shield, how to cope with the fierce heat. They practice until they are competent firefighters.

6) **Maintenance.** When fire suppression equipment fails, human negligence is almost always the reason. The finest equipment will not operate if it isn't recharged and properly maintained. Trainees are instructed in the importance of maintenance and drilled in inspection and maintenance techniques. The end result is that when fire emergencies occur, the employees are confident that the equipment they use will accomplish the task it was designed to do.

7) **Evacuation.** When all else fails, an orderly evacuation will save more lives than any form of firefighting heroics.

The Ansul Fire School can trace its roots back to 1940, when The Ansul Company introduced dry chemical fire extinguishing equipment to a skeptical public. Ansul established a fire test facility for purposes of



At the City of Boston Fire Department training grounds, Ansul trainees put out (left) a gasoline fire and (right) an LNG fire.

demonstration and comparison. It quickly became a training field for purchasers of Ansul's dry chemical equipment and eventually evolved into a school open to everyone. Students today come from all over the world.

The school's main campus is located within the Ansul Fire Technology Center in Marinette, Wisconsin. While the campus contains traditional classrooms for lectures, films, and discussions and an extensive audio-visual library, the real conversion of novices to competent firefighters takes place on a huge Fire Test Field honeycombed with flammable liquid and gas lines and dotted with simulated fire hazards. Just about every conceivable kind of fire can be created on this field—spills, flammable liquid and grease fires, indoor fires, and storage tank fires are just a few of the fires the students are trained to extinguish. A liquefied natural gas (LNG) regulating tank and typical LNG vapor control and fire hazards are a recent addition. Every type of fire extinguishing equipment is available and in use: dry chemical hand portable, wheeled, and mobile equipment, as well as carbon dioxide and Halon 1211 extinguishers, water equipment, and high expansion foam equipment.

Ansul offers a number of different kinds of training programs. Most heavily attended is the standard three-day basic First Aid extinguishment program. Special industry schools are also held from time to time, enabling representatives from industries such as petroleum, utilities, transportation, etc., to concentrate on common fire problems, share experiences, and undergo training on hazards unique to their industries. In addition, Ansul develops customized training programs for individual companies and goes all over the world to provide on-site training.

Ansul's students learn that there are four basic classes of fire. Fires are classified according to what substance is burning. It is important to know the different classes and the correct extinguishing agent to use on each. Using the wrong extinguisher can be not only ineffective but also hazardous. Water on a magnesium fire, for instance, can cause an explosion. Water on burning grease can spread the fire. Water on an electrical fire can result in electrocution. Extinguishers are labeled according to the class of fire they are designed to handle.

Class A: Extinguishers labeled with an "A" in a triangle will put out fires that burn with an ember—wood, paper, cloth, rubber. Water and multi-purpose dry chemical are used to fight such fires,

Class B: Extinguishers labeled with a "B" in a box are effective against flammable liquid and gas fires—fuel oil, benzene, solvents, gasoline, and other petroleum products. Carbon dioxide, a smothering agent, and dry chemical are used to fight such fires. One problem with carbon dioxide is that, if used in quantity in an enclosed area, it can smother not only the fire but people, too, since it removes oxygen from the atmosphere.

Class C: Extinguishers labeled with a "C" are designed especially to fight electrical fires. The C rating guarantees that the extinguishing agent will not conduct electricity back to the operator.

Class D: Extinguishers labeled "D" are special-purpose units for fighting metal fires, such as highly flammable magnesium. These are made primarily for industrial and military use.

Underwriters Laboratories rates fire extinguishers on the basis of what an amateur firefighter could be expected to do with one. A 350-pound wheeled dry chemical extinguisher with "Purple-K" dry chemical, for example, carries a rating of 480 B:C. The "B" means it works on flammable liquid or gas fires, the "C" that it doesn't conduct electricity. The "480" means it can theoretically put out 480 square feet of burning liquid when handled by a novice. An expert using the same extinguisher can put out as much as 1200 square feet of fire. There's no question about the value of training in firefighting.

While Class A fires may break out in such places as a ship's accommodations areas, fires on board a ship are most likely to fall into Class B. Class B fires can be divided into five types (the criteria for this further breakdown are where and how the fire is burning, rather than what is burning).

Liquid spill fires: uncontained flammable liquid spill fires can be of two varieties. A simple spill fire can be put out by a single firefighter sweeping the stream of an extinguisher from side to side. In an obstacle spill fire, an object (anything from an oil drum to an engine) splits the extinguisher stream and shields the flames behind it. Fighting this type of fire requires two men double-teaming it, walking around the flames from opposite sides to cover all blind spots. Typical liquid spill fires would be flammable liquids under compressors, turbines, storage drums, or transformers or accidental spillage around bulk storage areas or paint mixing areas.

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Trainees from an LNG carrier are given a refresher course 6 - 8 months after their training. No fires are set, but crews familiarize themselves with their vessel's firefighting systems. Here, they discuss operations and application in the control room.

With the sphere of a tank in the background, crewmembers discuss the vessel's deck-mounted systems.

Three-dimensional or multi-level liquid: if a suspended container of flammable liquid springs a leak and catches fire, there are two fires to put out—the spill fire on the deck and the gravity flow fire, the flaming liquid dripping from the container. Firefighters can extinguish this type of fire by putting out the spill fire first, then following the stream up and extinguishing the container fire. Typical multi-level fires would involve paint lockers, ruptured barrels or tanks, overflows in filling operations, or piping breaks or broken valves with fuel running down any object.

Flammable liquid under pressure: a typical example of this type of fire would be a fuel line breaking open and gasoline or oil spurting out under pressure. Firefighters should aim for the break first, then hit the spill fire on the floor or the fire balls burning above the pipe. Typical fires in this category might be traced to seal or packing failures in pumps, compressors, or turbines, flange failures on piping systems, gasket failure on pump parting surfaces, or valve stem packing failure, in addition to leaks in hoses and piping.

Flammable gas under pressure: if a propane or other gas line bursts, the fire resulting from ignited gas will look like the exhaust from a rocket. The extinguishing agent should be injected into the flow of gas at the break so that the fire may be cut off at its source. Typical fires in this category might be caused by operation of a safety relief valve, failure of welded joints, ruptured piping, seal or packing failure on valves and compressors, or line ruptures on gas-fired appliances.

The engine room presents special hazards. Trainees check their knowledge of equipment and techniques.

Flammable liquid in depth: this type of fire is like a spill fire but is more difficult to put out. The sides of the container interfere with the flow from the extinguisher, and the operator must be careful not to splash the flammable liquid over the sides of the pan. The best technique here is to stand well back and let the stream "fall" into the pan as gently as possible. Typical examples of this type of fire would be a deep-fat fire in the galley or fuel trapped in the bilge catching on fire.

The props used by Ansul are designed so that they can be assimilated to any type of fire scene.

One example of a course customized for a specific company is the training program Ansul put together for the Energy Transportation Corporation about five years ago. Ansul used the Boston Fire Department's training grounds out in Boston Harbor to teach crewmen of the company's LNG carriers how to properly used the chemical units they had on board. Ansul has since been been covering the company's ships on a rotating basis, training new crew members and providing refresher courses for those who have already received basic instruction.

Ansul teaches members of ships' crews how to use both hand portable firefighting equipment and fixed extinguishing systems. The story which follows describes the latter, a complete Halon 1301 system.

Ansul believes that trained employees who have an understanding of what fire suppression equipment can do and what their own capabilities are will be better prepared to deal with fire emergencies—both technically and emotionally.

Readers wanting more information should call or write:

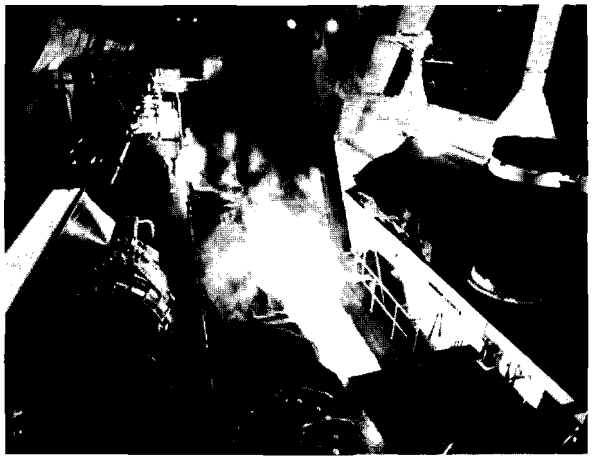
The ANSUL Company
Fire and Safety Training Services
One Stanton Street
Marinette, Wisconsin 54143
(715) 735-7411

"Fire in the Engine Room"

(Reprinted from DU PONT MAGAZINE--Jan/Feb 1981)

The supertanker AMOCO WHITING is a study in superlatives. Classed as a hefty 150,000 deadweight ton ship, she stretches 920 feet (281 meters) from bow to stern. Her construction bill would run to $50 million if she were built today.

When she is laden with a cargo of oil, her value doubles. But then, so do the terrifying prospects of what might occur should a fire break out on board. "The AMOCO WHITING is a diesel-powered ship, and diesel ships run a relatively higher risk for fires in their engine rooms," says Chester Bysarovich, Amoco's manager of Marine Engineering. "While Amoco has had no problem with fire aboard its fleet, I've seen ships—some right out of the builder's shipyard—with fire-gutted engine rooms. Some vessels have been sent to the bottom by fire.



Flames of deliberately set fire gain intensity before Halon 1301 is discharged into room.

"Diesels are susceptible to fire because some of their fuel lines are under pressures of 9,000 psi. Every once in a while, a line lets go, and there's a flash as soon as the fuel hits a hot engine."

Recently, adds Bysarovich, Amoco researched the latest developments in fire suppression systems and decided that Du Pont's Halon 1301 could provide an extra margin of protection sought for engine rooms. To outfit its 17-tanker fleet with Halon 1301, Amoco

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is Fire

Prevention Week

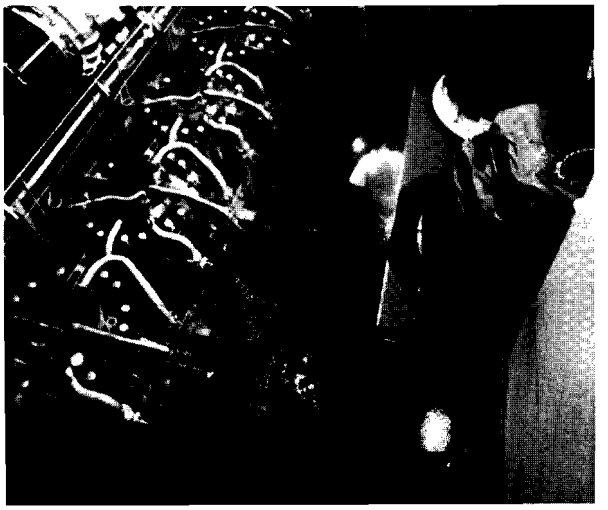
selected systems built by The Ansul Company. As each tanker went into its biannual 15-day drydock overhaul, an entire Halon 1301 system—pipes, tanks, discharge nozzles, sensors, and hundreds of smaller components—was installed by Ansul. The company, a subsidiary of Wormald International, Ltd., of Australia, also can retrofit systems on ships anywhere in the world.

"Once we had the system aboard the first tanker," continues Bysarovich, "we wanted an early test of the effectiveness of the system designed to protect an engine room with a diesel standing five decks high. In a space that large, you can't conduct weekly discharge tests, as we do with ordinary fire hoses on deck. Jack Goudreau of Ansul suggested that we start a fire aboard an Amoco ship to prove, in one really dramatic exhibition, that the system would suppress engine room fires."

Following numerous planning sessions between Amoco, Ansul, and Du Pont, representatives of Ansul and Du Pont journeyed to Cape Town, South Africa, and boarded the AMOCO WHITING by helicopter as she rounded the Cape of Good Hope. "In the interest of safety, we wanted to check every detail of construction in the ship's engine compartment before we started a fire in there," reports Goudreau, Ansul's Marine Market manager. "We intended to make the test as realistic as possible by starting the fire in spots where fires actually might occur, near fuel pumps, for example."

After the survey, all the equipment necessary for the test, including replacement Halon 1301 cylinders, was assembled in Texas City, Texas, next port of call for the AMOCO WHITING. When the tanker dropped anchor off Galveston, the material was barged aboard for installation while the ship waited for dock space. Ten days later, having offloaded her cargo of oil, the ship anchored 16 miles (25.6 kilometers) offshore for the test.

"To demonstrate that every nook and cranny in the entire 550,000 cubic feet of engine room would be reached by the Halon 1301, we conducted a discharge test before touching off the actual fire," says Du Pont's Al Dougherty. "We placed monitoring instruments throughout the space and dumped 15,000 pounds of Halon 1301 into the area just as if there were a fire. The system functioned perfectly, and the concentration of Halon 1301 met our specifications throughout the engine room. We also were pleased to see that the concentration remained constant until we ended the test after 30 minutes. That's plenty of time for someone to track the source of the fire and correct the problem."



Damage report: paint blistering around fire pans; no equipment damaged.

Halon 1301 is a gas that extinguishes fire by interfering chemically with the combustion process. As long as the atmosphere remains at a concentration over five percent of Halon 1301, ignition of normal combustibles (Class B and C fires) will not occur.

With concentration tests out of the way on the AMOCO WHITING, it was time to stage the real thing. Another 15,000 pounds (6,800 kilograms) of Halon 1301 were loaded into the system in 45 cylinders. Nine test pans containing N-heptane, 60 octane test fuel, were placed at strategic spots throughout the engine room. Seven of the pans were one foot square (0.09 m^2), and the remaining two measured two by ten feet (0.61 x 3.0 m.) While representatives of Amoco, other major oil companies, the Coast Guard, and Texas A&M University fire school looked on, torches were applied to the pans of fuel. The fires were allowed to burn for 18 seconds to give the flames time to grow. With nine blazes roaring, the Halon 1301 was discharged into the vast engine room.

Time from initiation of discharge to complete suppression of flames: seven seconds. Damage report: slight paint blistering around the large pans and the burning of two fire-retardant tarpaulins covering an engine. Once the visitors were ashore, the ship was able to get under way in perfect condition.

The entire event was captured on film for use by Amoco as a training tool for crewmen. Scenes were filmed showing proper procedures for reporting fires and sounding an alarm. "It's only natural that crewmen want to be reassured that they are protected from fire," says Goudreau. "Moreover, they have to see that the Halon 1301 won't hurt them if they're in a room when it's discharged. People who have worked around carbon dioxide systems know they can't discharge the gas with personnel still in the room. The CO_2 will put out the fire, but it will kill the people, too. That fear of premature discharge extends to all gaseous fire suppression agents, I think. However, we demonstrated in this test, as we have repeatedly in the past, that it's safe to be in a room after Halon 1301 is discharged. The film also will help to prepare crewmen for the noise of a discharge. All that gas rushing through a nozzle in a few seconds sounds like a small jet engine. It can be shocking the first time."

Goudreau believes this test confirms that Halon 1301 systems combine effective fire control with personnel safety and proves their value in the engine room. The engine room is, after all, "the heart of the ship; you lose the engine room and you're in danger of perhaps losing the entire ship."

For more detailed information about Halon 1301 fire extinguishant, write to: FIRE TEST, Du Pont Magazine, Wilmington, Delaware 19898. ↓

Close Encounters... of a Dangerous Kind

The U.S. inland waterway system is a vast network consisting of 25,830 miles of rivers, bays, estuaries, canals, and locks. There are an estimated 5,000 tug-and towboats active on the waterways, and the tow/tug/barge system moves almost 700 million tons of cargo annually. This requires the services of some 90,000 men, 45,000 of whom are employed on the water. The inland waterways make it possible to move bulk cargoes to major ports at a relatively low cost. This makes them very important to our country's economy and its balance of payments. An inland waterway barge is the least expensive means of moving bulk merchandise because the system is so fuel-efficient: just one powered vessel can move dozens of barges. The largest towboats can push up to 36 jumbo barges totaling some 54,000 tons.

The strengths of the industry, however,--its size and the enormous quantities it moves--, bring it directly into conflict with recreational boaters, who also use the country's bays and rivers. The following article is based on interviews with various waterway users.

Vince Winn wears two hats. At work he's the director of safety for MG Transport in Cincinnati. At play he's an avid recreational boater. His concern about accidents never ends.

"I feel like there's a definite need for some sort of educational program for everyone concerned. The towboat wheelhouse people should become aware that the recreational boater has a right to have his fun out on the river. The recreational boater, on the other hand, should know that the commercial towboats have a right out there and we must the get the commodity from its point of origin to its destination in the most economical manner, which we feel is by carrying the bulk commodities on the inland waterways. Recreational boaters should sort of assume the attitude, the idea, that that is like an arterial highway or an expressway out there."

MG Transport set up a safety program when a series of accidents caused its insurance premiums to double. Winn doesn't leave his safety-consciousness behind when he boards his own boat.

"I give the towboats a wide berth. I don't generally get out in the 'way' or in the sailing lane when I know they're coming through there because I realize the extreme problem they have slowing a towboat down. With 23,000 tons of coal, a 1,650-ton towboat, and the 15 barges that he has in tow, there's a tremendous amount of weight and bulk coming on top of you, and it sometimes would take him a mile or two to stop the boat, if there's any current at all."

Unfortunately, not all pleasure boaters share Winn's concern:

"We were behind [a tug] in a little Evinrude . . . we was having a helluva time, and all of a sudden we hit [the wake] at a 45° angle, and when you hit it at that angle, you know, it slices through instead of going over like a boat should, OK? It's an unsinkable boat and

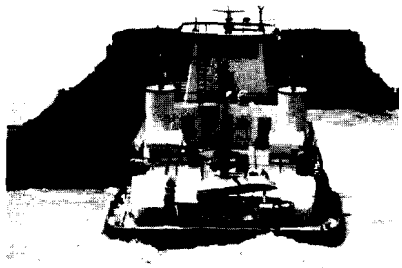
"I was sittin' on the front railing . . ."

". . . next thing I know . . ."

everything, but it still filled with water and knocked me off. I was sittin' on the front railing and I ripped the railing all the way off. Next thing I know I was about 50 yards back. You know, I was under for about a minute and a half."

Other boaters haven't been so lucky. Jack Woodall, a pilot on the WILLIAM H. ZIMMER, reports:

"It happened up the Brilliant, Ohio. Boy and a girl in a motorboat went right under. The boy,



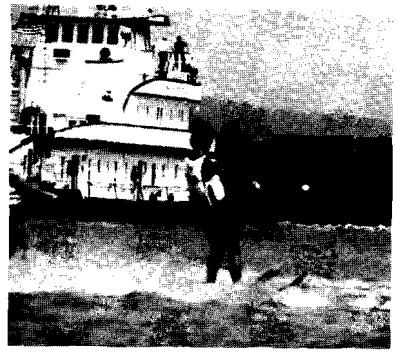
"You get 23 or 24 thousand tons at 15 miles an hour . . ."

they got him out. He didn't drown. But the girl—killed her, she went through the wheels, cut her legs off—it was an awful mess."

Woodall believes the small boater just doesn't understand the towboat operator's problems.

". . . they want to get right in front of you . . ."

"Oh, man. They don't have a bit more idea what you're doing here . . . They don't know where you got to get. I've got to stay



"Water skiers . . .

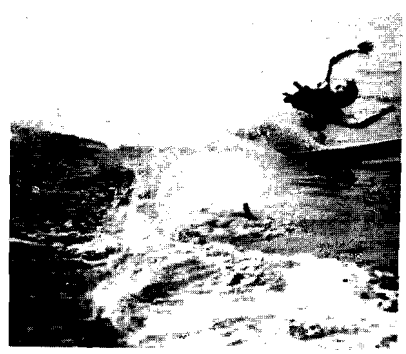
where the water is deepest, in the channel. They can get anywhere. But still they want to run circles around you. They could be clear over there against shore and it wouldn't be no problem for me at all. But they want to get right in front of you. Run around you and holler and wave and fall off. It's just an awful problem. I'm comin' down about 10 miles an hour, 15 miles an hour. Well that's slow to them. But you get 23 or 24 thousand tons at 15 miles an hour, and that's fast. But to them it's slow. It's like you driving your car 10 or 15 miles an hour—you're going slow. Well that's what they feel. You can stop anytime, they think. But you just don't do that. No way."

To Woodall, water skiers are a special worry.

"Somebody just now went across in front of my tow, less than a tow-lenth from me, and if he'd fall off, which they do—there, he just now fell— . . . If he'd fell in front of me, there's nothing I coulda done. If I'd stopped back full stern, I still couldn'ta cut my headway."

The recreational boaters' lives are not the only ones the towboat operator has to concern himself with. A crewman on the WILLIAM H. ZIMMER points out:

"The man in the wheelhouse, the man running this boat, is not only responsible for that tow out there, but he's responsible for this boat and 12 people on it. It wouldn't take long—if you tear the bottom out of one of these boats, they



. . . are a special worry"

go down in a hurry. And he's gotta weigh the consequences of getting this thing out of the channel and running aground and maybe tearing the tow up or sinking the boat and killing the 12 people on the boat, too. Not only the boat out in front of him causing the problems but the boat he's on and all the people in here that are looking to him to run the boat and keep them safe."

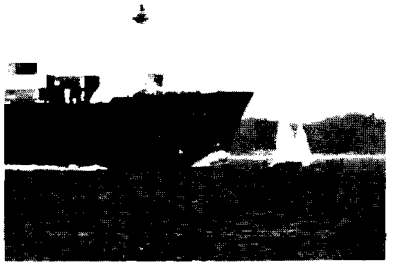
As far as Woodall is concerned, there's no question as to what takes priority:

"I'm not going to jeopardize my job, my tow, on account of them dummies. I'll tell you that. I give it my best shot. That's all I can do."

"I'm not going to jeopardize my job, my tow, on account of them dummies"

The cargo from a tow on the rivers often finds itself in the hold of a ship bound for a foreign port. And even though a bay is wider than a river, the channel may be very narrow, and the problems are the same. A towboat skipper describes a run-in with a sailboat:

"It was a summer afternoon, clear visibility, and we were southbound at Annapolis. A sailboat approached crossing the bow and decided he didn't have sufficient clearance, came about, and sailed away, which was a good move. Soon as the tug had cleared him, he came about again and proceeded across the bay, sailing right square into the side of the barge and scratched the side of his hull with no major damage. And he proceeded to chase me and curse at me for running into him."



"A sailboat approached, crossing the bow. . ."

Incidents like those aggravating towboat crews also plague the captains of ships on the nation's harbors and bays. To a foreign ship captain, they mean time lost. And time lost means money lost. Says one:

"On the open sea we can run an average speed of, say, approximately 22 knots. Here it has to be less than 16 knots. That's maneuvering speed."

And just like their counterparts on the rivers, recreational boaters in the harbors and bays underestimate the time and distance it takes a captain to stop his ship, as is evident from the following misperception:

"Oh, it'd take a long distance, because he really has very little control over that. There's such a tremendous weight I wouldn't have any idea, but I know good and well it would take a quarter of a mile."

Talking to a captain would quickly set the previous speaker straight:

"Before I get from 16 knots to stop, it will take me 15 or 20 minutes."

Putting the ship on emergency stop is not the simple solution it would seem. Roger Donnegan, a veteran pilot on the Chesapeake, explains the problems this entails:

"They don't like the maneuver at all. It's a very expensive proposition, and you would probably go, for some ships, three miles before you could come to a complete stop. And you'd be well off course. When you're reversing your engines, you have no way of steering. So, to stop, it would be . . . you couldn't even predict where you'd be when you stopped."

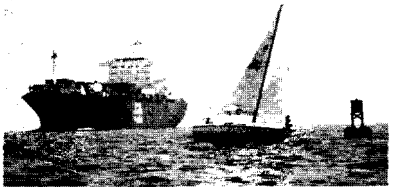
Donnegan says the recreational boater also often underestimates the speed and the size of the ships.

". . . they go from a speck to there on top of you"

"It's dangerous. The ships move much faster. Most people think their small boat's fast. The ships are faster. They can almost count on that. But they don't look like it. They just grow and come upon you before you know it. If they see us off in the distance, they don't realize how fast we're coming. And these ships—some 18, 19, and 20 knots—they come upon 'em pretty fast. And they go from a speck to there on top of you. So if you see a ship, keep clear of it. Get out of the way, and keep an eye on it."

At times Donnegan doesn't believe what he sees.

"Off Sparrow's Point today, for instance, they were using a black channel buoy to turn on. For their race! And so they all had to come into the channel and turn to go



". . . they were using a black channel buoy to turn on. For their race!"

back out of the channel, which wasn't bad today, but if there'd been a lot of traffic, other ships coming the other way, they would still race and try to turn on that buoy and make the channel that much smaller. I just don't understand why they have to use mark ers like that. A navigational aid for a turning buoy, for a racing buoy, doesn't make much sense."

Often he feels helpless.

"Well, we're almost helpless, in that the ship can't stop. They have a better chance of getting out of our way than we have of getting out of theirs. Also, we have to stay in the deepwater channels. And though a sailboat or a small boat looks up and it looks like we can go anywhere in the bay, we're in a track, and they aren't. They can go right up to the beach."

Each and every trip is a close encounter of a dangerous kind.

"We have 80 men working on this bay, and practically every day every pilot that's involved has a story to tell about an encounter with a small pleasure boat and how dangerous it could have been or was. And it makes no sense to have that many stories coming when, with a little caution, everybody could be quite safe."

The preceding article was based on the slide show "Close Encounters of a Dangerous Kind," produced by the Boating Education Branch of the Office of Boating, Public, and Consumer Affairs. The photography was done under the direction of the Coast Guard Photo Team.

Black-box Harbor Navigation

(Look what the microprocessor hath wrought)

by CDR J. F. Roeber
Office of Research and Development

Demands on the mariner in harbors and other confined waterways require some form of automatic navigation. The availability of powerful microprocessors (small computers) has made possible the development of sophisticated navigation equipment. Computer-based devices such as these are traditionally referred to as "black boxes."

Background

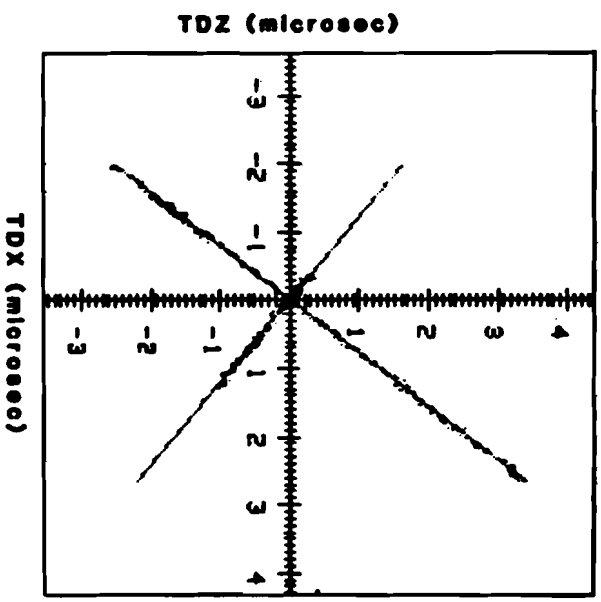
In the National Plan for Navigation it developed in 1971, the Department of Transportation included a requirement for a reliable, all-weather navigation system for Harbor and Harbor Entrance (HHE) areas so accurate that vessels could proceed "as if the visual aids did not exist." Loran-C was selected as the national marine navigation system for the Coastal Confluence Zone (CCZ), and additional Loran-C chains were constructed to provide full coverage of the CCZ. The Coast Guard proposed that an attempt be made to derive the maximum accuracy from Loran-C and display navigation information in a format suitable for use in an HHE area.

Displays

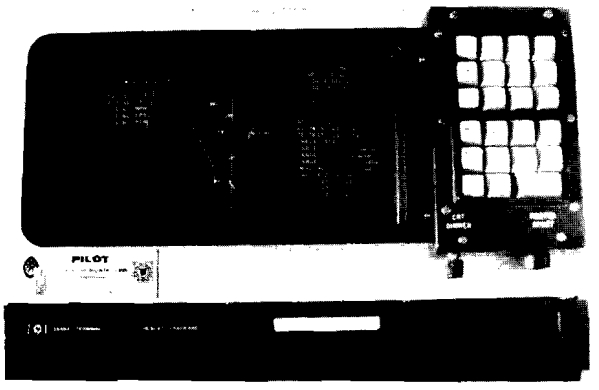
The traditional method for displaying radionavigation information has been a marine chart overlaid with the radionavigation system lines of position (LOPs). The HHE environment, with its narrow channels, nearby hazards, and considerable traffic, does not lend itself to a system requiring a table or chart conversion from LOP to latitude and longitude.

Beginning in the mid-1970s, the Coast Guard Office of Research and Development instituted programs to develop an electronic navigation system for the HHE. While several systems were examined, the availability of stable Loran-C LOP grids in most harbors led the Coast Guard to narrow its work to a Loran-C-based system.

Several generations of equipment were developed.



Waypoint calculation is based on the observed time differences at the intersection of two visual ranges.



PILOT features a video display and a microprocessor to do the navigation and guidance calculations.

PLAD is a portable, carry-on version of PILOT.

The earlier generations were engineering tools in the sense that they were based on a general computer (and in the sense that it took an engineer to operate them). Out of these early systems evolved a video display showing the vessel position, based on Loran-C, in relation to channels and hazards. This eliminated the need for plotting loran lines on a chart in order to find the vessel's current position. The next step was to define, in loran coordinates, the vessel's desired route through the harbor.

Survey

Early attempts at waypoint navigation utilizing loran had concentrated on predicting the loran coordinates for the desired position—in essence, fitting the loran grid to the real world. The accuracy with which loran time differences (TDs) could be predicted did not meet the accuracy requirements for the HHE area. In order to improve the predictions, calibration points distributed throughout the harbor were required. Time differences were measured at known locations and compared to the predictions. Any differences between the two were used as local corrections which could be applied to correct other nearby predictions. Perhaps several hundred calibration points were required in order to cover a large harbor. Even such a complex calibration did not solve all of the problems. Many of the visual aids to navigation positions are known only approximately. As long as the aid accurately marks a hazard or channel boundary, the exact latitude and longitude are not important to visual navigation. In the St. Marys River, where most of the work took place, the problem was compounded by the different local survey grids employed in Canada and the United States. In short, the attempts to match the loran TD grid to a latitude and longitude grid suitable for harbor navigation failed.

Since harbor navigation is really channel navigation, conversion from TD to position is actually required only in a narrow strip. The idea of measuring the TDs at waypoints in the channel was proposed. In the case of the St. Marys River, where nearly all channel segments are marked with visual ranges, a visual survey technique was developed. The survey vessel proceeds through a waypoint on one visual range several times and then repeats the process for the intersecting range. Computer analysis of the data yields the TDs of the waypoint. If the TDs of successive waypoints are known, position and guidance information between waypoints can be accurately calculated. Further, digitizing chart information allows the surrounding topographic and visual navigation features to be displayed on a video screen accurately related to the vessel position.

PILOT

The latest generation of HHE guidance equipment, the Precision Intracoastal Loran Translocator (PILOT), was developed for the Coast Guard by the Johns Hopkins University Applied Physics Laboratory (APL). It consists of an off-the-shelf video display modified for inclusion of a microprocessor to do the navigation and guidance calculations. A "survey quality" (.01 microsecond resolution) Loran-C receiver and the vessel gyrocompass are connected to the PILOT. The display has two cassette tape units. A "user tape" prepared for the desired route is inserted. The system is activated, and the PILOT "pages through" the user tape until it finds the proper chartlet for the current vessel position. From this point on, the PILOT automatically displays the appropriate chartlet as the vessel proceeds through the channel. In addition to the graphics display, the PILOT can also display digital information. Information includes: distance and time to go to the next waypoint, cross-track distance and speed with respect to the channel centerline, current and next course to steer, heading, and range and bearing to any point on the graphics display. Other vessels are not displayed, although integration of the PILOT navigation display with a radar is possible.

PLAD

Having seen a demonstration of PILOT, the Delaware Pilots' Association requested that the Coast Guard develop a portable, carry-on version. This device, the Portable Loran-C Assist Device (PLAD), has been in use by Association pilots since May of this year. The survey techniques for defining waypoints and the microprocessor are identical to those of

The operator enters his route on PLAD's keyboard.

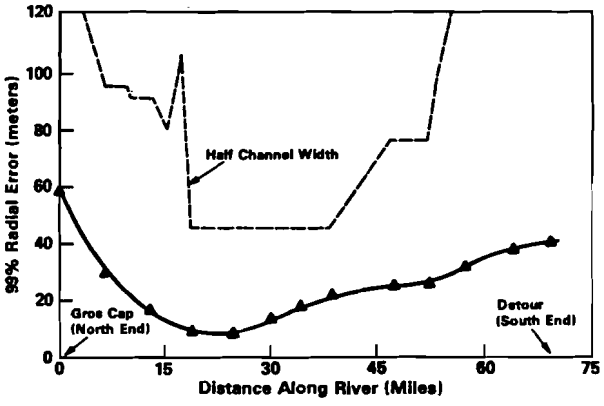
PILOT. PLAD has a self-contained Loran-C receiver, and the hand-held display is limited to two lines of digital information. Upon boarding, the pilot connects the PLAD to ship's power, clamps the antenna to a handy rail, and turns on the unit. In five to eight minutes the receiver has locked on. The operator enters the route (upbound or downbound) through the keyboard of the display. The PLAD microprocessor determines which channel segment the vessel is on. At this point, the PLAD can display any two of the following: distance to the next waypoint, along-track speed, cross-track speed, or cross-track distance relative to the channel centerline.

Accuracy

The simplest way to describe the degree of accuracy achieved by PLAD and PILOT is that it is so high it is difficult to measure. Data collected on the St. Marys River using a Mini-ranger transponder system as the reference and accuracy calculated from the measured TDs indicate an accuracy of 30 meters 99 percent of the time. Measurements on a 21-mile section in the lower Delaware Bay referenced to a U.S. Corps of Engineers Autotape system yielded a mean error of 27 feet with a standard deviation of 53 feet.

The Future

The development of PLAD and PILOT has now been completed. Descriptions of the survey techniques, software, and hardware used will shortly be available to marine elecronics firms through the National Technical Information Service (NTIS), Springfield, Virginia 22161. Commercial availability of such devices awaits only the marketplace demand.



Data collected on the St. Marys River indicate that PILOT is accurate to within 30 meters 99 percent of the time.

FCC Warns Boaters

In response to Coast Guard complaints that private and commercial vessels are using radio frequencies allotted for exclusive use by the U.S. Government, the Federal Communications Commision has issued a public notice. It warns that unauthorized use of these frequencies is a violation of the Communications Act of 1934, as amended, and violators are subject to monetary forfeiture. Further, it explains:

> "There are two marine VHF frequencies allocated specifically for private and commercial vessels to communicate with the U.S. Coast Guard: 156.8 MHz (Channel 16) and 157.1 MHz (Channel 22). Channel 16 is an FCC-allocated frequency designed as a distress and safety communication channel and as a calling channel. The Coast Guard monitors Channel 16 at all times. Channel 22 is a U.S.-Government frequency, which the Coast Guard has authorized for use by private and commercial vessels to communicate with the Coast Guard on generally routine matters after first calling on Channel 16. Use of any other U.S.-Government frequency by private and commercial vessels to contact the Coast Guard must have prior authorization. Some persons may be misled in their understanding of channel use by the fact that U.S.-Government frequency crystals may be legally installed in radio equipment, particularly that equipment which is frequency-synthesized. Their use, however, is strictly prohibited without prior authorization."

Sulfur: S

synonyms:	sulphur, brimstone
Physical Properties	
boiling point:	446°C (870°F)
melting point:*	110 - 120°C (230 - 248°F)
vapor pressure at 140°C (284°F):	0.11 mm Hg
autoignition temperature:*	248 - 261°C (478 - 502°F)
flash point (open cup):*	168 -188°C (335 - 370°F)
Density	
liquid density (125 °C):	1.8 (water = 1.0 at 20°C)
vapor density (44 °C):	0.13 (air = 1.0 at 20°C)
Identifiers	
U.N. Number	1350 solid, 2448 liquid
CHRIS Code:	SXX

*Varies according to purity and crystalline state of the solid

The chemical industry uses more sulfur, one of the 92 naturally occurring elements, than any other raw material. Prehistoric man used the yellow colorant in sulfur as a pigment for his cave paintings. Burning sulfur was used in ancient religious rituals, and by 1600 B.C. the Egyptians were bleaching their cotton and linen in the sulfur dioxide fumes created by burning this element. Gunpowder—made of sulfur, saltpeter, and charcoal—was developed by the Chinese in about 500 B.C. Today sulfur is the foundation of a major portion of the world's economy. A country's industrial capacity, in fact, is measured in part by how much sulfur the country uses.

Much of today's sulfur is obtained by using the Frasch process: superheated water under pressure is introduced into underground sulfur deposits through pipelines, the sulfur melts, and compressed air forces the molten sulfur to the surface. With today's technology, vast quantities of by-product sulfur can also be recovered by such processes as stripping it from oil.

Sulfur is used primarily to make other chemicals. Over 85 percent goes into production of sulfuric acid, which, in turn, is an ingredient in fertilizers, steel, rayon, explosives, other chemicals, and certain dyes. Sulfur's other uses are also extensive, however. It is necessary for production of wood pulp, insecticides, fungicides, rubber, sugar, starch, and dyes. Rubber, for example, requires sulfur for vulcanization (the process which gives rubber its strength and elasticity). The dye ultramarine blue is produced by heating a sulfur-containing mixture. Unlike many raw materials, sulfur is reasonably pure to start with. Most processing involves altering the physical form of the solid, such as grinding lumps to a very fine powder.

For ease in handling, sulfur is almost always liquefied for carriage aboard ships and barges. It is usually kept within a temperature range of 132°C to 143°C (270°F to 290°F). If the sulfur solidifies, heat must be applied for a long time to return it to the liquid state. This can be quite a job, but no safety issue is involved.

Sulfur's flash point (the temperature at which it gives off a vapor sufficient to form an ignitable mixture with the air near its surface) ranges from 163°C to 188°C (335°F to 370°F). Since a static charge can accumulate during loading and possibly during offloading, it is possible to ignite a tank of sulfur without an external ignition source. When sulfur is burned, sulfur dioxide is formed. This is a toxic gas, so anyone near it must wear a self-contained breathing apparatus.

Sulfur deposits often lie close to petroleum deposits, from which the sulfur can pick up hydrocarbon impurities. The presence of such impurities, even in small amounts, can cause hydrogen sulfide to form. Hydrogen sulfide, which is highly flammable and very toxic, has a characteristic "rotten egg" odor that quickly deadens one's sense of smell. Anyone who notices this odor and then suddenly realizes that he can no longer detect it should don a breathing apparatus and leave the area. Sulfur or hydrogen sulfide in contact with iron or steel (i.e., the walls of tanks) can produce pyrophoric iron, which forms in the absence of oxygen. When air enters a tank, the pyrophoric iron can spontaneously ignite.

Although sulfur itself is not toxic, it does present a serious hazard from the standpoint of fires and explosions. Several ships and barges have been lost because of fire, and the SS MARINE SULFUR QUEEN vanished in February 1963.

Neither the Environmental Protection Agency nor the Inter-Governmental Maritime Consultative Organization considers sulfur a pollutant. Because sulfur is nontoxic, the American Conference of Governmental Industrial Hygienists has not found it necessary to establish exposure limits. Coast Guard regulations regarding sulfur can be found in Subchapter O of the Code of Federal Regulations, Certain Bulk Dangerous Cargoes.

ALAN L. SCHNEIDER, Sc.D., and CURTIS PAYNE, B.A.
HAZARD EVALUATION BRANCH
CARGO AND HAZARDOUS MATERIALS DIVISION

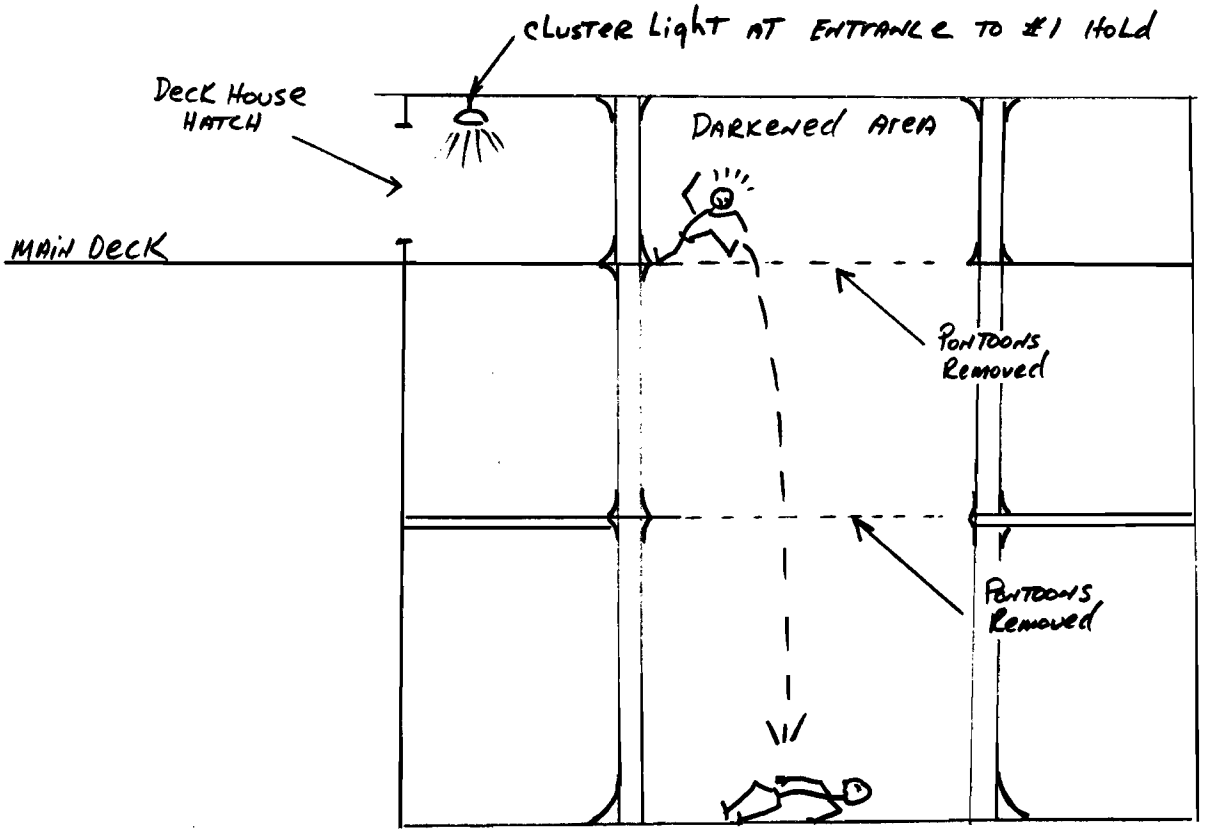
Lessons from Casualties

Falling into an open hold is a casualty which occurs all too frequently. In many instances there are no witnesses, so the exact details of a fatal fall are undeterminable. The scenario, however, is common. To reinforce your appreciation for this unique shipboard hazard, here is a recent case for your consideration. Ask yourself if it sounds familiar. Then see if the situation exists on your ship. What would you do to prevent an accident?

The victim, an Able Seaman (AB) on a medium-sized cargo vessel, was working with several crewmembers, clearing the forward decks of dunnage and stowing gear inside the deckhouse over the number one hold. A cluster light rigged inside the entryway to the deckhouse provided illumination for the immediate work area. Forward of this area in a darkened part of the hold, hatch cover pontoons had been removed, leaving the center of the hold open. This condition had existed since the last port call several days earlier, and the work crew was aware of it. When the task at hand had been completed, all crewmen except the AB went aft. He was last seen alive, entering the number one hold deckhouse. When he failed to show up for watch, a seaman dispatched to the hold to look for him found the victim at the bottom of the hold. He died of an apparent skull fracture suffered when he fell through the open area over the hold.

This casualty might have been averted by adequate illumination of the open hold area, the rigging of a safety chain, or the posting of a warning sign at the entrance to the compartment.

Look around your ship—don't take it for granted that everyone is aware of a potential hazard. It doesn't have to be a hold that is open, either. It could be a deck plate open for the passage of hoses and equipment or a larger hole cut out for repair. But no matter why the opening is there, remember: light it, guard it, and pass the word. ⚓



Nautical Queries

The following items are examples of questions included in the Third Mate through Master examinations and the Third Assistant Engineer through Chief Engineer examinations.

DECK

(1) A marine sextant has the index arm set at zero, and the reflected image of the horizon forms a continuous line with the actual image. When the sextant is rotated about the line of sight, the images separate. The sextant has

A. error of perpendicularity.
B. side error.
C. prismatic error.
D. centering error.

REFERENCE: Bowditch

(2) The master of each merchant vessel of one hundred gross tons or upward shall report the employment, discharge, or termination of the service of every seaman. This does not apply to vessels engaged

A. on an intercoastal voyage.
B. on a nearby foreign voyage.
C. in fishing and whaling.
D. on a foreign voyage.

REFERENCE: 46 CFR 14.05-10

(3) When you are taking stars, those bodies to the east and west will

A. change altitude rapidly.
B. change altitude slowly.
C. remain in an almost fixed position.
D. appear to be moving in the plane of the horizon.

REFERENCE: Dutton

(4) When viewed from above, the best position for the guy in relation to the boom is

A. parallel.
B. four feet aft of the heels of the booms.
C. at right angles.
D. at a 45° angle.

REFERENCE: Sauerbier

(5) 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.

REFERENCE: La Dage

ENGINEER

(1) If a small fire broke out in an automation console, you would first secure the power and then use which type of hand portable fire extinguisher?

A. Soda Acid
B. High Expansion Foam
C. CO_2
D. Protein Foam

REFERENCE: Marine Fire Prevention, Fire Fighting, Fire Safety

(2) Coast Guard Regulations (46 CFR 112) require the emergency diesel generator to be able to supply power to the

A. smoke detector system.
B. gyrocompass.
C. radio installation.
D. main circulating pump.

REFERENCE: 46 CFR 112.15-5(i)

(3) The governor on a diesel engine controls crankshaft RPM by adjusting the

A. intake air supply.
B. turbocharger speed.
C. fuel injection pumps.
D. engine speed drop.

REFERENCE: Maleev

(4) Why would a flash type distilling unit operate more efficiently when using colder seawater?

A. Steam carryover between stages is reduced.
B. Amount of available flash steam is decreased.
C. Evaporator vacuum is substantially increased.
D. Feedwater flow from the feedwater heater is increased.

REFERENCE: Osbourne

(5) If you hear a continuous blast of the ship's whistle for a period of not less than 10 seconds supplemented by a continuous ringing of the general alarm bells for not less than 10 seconds, you should go to your

A. boat station.
B. fire station.
C. man overboard station.
D. collision station.

REFERENCE: 46 CFR 35.10-5(a)

ANSWERS

DECK
1.B;2.C;3.A;4.C;5.D

ENGINEER
1.C;2.A;3.C;4.C;5.B

INDEX TO COAST GUARD REGULATIONS

Many of the publications previously included in this list (under the title "MERCHANT MARINE SAFETY PUBLICATIONS") were unavailable because they were being revised or reprinted. These publications were reprints of selected subchapters of the Code of Federal Regulations (CFR). The Superintendent of Documents publishes the CFR in yearly updated form, and the CFRs are thus the best source for those needing up-to-date information on Coast Guard regulations. The price and availability of any desired volume can be obtained by calling (202) 783-3238 or writing: Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

Safety-related publications not falling into the CFR-reprint category will henceforth be published periodically in a separate list.

Listed below are the Code of Federal Regulations (CFR) subchapters covering Coast Guard shipping regulations (Title 46, Chapter I of the CFR). Chapter I comprises nine volumes. A desired volume should be ordered by referring to the parts it contains; for example, if marine engineering regulations (Subchapter F) are needed, 46 CFR Parts 41 to 69 (the third volume) should be ordered. The numbers shown in the "Coast Guard Equivalent" column refer to previous reprints of selected subchapters. See the chart below.

	Volume	Coast Guard Equivalent	Contents
1.	46 CFR Parts 1 to 29	None	Subchapter A—Procedures Applicable to the Public. Parts 1 to 9.
		CG-191	Subchapter B—Merchant Marine Officers and Seamen. Parts 10 to 16.
		CG-258	Subchapter C—Uninspected Vessels. Parts 24 to 29.
2.	46 CFR Parts 30 to 40	CG-123	Subchapter D—Tank Vessels. Parts 30 to 40.
3.	46 CFR Parts 41 to 69	CG-176	Subchapter E—Load Lines. Parts 42 to 46.
		CG-115	Subchapter F—Marine Engineering. Parts 50 to 64.
		None	Subchapter G—Documentation and Measurement of Vessels. Parts 66 to 69.
4.	46 CFR Parts 70 to 89	None	Subchapter H—Passenger Vessels. Parts 70 to 89.
5.	46 CFR Parts 90 to 109	CG-257	Subchapter I—Cargo and Miscellaneous Vessels. Parts 90 to 106.
		None	Subchapter I-A—Mobile Offshore Drilling Units. Parts 107 to 109.
6.	46 CFR Parts 110 to 139	CG-259	Subchapter J—Electrical Engineering. Parts 110 to 139.
7.	46 CFR Parts 140 to 155	None	Subchapter N—Dangerous Cargoes. Parts 146 to 149.
		None	Subchapter O—Certain Bulk Dangerous Cargoes. Parts 150 to 154.
8.	46 CFR Parts 156 to 165	CG-268	Subchapter P—Manning of Vessels. Part 157
		None	Subchapter Q—Specifications. Parts 160 to 165.
9.	46 CFR Parts 166 to 199	None	Subchapter R—Nautical Schools. Parts 166 to 168.
		CG-323	Subchapter T—Small Passenger Vessels (Under 100 Gross Tons). Parts 175 to 187.
		None	Subchapter U—Oceanographic Vessels. Parts 188 to 196.
		None	Subchapter V—Marine Occupational Safety and Health Standards. Part 197.

Listed below are the Code of Federal Regulations (CFR) subchapters covering Coast Guard regulations on Navigation and Navigable Waters (Title 33, Chapter I of the CFR). Chapter I consists of a single volume containing 19 subchapters. Subchapters and/or parts of this chapter are not published individually; the entire volume must be ordered.

	Volume	Coast Guard Equivalent	Contents
1.	33 CFR Parts 1 to 199	None	Subchapter A—General. Parts 1 to 26.
		None	Subchapter B—Military Personnel. Parts 45 to 53.
		None	Subchapter C—Aids to Navigation. Parts 60 to 76.
		None	Subchapter D—Navigation Requirements for Certain Inland Waters. Parts 80 to 86.
		None	Subchapter DD—Implementation and Interpretation of the 72 COLREGS. Parts 87 and 88.
		None	Subchapter E—Navigation Requirements for the Great Lakes and St. Marys River. Parts 90 to 92.
		None	Subchapter F—Navigation Requirements for Western Rivers. Parts 95 and 96.
		None	Subchapter G—Regattas and Marine Parades. Part 100.
		None	Subchapter H—Routes for Passenger Vessels. Part 105.
		None	Subchapter I—Anchorages. Parts 109 and 110.
		None	Subchapter J—Bridges. Parts 114 to 118.
		None	Subchapter K—Security of Vessels. Part 122.
		None	Subchapter L—Waterfront Facilities: Security Zones and Regulated Navigation Areas. Parts 125 to 128.
		None	Subchapter M—Marine Oil Pollution Liability and Compensation. Parts 135 and 136.
		None	Subchapter N—Artificial Islands and Fixed Structures on the Outer Continental Shelf. Parts 140 to 147.
		None	Subchapter NN—Deepwater Ports. Parts 148 to 150.
		None	Subchapter O—Pollution. Parts 151 to 159.
		None	Subchapter P—Ports and Waterways Safety. Parts 160 to 165.
		M16752.2	Subchapter S—Boating Safety. Parts 173 to 183.

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