

PROCEEDINGS

OF THE MARINE SAFETY COUNCIL

Vol. 37, No. 2

February 1980



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

CG-129

PROCEEDINGS

OF THE MARINE SAFETY COUNCIL

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B: n(50); e(16); e(5); f(4);
g(3); r(2); bkipq(1)
C: egimp(1)
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20 READERS—
PLEASE PASS IT
ALONG

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cover

The EL PASO ARZEW is a 125,000 M³ LNG carrier. While enroute from Savannah, Georgia to Arzew, Algeria last summer, her officers and crew decided to maneuver both the Navy and Coast Guard methods of the Williamson Turn for the sake of comparison. Captain James Stilwell, Master, reports on their findings beginning on page 31.

maritime sidelights

SHIP SAFETY ACHIEVEMENT CONTEST

The American Institute of Merchant Shipping and the Marine Section of the National Safety Council have announced a Ship Safety Achievement Awards Contest for American flag merchant ships, including barge and towing vessels, which have performed outstanding feats of safety in the course of the calendar year ending December 31, 1979.

Entries will be accepted until February 22 and should be sent to Barbara D. Burke, Director of Public and Legislative Affairs, American Institute of Merchant Shipping, 1625 K Street NW, Suite 1000, Washington, DC 20006.

CERTIFICATES OF FINANCIAL RESPONSIBILITY

Several questions have arisen recently from the maritime industry concerning Certificates of Financial Responsibility (COFR).

The purpose of this section of the law is to insure that each vessel using U.S. waters will have sufficient financial resources to indemnify the taxpayers of the United States against removal costs up to \$150 per gross ton or \$14 million, whichever is lesser, when that vessel is responsible for removal costs.

The regulations concerning the COFR's apply to all vessels using any port or place in the United States or the navigable waters of the United States except (1) vessels which are 300 gross tons or less, (2) non-self-propelled barges which do not carry oil or hazardous substances as cargo or fuel, and (3) public vessels. The COFR is required in order for the owner or operator of the vessel to provide evidence that he possesses the resources to meet his liability to

the United States in case of an accident in which oil or hazardous material spilled from the vessel must be cleaned up.

Before a vessel is allowed to enter the navigable waters of the United States, the Captain of the Port will check to ensure that a valid COFR for the vessel does exist. If the vessel does not have a COFR, or if its COFR is not current, the vessel will be denied entry to U.S. navigable waters or otherwise restricted in her activities until a valid COFR is obtained. Oil transfer operations will not be permitted in the absence of a valid COFR.

Details on Certificates of Financial Responsibility can be found in 46 CFR 542.

Reprinted from the U.S.C.G. Marine Safety Newsletter, Houston

NEW GUIDE FOR TANKER AND TERMINAL SAFETY

A new book entitled "International Safety Guide for Oil Tankers and Terminals" has been published jointly by the International Chamber of Shipping (ICS) and the Oil Companies International Marine Forum (OCIMF). This important work combines and updates the contents of the separately published "Tanker Safety Guide (Petroleum)" by ICS and the "International Oil Tanker and Terminal Safety Guide" by OCIMF.

The new book consists of two parts. Part 1 covers operational procedures and safe practices. Part 2 provides additional information and supporting reasons for guidance given in Part 1.

This text is generally accepted worldwide as an industry standard for tanker safety and is carried on board many oil tankers. Further, the Maritime Safety Committee of IMCO has acknowledged it as a significant contribution toward tanker safety. A second edition of the "Clean Seas Guide for Oil Tankers" by the same authors has also been published. This text is referenced in 33 CFR 157.23. Copies may be obtained from:

New York Nautical Instrument
and Service Corporation
140 W. Broadway
New York, NY 10013

The International Safety Guide costs \$45.00 plus postage; the Clean Seas guide is available for \$4.50 plus postage. Copies are also available from Witherby and Company, Ltd., 32-36 Aylesbury Street, London, EC1R 0ET, England for £ 18 and £ 2, respectively.



This month's list of proposed and final rules published in the Federal Register is not as large as that of last month. Of particular interest are the final rules on Marine Investigation and Revocation Proceedings, CGD 79-080, which were published on January 10, 1980 and will become effective on February 11, 1980. These regulations, together with CGD 77-168, Navigation Safety Regulations for Electronic Navigation Devices, comprise the highlights of the Coast Guard's regulatory efforts since the last issue. Aside from these, the only other final rules published pertain to boating safety. These rules are the Ventilation Standards, CGD 76-082 and 76-082A, published on December 17, 1979 and CGD 78-034, Display of Capacity Information On Boats, published on January 10, 1980.

Of the proposed rules, two, published on January 7, 1980, pertain to the Great Lakes. These are the proposed rules for Great Lakes Pilotage, CGD 79-138, and those for Tank Vent Piping on Great Lakes Vessels, CGD 79-083. The other proposed rule published pertains to Standards for Offshore Crane Design, Inspection, Testing, Operation and Operator Qualifications. This rule was published on January 10, 1980.

The Marine Safety Council has received several requests for reprints of the final rule on the Pollution Prevention Regulations (CGD 75-124A). This rule, ex-

Continued on next page.....

KEYNOTES.....

pected in January, has hit a snag in our legal department on clearance. We are promised that it should clear shortly and most probably will be published by the time you receive this issue. Requests for reprints of this final rule, as is the case with any reprint which is unavailable when a request is received, will be placed on file and filled as soon as the material is available. If you have requested and not received a copy of an article which has not yet been published, a second request is not necessary.

Any questions regarding regulatory dockets or companies and individuals wishing to speak at public hearings should notify Capt. P. J. Danahy (G-CMC/24), U.S. Coast Guard Headquarters, 2100 Second St. SW, Washington, DC 20593; (202)426-1477.

* * *

QUALIFICATIONS OF THE PERSON IN CHARGE OF OIL TRANSFER OPERATIONS, TANKERMAN REQUIREMENTS CGD 74-44, 74-44a

These regulations 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.

As stated in the last issue, these projects have been withdrawn (44 FR 25243). New NPRM's which were anticipated in June have been delayed and are now scheduled for publication in April of this year under new Coast Guard docket numbers 79-116 and 79-116a.

REVISION OF ELECTRICAL REGULATIONS CGD 74-125

This regulation will constitute a general revision and updating of the electrical regulations to conform with latest technology. It

will include steering requirements for vessels other than tank vessels.

This revision is occurring because industrial standards for electrical engineering have changed in the past few years, and 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 will be issued early in 1980.

NEW TANK BARGE CONSTRUCTION CGD 75-083 UPGRADE OF EXISTING TANK BARGE CONSTRUCTION CGD 75-083a

This action is comprised of 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. One project will address new barge construction while the other will pertain to existing barges. Regulatory documents for both will be published at the same time and joint public hearings have been held.

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 advanced notice of proposed rulemaking (ANPRM) was then issued to gather additional data and assess impacts related to existing barges.

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

Public hearings were held on the dockets as follows: August 2, 1979, Washington, DC; August 15, 1979, Seattle, WA; August 23, 1979, New Orleans, LA; September 5, 1979, Washington, DC; and September 7, 1979, St. Louis, MO. The comments given 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.

This extension has expired and no further comments will be accepted. A final rule on Tank Barge Construction (CGD 75-083) is presently anticipated in June of 1980 and an NPRM on Existing Tank Barges (CGD 75-083A) is scheduled for April of the same year.

Anyone wishing to obtain copies of the rulemaking may do so by contacting Capt. P. J. Danahy, Marine Safety Council (address is given in the introduction to the Keynotes section).

POLLUTION PREVENTION, VESSELS AND OIL TRANSFER REGULATIONS CGD 75-124a

This regulation would reduce accidental or intentional discharge of oil or oily wastes during vessel operations.

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

The NPRM was published on June 27, 1977 (42 FR 32670). A supplemental NPRM was published October 27, 1977 (42 FR 56625). The draft of the final rule is under review by the Coast Guard legal office and is scheduled to appear in late January or early February 1980.

DESIGN AND APPROVAL REQUIREMENTS FOR OIL POLLUTION PREVENTION EQUIPMENT CGD 76-088a

These regulations set out specifications and procedures for approving oil-water separators, cargo monitors, bilge monitors and bilge alarms for use on merchant

Continued on next page.....

KEYNOTES.....

vessels. They are based upon international design and test specifications adopted by the International Maritime Consultative Organization (IMCO) as Resolution A-393X, and provide standards for equipment that is representative of the best technology presently available.

The final rule, published in the September 13, 1979 Federal Register (44 FR 53352), requires that performance testing of prospective equipment must be done by one of the independent testing laboratories designated by the Commandant (G-MMT). The following laboratories have received authorization to commence testing:

Underwriters Laboratories
Tampa, Florida, USA

National Sanitation Foundation
Ann Arbor, Michigan, USA

University of New Castle
New Castle Upon Tyne, UK

The following three regulations, CGD 77-057, CGD 77-058(b)(c)(d), and CGD 77-063, make up the Tanker Safety and Pollution Prevention (TSPP) Regulations. Public hearings have been held on the package, comments were requested and 541 have been received. A notice of delay in publishing the final regulations was published in the June 7, 1979 Federal Register (43 FR 32713). Final rules have been published and appeared in the November 19, 1979 Federal Register (44 FR 66500).

INERT GAS SYSTEM CGD 77-057

This regulation would require certain oil tankers of 20,000 deadweight tons and over to be fitted with inert gas systems.

As part of the President's initiatives to reduce marine pollution, this regulation will reduce the possibility of in-tank explosions which have been the cause of some pollution incidents.

The Inflationary Impact Statement for this regulation was completed in May 1977. An NPRM was published February 12, 1979 (44 FR 8984). Hearings were held March 21, 1979 in Washington, DC and March 28, 1979 in San Francisco, CA; 136 comments were received, have been evaluated, and the final rule has been published.

SEGREGATED BALLAST AND TANK CLEANING REGULATIONS GCD 77-058(b), (c) and (d)

This four-part regulation was initiated when President Carter directed the Secretary of Transportation to issue new rules for oil tanker standards, which were to include segregated ballast on all tankers and double bottoms on all new tankers which call at American ports. The provisions of these proposed regulations have been changed by the February 1978 Intergovernmental Maritime Consultative Organization (IMCO) Conference to include Crude Oil Washing (COW) and Clean Ballast Tanks (CBT).

The NPRM was published May 16, 1977 (42 FR 24868). As a result of the IMCO Tanker and Pollution Prevention Conference of February 1978, a new NPRM was issued on February 12, 1979 (44 FR 8984). Public hearings were then held in March in Washington, DC and San Francisco, CA; 265 comments were received on the docket, and were analyzed and the final rules were formulated. These rules appeared in the Federal Register of November 19, 1979.

STEERING GEAR DESIGN STANDARDS TO PROVIDE REDUNDANCY CGD 77-063

As part of the President's initiatives to reduce pollution, this regulation is needed to help reduce the possibility of a marine collision due to a loss of steering.

An NPRM was published May 16, 1977 (42 FR 24869). As a result of the IMCO Tanker Safety and Pollution Prevention Conference of February 1978, a new NPRM was issued on February 12, 1979 (44 FR

8984). Public hearings were held on the docket and 138 comments have been received and analyzed and the final rules have been published.

CONSTRUCTION AND EQUIPMENT EXISTING SELF-PROPELLED VESSELS CARRYING BULK LIQUEFIED GASES CGD 77-069

These regulations would amend the current ones to include the substantive requirements of the "Code for Existing Ships Carrying Liquefied Gases in Bulk," adopted by the Intergovernmental Maritime Consultative Organization (IMCO). The use of liquefied gas has increased, as have the problems associated with it. Due to its unique properties and the dangers associated with them, new regulations are being drafted. The environmental impact statement and regulatory analysis were completed in February 1979 and an NPRM on these regulations is anticipated in early 1980.

LICENSING OF PILOTS CGD 77-084

This regulation takes into account the problems caused by increased ship size and unusual maneuvering characteristics. The proposal would 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 ship-handling simulator training for pilots of very large vessels. A regulatory analysis and work plan were completed in October 1978. An NPRM is expected in April 1980.

REVISION OF 46 CFR 157.20-5 DIVISION INTO THREE WATCH REGULATION CGD 78-037

This revision would require an adjustment in vessel manning requirements, to bring them in line with current legislation. It would change the requirements which

Continued on next page.....

KEYNOTES.....

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 will not be published, as the docket is being withdrawn.

TANK VESSEL OPERATIONS REGULATIONS, PUGET SOUND CGD 78-041

This regulation governs the operation of tank vessels in the Puget Sound area. It was 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 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 June 11 and 12 in Seattle, Washington, June 13 in Mt. Vernon, Washington, and June 14 in Port Angeles, Washington have been completed and all the comments received have been entered in the docket files for consideration. The extension of the interim navigation rule was published June 21, 1979 (44 FR 36174). This extension was effective July 1 and will be in effect until the Coast Guard prints notice of its cancellation. 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 July 1980.

EIGHT-HOUR DAY VOLUNTARY OVERTIME CGD 78-146

This docket is a review of the Eight Hour Day, Voluntary Over-

time regulation in 46 CFR 157.20-10, which states that no licensed officer should be required to be on duty more than eight hours per day except in extraordinary circumstances. Existing regulations, however, do not address overtime or consider any possible "fatigue factor." Recent Coast Guard studies have shown that this factor has a profound effect on reaction time and judgement, therefore the regulation is currently being reviewed and is in the process of being withdrawn.

PERSONNEL JOB SAFETY REQUIREMENTS FOR FIXED INSTALLATIONS ON THE OUTER CONTINENTAL SHELF CGD 79-077

This regulation is concerned with the health and safety requirements for installations and vessels engaged in oil field exploration and development. This action was mandated by pending Outer Continental Shelf legislation. It will provide more comprehensive protection for personnel employed in vessels and installations in the oil trade. The work plan received by the Marine Safety Council (MSC) in early July calls for an NPRM in January 1980.

SHIPBOARD NOISE ABATEMENT STANDARDS CGD 79-134

These standards will establish acceptable sound levels for each of the various vessel compartments based on the latest technology. The standards will differentiate acceptable sound levels for both existing vessels and new vessels, acceptable methods of compliance, and will establish a hearing conservation program.

During the development of these standards, the U.S. Naval Ocean Systems Center (NOSC), San Diego, California was contracted by the Coast Guard to evaluate sound levels aboard several U.S. merchant vessels, to study the data obtained, and then to define the extent of the noise problem. Based on this data and other information available, they were asked to recommend a set of noise levels to

be used in the control and/or elimination of the shipboard noise problem for the proposed standards.

This study has been completed. Copies are available through the National Technical Information Service (NTIS), Springfield, Virginia 22161; request NOSC technical documents numbers 243, 254, 257, 267 and 405.

PERSONNEL AND MANNING STANDARDS FOR FOREIGN VESSELS CGD 79-081

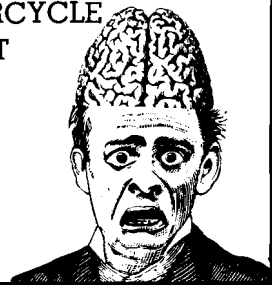
This regulation, deemed necessary to reduce the probability of oil spills, would establish minimum manning levels for foreign tank vessels operating in U.S. navigable waters. It would also establish procedures for the verification of training, qualification and watch-keeping standards. As we go to press, an NPRM is pending.

A complete listing of all Coast Guard regulations, both "significant" and "non-significant," appeared in the Monday, August 27, 1979 Federal Register (44 FR 50140).

THE COAST GUARD HAS NO PUBLIC HEARINGS SCHEDULED AT THIS TIME FOR FEBRUARY OR MARCH

USE YOUR HEAD!

IT'S A GOOD
PLACE TO PUT A
MOTORCYCLE
HELMET



Williamson Turn Tests on the *EL PASO ARZEW*

The following letter was forwarded from Captain James Stilwell, Master of the EL PASO ARZEW. After reading Captain Oliver F. Williams' "Which Williamson Turn?" in the July 1979 U.S. Naval Institute Proceedings, Captain Stilwell and others aboard his ship conducted some tests of their own. Their findings are worth sharing

In response to the letter by Captain Oliver F. Williams, "Which Williamson Turn?" in the July 1979 *Proceedings* I would like to offer the following comments.

After reading said article a discussion was conducted among the officers of the EL PASO ARZEW. Each had his own particular ideas about how the Williamson Turn should be conducted. To satisfy the ambiguities it was decided to conduct two turns. One was to use the Navy method and the other was to use the Coast Guard method as described in CG-175. The object was to determine which method was the more accurate to return the vessel down the original track line.

The turns were conducted on the afternoon of 28 July 1979 aboard the EL PASO ARZEW while enroute from Savannah, Georgia to Arzew, Algeria. Weather conditions were perfect. The sea was glassy, with little or no swell. An empty 55-gallon drum was used in lieu of the traditional "oscar." The EL PASO ARZEW is a 125,000 cubic meter LNG carrier having an LOA of 948'-06", a beam of 135' and a depth of 90'. The drafts during the tests were 29'-00" forward and 34'-00" aft. The height of the eye of the bridge is 121' so no problem was experienced in keeping the drum in sight continuously throughout the test.

It was decided to conduct the Navy method test first. The drum was thrown over the side from the starboard bow. As it became visible from the bridge wing the order was given for "Hard Right Rudder." Thirty-five degrees was used throughout the test for hard rudder although this vessel has capability to forty-five degrees. Hard rudder was held until the vessel was exactly 60 degrees off the original course at which time the rudder was shifted to hard left. The vessel continued to swing to the right until it reached

a maximum of 88 degrees off the original course. Hard left rudder was held until the vessel was 25 degrees off the reciprocal course at which time hard right rudder was again applied in order to steady the vessel onto the reciprocal course. Experience has shown that when the vessel is swinging at the maximum rate of turn, 25 degrees lead is required in order not to overshoot the desired course. The vessel steadied on the reciprocal course and the drum passed approximately 100 feet down the starboard side. As shown in the diagrams this method resulted in the vessel being approximately 285 feet to the right of the original course.

The Coast Guard method test began when the drum passed down the starboard side. The order was again given for "Hard Right Rudder." This time the rudder was only held until we were 35 degrees off the original course in order to allow the vessel to steady on a course which was 60 degrees off the original. Hard left rudder was used to accomplish this. When the vessel was steady and 60 degrees off the original course the order was given for "Hard Left Rudder." Once again, when 25 degrees short of the original course hard right rudder was applied to check the vessel's swing and allow her to steady onto the reciprocal course. This time the drum passed about 200 feet down the port side of the vessel. As shown in the diagrams this method resulted in the vessel being approximately 100 feet to the left of the original track line.

Based on the foregoing test I can only conclude that the Coast Guard method is the more accurate method however it has to take into account the maneuvering characteristics of the vessels concerned.

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EL PASO ARZEW.....

The Navy method does not result in this vessel returning down the original track line.
Sincerely,

(Signed)

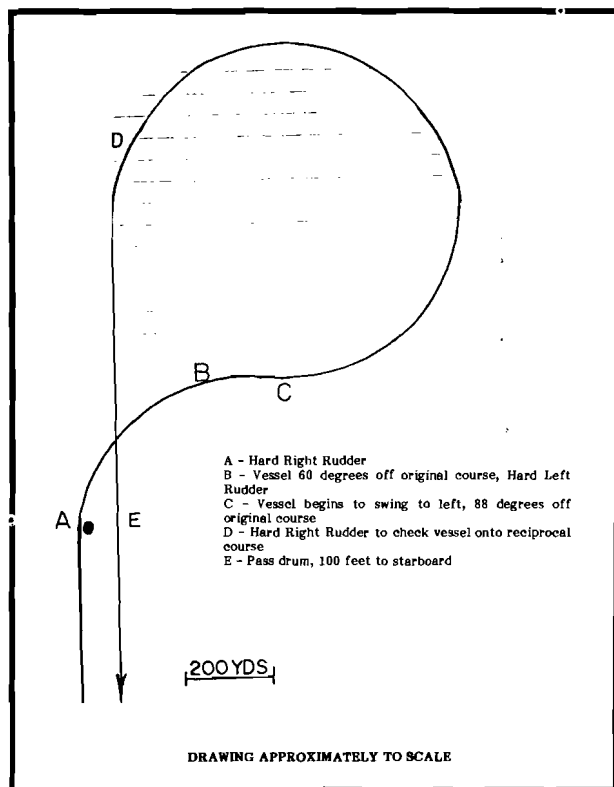
James Stilwell
Master, EL PASO ARZEW

Another reminder that you must always take into account the capabilities and limitations of your particular vessel!

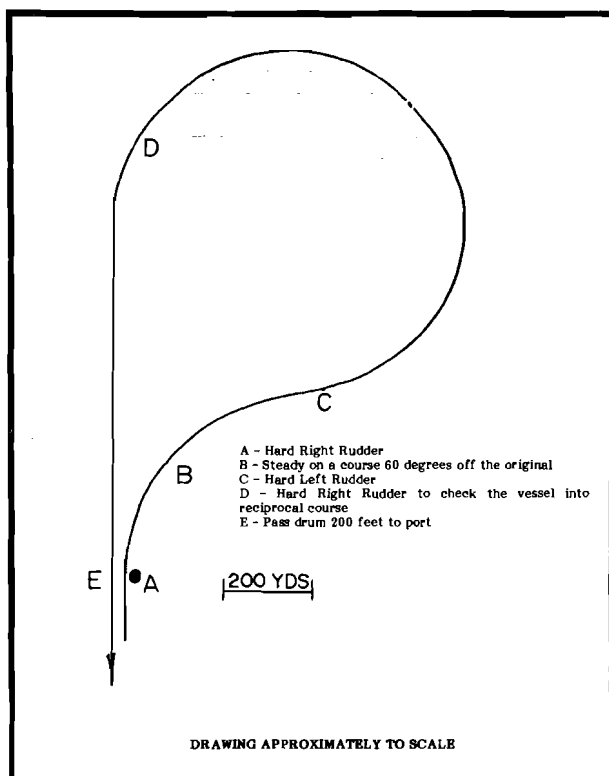
WILLIAMSON TURN (Navy Method). The rudder is put hard over to the side on which person fell over. It is held hard over until vessel is 60 degrees off original course, at which time it is put hard over the other direction. The vessel is then steadied on a reciprocal course to the original.

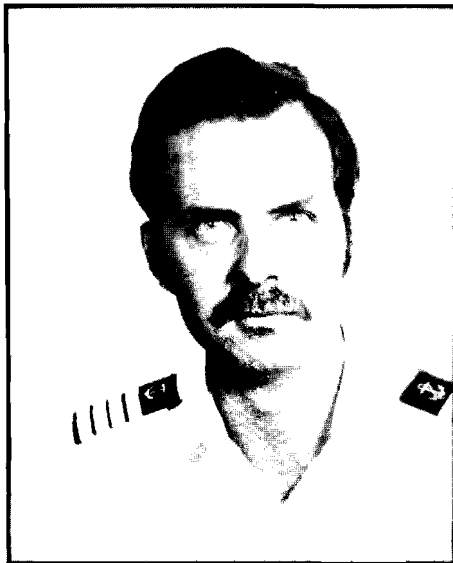
WILLIAMSON TURN (Coast Guard Method) - The rudder is put hard over to the side on which person fell over. The vessel is steadied on a course approximately 60 degrees off the original, at which time the rudder is put hard over in the opposite direction. The vessel is then steadied on a reciprocal course to the original.

NAVY METHOD



COAST GUARD METHOD





About the Author

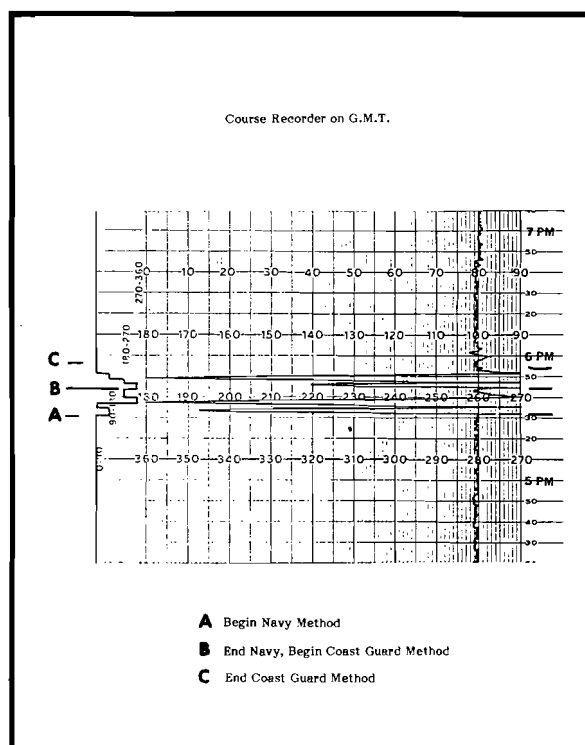
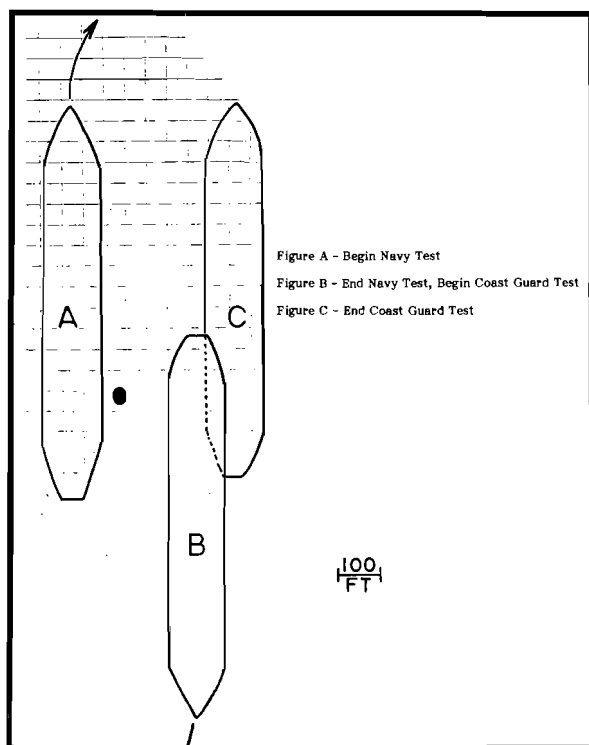
James Stilwell
Master, EL PASO ARZEW

Captain James Stilwell was appointed Master of the EL PASO ARZEW, a 125,000 M³ LNG carrier, in June 1978. A graduate of the California Maritime Academy, he has gained experience aboard freighters, drilling vessels, research vessels and tankers. His first command was in December 1973 as master of the T. T. BROOKLYN, then the largest ship to fly the American flag. Since then he has sailed exclusively as master on vessels varying from 20,000 DWT to 226,000 DWT, tankers, OBOS, and LNG carriers. In addition, Captain Stilwell is an active member of the Naval Reserve and holds the rank of Lieutenant USNR-R.

Throughout the test maximum rudder (hard) was held to 35 degrees.

"Steady" is defined as Zero Rate of Turn as determined by Rate of Turn Indicator.

Base Course 079 degrees p.g.c., Speed 18.0K
ELAPSED TIME - Each Method, approximately 11m-32s



Effective Navigation and Inspection Circulars

The effective Navigation and Vessel Inspection Circulars listed below are available individually or by subscription, free of charge, from: Commandant (G-MP-4/14), U.S. Coast Guard Headquarters, Washington, DC 20593, or call (202) 426-2163.

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10-60	Placards, Forms, and Instructions Required to be Posted Aboard Vessels; Alternate Materials and Methods
11-61	Fire Hose
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8-64A	Renewal of Operators' Licenses - Western Rivers
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2-71	Pipe Stress Analysis Calculations; Procedure for Submission of
4-71	Valves Employing Resilient Material
5-71	Index to 46 CFR Part 151 (Certain Bulk Dangerous Cargoes on Unmanned Tank Barges), Subchapter 0
6-71	Monitoring Carbon Monoxide (CO) in Ship's Cargo Spaces
3-72	Portable Radio Apparatus, training in use of
4-72	Definition of Paraffinic Hydrocarbon Commodities
6-72 CH-1 *	Guide to Fixed Fire-Fighting Equipment Aboard Merchant Vessels
1-73	Pilot Ladders used aboard Merchant Vessels
3-73	Intact Stability Criteria for Passenger and Cargo Ships under 100 Meters in Length
4-73	American Bureau of Shipping Approval of Machinery and Electrical Plans
6-73	Interim Regulations for Foreign Vessels Carrying Certain Bulk Dangerous Cargoes in U.S. Ports
7-73	Main Propulsion Boiler Automation
8-73	Alternate Means of Determining the Weight of CO ₂ in Fire Extinguishing Systems
9-73 CH-1 *	Implementation of the Pollution Prevention Regulations (33 CFR, Subchapter 0 and Amendments to 46 CFR, Subchapter D)
2-74	Change in Administration of Ships' Stores and Supplies of a Dangerous Nature
3-74	Implementation of the Regulations Concerning Licenses for Operation of Uninspected Towing Vessels (46 CFR, Subpart 10.16 and Sections 157.10-83, 157.10-85, 157.30-45)
4-74	Stability Information Required on Inspected and Uninspected U.S. Vessels Receiving a Load Line Certificate and Foreign Vessels Receiving Form B Load Line Certificates
6-74	Elimination of Unsafe Conditions on Board Tank Barges
7-74	Oil-water Separators; acceptance of
1-75	Fire Safety Standards for Foreign Passenger Vessels
2-75	Alteration of Existing Rafts to Comply with Improved Inflation Standards
3-75	Bulk Grain Cargoes
4-75	Bulk Liquid Cargoes; Guide to Compatibility of Chemicals
2-76	Damage Stability Calculations for Tank Vessels
3-76	Stability of Fishing Vessels
1-77	Unified Interpretations of the 1966 International Convention on Load Lines
2-77	American Bureau of Shipping Acceptance of Structural Fire Protection Approval
3-77	Code of Safe Practice for Ships Carrying Timber Deck Cargoes
4-77	Shifting Weights or Counter Flooding During Emergency Situations
5-77	Inspection of Hydraulic Starting Systems for Lifeboats and Survival Capsules
1-78 CH-1 *	Automation of Offshore Supply Vessels of 100 Gross Tons or Over
2-78	Bulk Grain Cargo Regulations (46 CFR 31.10-33, 46 CFR 74.10-12, and 46 CFR 93.20)
3-78	Cross-Reference List Between the IMCO Chemical Code and 46 CFR, Part 153
4-78	Inspection and Certification of Existing Mobile Offshore Drilling Units
1-79	Literature Concerning Hazardous Cargoes
2-79	Aluminum Bus Bars
3-79	Lifeboat Capacity on Foreign Flag Passenger Vessels
4-79	Recommended Procedures for Using Smith & Wesson International Line Throwing Appliances
5-79	Inerting and Tank Cleaning Procedures for Alkylene Oxide Containment Systems
6-79	Coast Guard Review of Merchant Vessel Plans and Specifications
7-79	1969 Amendment to the International Convention for the Prevention of Pollution of the Sea by Oil 1954; operational compliance with
8-79	Shipment and Discharge of Seamen

*Please note change

Fumigation of Ships' Holds, Unmanned Barges and Freight Containers

By John F. McNulty
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Hundreds of millions of tons of grain have been exported each year from this country to ports world wide--principally to Russia, China and Japan. This year about 40 million tons of wheat, corn and soybeans will be funneled from thousands of midwest farms into terminals along the Mississippi, Illinois, Ohio, Missouri and Arkansas Rivers. This vast river system, extending from Minneapolis to New Orleans and running through the richest agricultural basin in the world, has become the main thoroughfare of the American grain trade.

INFESTATION AND FUMIGATION

Grain is subject to a variety of insect and rodent infestations from the field and from handling, storage and shipping facilities. When continuously cooled (52 degrees F. or less) and properly aerated it may be stored for prolonged periods of time practically infestation free. However, during its journey to the final shipping destination it becomes contaminated and requires a chemical treatment to destroy the insects.

The chemical agents used for deinfestation may be added to the grain in the form of sprays, fogs or gases

or by direct contact. Fumigants discussed in this article are liquid or solid compounds that release poisonous gases. Unfortunately, these gases are harmful, possibly fatal, to humans as long as they remain potent. Therefore, they constitute a safety hazard from the time of application throughout the duration of their potency—which may last for several days.

One widely used preparation, an aluminum phosphide compound sold commercially as "Detia" or "Phostoxin," reacts with moisture to produce phosphine (PH_3), carbon dioxide and ammonia. Phosphine is more toxic to insects than either cyanide or methyl bromide, all of which are highly toxic to humans. It is used in the marine mode because it is coated with paraffin, which temporarily inhibits the release of the fumigant. This is important when phosphine is applied

The opinions or assertions contained herein are the private ones of the author and are not to be construed as official or reflecting the views of the Commandant or the Coast Guard at large.

FUMIGATION.....

in confined spaces because it allows the fumigator to leave the area before a lethal atmosphere has time to accumulate. The release of gases will continue two or three days; in an airtight compartment, the fumigating effect of phosphine may continue for a number of days.

Grain insects pass through four stages--egg, larva, pupa, and adult. Growth takes place in the larval stage. In the final stage insects form a hard shell which limits growth and prevents effective fumigation. Thus, fumigation is never complete. Once the potency of the poisonous gas is lost, the chain of insect growth begins anew. The insects cause deterioration in the grain by spontaneous heating due to biological action, and they cause weight shrinkage by actually consuming the kernels.

BACKGROUND OF CURRENT FUMIGATION REGULATIONS

Fumigating ships' cargo holds and cargo spaces presents problems not normally encountered in other types of fumigation. The large amount of gas required and the fact that space configurations vary from ship to ship and hold to hold make it imperative that qualified pest control operators perform ship fumigation. In some instances, ships sail from port with their holds under fumigation.

Initially, the U.S. Coast Guard attempted to govern shipboard fumigation through the ships' stores regulations (46 CFR 147) issued January 18, 1941. These regulations were intended to control the use of all dangerous and hazardous materials on board vessels, including all types of fumigants. Fumigant vendors and manufacturers were required to obtain USCG certification for their products. These certificates were issued once the Coast Guard was satisfied that the product could be used safely in accordance with the instructions on the label.

The International Maritime Consultative Organization (IMCO) was also concerned with the safe use of fumigants. Under the direction of IMCO's Maritime Safety Committee, the Subcommittee on the Carriage of Dangerous Goods prepared "Recommendations on Pesticides in Ships," which were issued as MSC/108 on September 30, 1971. These recommendations were intended as a guide to mariners as well as other competent authorities. They were general in nature and included all types of infestation removal. However, they were not keyed to shipboard fumigation of grain, did not contain detailed safety precautions, and were too broad for specific application.

DEVELOPMENT OF CURRENT FUMIGATION REGULATIONS

In the early 1970's, there were numerous shipboard casualties involving fumigation which demonstrated the importance of establishing specific fumigation regulations. In spite of attempts to insure proper use of fumigants, the continuing incidents indicated that many fumigant vendors and manufacturers were not complying with the regulations. One incident that brought unfavorable publicity to ship fumigation

practices occurred on October 9, 1973. Two grain samplers at a New Orleans dock entered a previously fumigated ship hold and were fatally overcome by lingering fumes. Six other persons were injured by fumigant inhalation as they tried to rescue their fellow workers.

As a result of these incidents, in 1973-74 the Coast Guard held a series of meetings with the Departments of Labor and Agriculture and the Environmental Protection Agency (EPA) in order to produce effective nonoverlapping regulations which would provide safeguards. Regulations were developed both by the Coast Guard and the Department of Labor with assistance from the Department of Agriculture and EPA. The meetings focused attention on several unsafe practices which the proposed regulations would have to address. These included:

- A. Entering fumigated spaces before ventilation was complete;
- B. Entering fumigated spaces without testing the atmosphere for fumigant vapor or oxygen content;
- C. Fumigating and ventilating spaces without having respiratory protective equipment on board;
- D. Fumigating holds and allowing the vessel to sail with no testing equipment on board or without the crew having detailed knowledge of the fumigant that was used in the hold;
- E. Fumigating containers and shipping them with no visible warning that they may contain poisonous materials;
- F. Neglecting to isolate fumigated spaces and to check to make certain the fumigant does not leak from the isolated spaces.

In order to correct the problems that were causing shipboard fumigation incidents and to strengthen safety precautions and procedures, the Coast Guard issued the present "Interim Regulations for Shipboard Fumigation" (46 CFR 147A). These were published in the Federal Register on September 13, 1974. They were published as interim regulations in response to the urgent need for shipboard fumigation control, evidenced by the recent rash of connected casualties. It was intended that these regulations would be later issued in final form based on the experience resulting from their application.

The interim regulations defined terms and required the notification of the Captain of the Port for all fumigations. A very important definition is that of the fumigator or "qualified person." A "qualified person" is one who has had experience with the applicable fumigants and detection equipment, or an applicator certified by the EPA for the fumigant used. A person may be qualified by experience or training, but in any case he must know the properties and dangers

Continued on next page.....

FUMIGATION.....

of the fumigant and be able to ascertain fumigant concentrations by suitable detection equipment.

These interim regulations established that both the fumigator and the person in charge of the vessel must be designated for each fumigation operation. The fumigator must be designated by the firm doing the fumigation. The person in charge of the vessel must be designated by the ship owner or master. By designating these two individuals, communication between the fumigating crew and the ship's crew is simplified and each has designated duties and responsibilities.

46 CFR 147A also mandated that before fumigation begins the fumigator must inform the vessel's master of the spaces in which occupancy is allowed during fumigation. He must inform all appropriate parties of the symptoms of poisoning and first aid treatment. The fumigator must be familiar with the vessel's construction to ascertain the ability of designated spaces to contain the fumigant. The fumigator must determine the frequency of testing to determine gas leakage. He must also see that proper warning signs (National Fire Prevention Association standards) and watchmen are posted in unsafe areas. The master of the vessel must know what, if any, spaces are safe for occupancy during fumigation. If there are no safe spaces he must see that all persons not involved in fumigation leave the vessel.

During fumigation the fumigator must inspect the vessel for leakage into the occupied areas. These inspections must be carried out at specified time intervals and if there is leakage he must notify the master, who takes the necessary steps to prevent injury. After the completion of fumigation with the vessel at berth the fumigator must oversee the subsequent ventilation to ensure that it is done safely and that the atmosphere in the treated space is tested and determined safe for entry. Once the area is safe the warning signs and watchmen may be removed.

It is the master's responsibility to insure that all persons aboard follow the instructions of the fumigator and that appropriate action be taken if there is dangerous leakage of poison into the occupied areas. If the vessel leaves port while under fumigation the master must be certain that adequate personnel protection equipment and detectors are on board and that periodic inspections are made for fumigant leakage into occupied areas. The master must also make certain that all fumigated spaces are ventilated and tested as safe before entry is allowed.

Upon completion of fumigation, after the spaces are certified as safe for humans, either the master or fumigator must dispose of all fumigant residue and warning signs.

A PHOSPHINE POISONING EN ROUTE

In September 1978, the author became involved with an incident which illustrates the problems that may result from disregarding Coast Guard regulations.

This incident occurred aboard a foreign bulk grain vessel. The vessel is a two-house ship (midship and aft) with all the machinery in the aft house. The midship house stands on the main deck with cargo

holds Nos. 3 and 4 continuing underneath. With the exception of the navigation bridge on the 03 level and the storage room (including the fresh water tank on the main deck level) the midship house is entirely devoted to living quarters.

The vessel was loaded with grain in Chicago to be shipped to the Far East. Holds Nos. 1, 2, 5 and 6 were loaded and No. 3 hold was half loaded. The Federal Grain Inspection Service found No. 3 hold weevily and had it treated with Phostoxin. The ship then sailed through the St. Lawrence Seaway to Port Cartier, Canada where it was topped off by loading Nos. 4 and 7 holds and adding additional grain to No. 3 hold. All holds were then treated with "Detia," an aluminum phosphide based compound. Shortly after the fumigant was added the ship sailed. The contract not only required that the grain be fumigated in transit but that the fumigant should remain potent during the entire trip. The time estimate for release of phosphine is two to eight days, and by sealing the hatches this time is extended.

By late afternoon of the day the ship sailed, symptoms of poisoning were apparent in several people aboard and the captain signaled the Coast Guard for help. When the vessel was 480 miles southeast of Boston a dramatic air evacuation effort removed the three most serious cases to a Boston hospital. They were the captain's wife and two small children. The youngest child (22 months old) was declared dead on arrival. The vessel then proceeded under *force majeure* to New York, where in late September it was boarded by a team consisting of the Coast Guard, the U.S. Public Health Service, the Department of Agriculture (USDA), the fumigant manufacturers and the vessel flag consul. While some Coast Guard personnel boarded with the medical team, the remainder, along with the USDA, conducted a search to locate the source of poisoning.

The source of poisoning, phosphine, was found in the midships house where the highest concentration was detected in the water tank room. Testing indicated that the gases entered the water tank room through two electrical stuffing boxes in the main deck. It was concluded that the poison gases from No. 3 hold passed through the stuffing boxes to the water tank room and then spread throughout the house by natural convection, in combination with the heating system. The dead child had been quartered in the room directly above the water tank storeroom and all persons affected lived, worked or had access to the midship deck house for extended periods. The survey also indicated that the phosphine level in the holds was not high enough to effect complete insect control because the holds were not gas tight.

The experience of this vessel indicated that several safety precautions proposed in the regulations were not followed. For example:

- A. The ship's living quarters were directly over the hold, allowing phosphine to escape into the accommodations;
- B. There was no indication of either a written transmission to the captain of the dangers of

Continued on next page.....

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the fumigant, or that he understood the nature of phosphine poisoning;

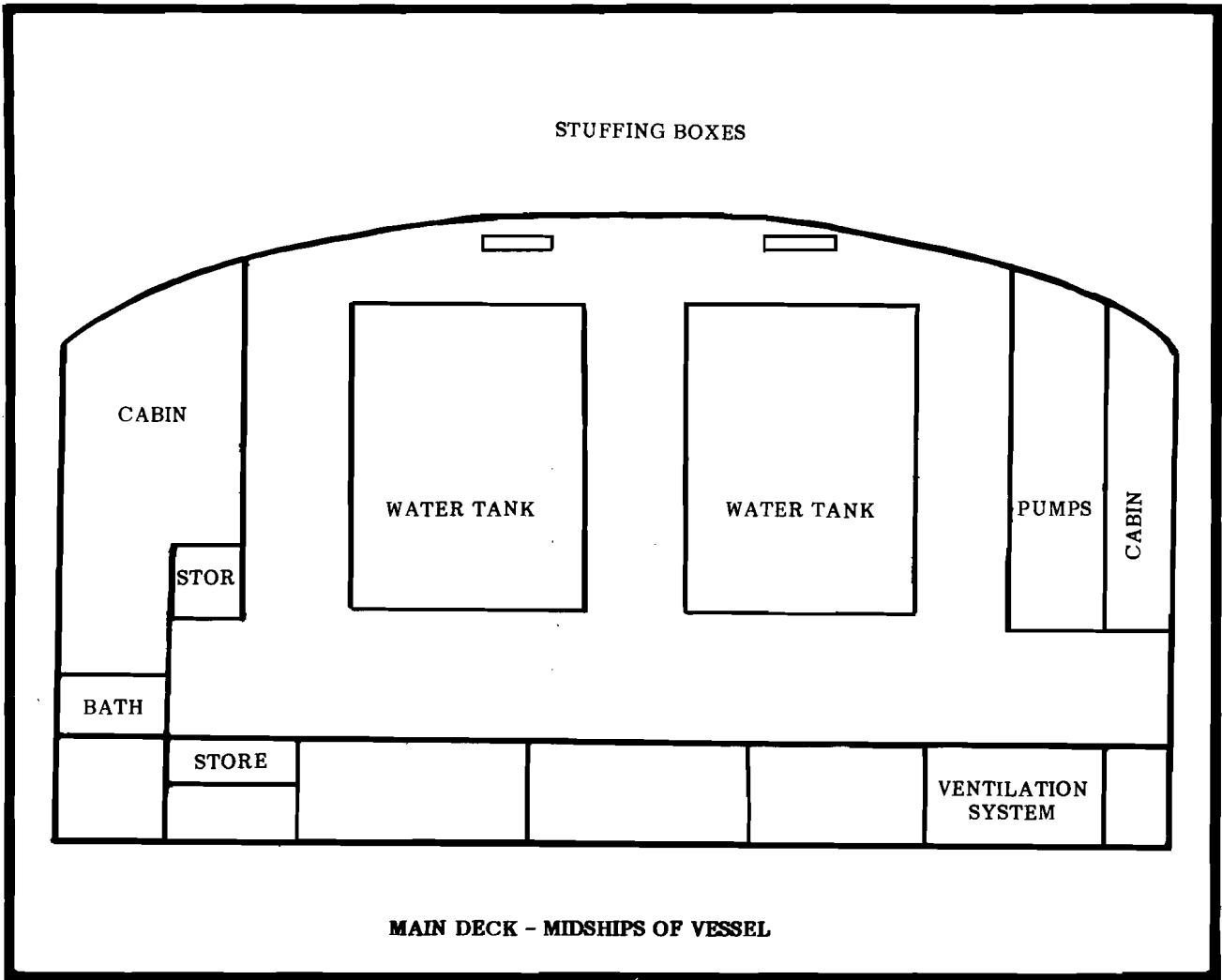
- C. There was no evidence of fumigation information being transmitted to the crew. It was noted that since the crew had no common language it was possible to transmit the instructions clearly only if several languages were used;
- D. There were no fumigation detection or self-contained breathing apparatus on board;
- E. There were no tests made to determine possible toxic vapor leakage into the living quarters.

CURRENT DEVELOPMENTS

After the interim regulations (46 CFR 147A) were issued as a final rule, it became obvious that they did not cover unmanned barges or freight containers. To rectify this situation the Coast Guard issued special permits 2-75 for unmanned barges and 52-75 for freight containers.

Current (interim) regulations are now under revision and will be issued shortly as a Notice of Proposed Rulemaking. The revised regulations will correct deficiencies in the current regulations by including provisions for freight containers and unmanned barges. Special permits for alternate procedures will be permitted, provided that the applicant for the special permit recommends a method

Continued on next page.....



FUMIGATION.....

of fumigation that is as safe as that procedure permitted by the regulations. The proposed regulation defines a fumigator as a fumigation applicator certified by the EPA or a state agency designated under 40 CFR. All fumigants for shipboard use will require EPA approved labels on their containers in accordance with 40 CFR 162, which defines a fumigant as a substance or mixture of substances that is in or is progressively transformed into a gaseous state.

The IMCO recommendations are being revised to include provisions for (a) a 24-hour delay of the ship's departure after fumigation to check for gas leakage or (b) a 72-hour monitoring period by the fumigator (or his designate) after the ship departs to check for fumigant leakage. It also recommends that intranit fumigation should be limited to tankers or bulk carriers.

CONCLUSIONS

Unfortunately, fumigation-related incidents continue to occur. Within the last few months, another death resulted from failure to follow the existing regulations.

In any action involving fumigation it must be kept in mind that fumigants are harmful and possibly fatal to humans and must be handled, monitored and tested by personnel who know all the hazardous properties of the fumigant. They must know the methods of testing for harmful concentrations and the proper use of personnel safety equipment for safe handling of the fumigants. No fumigated area should be entered until a determination is made by a qualified person, with proper detection equipment, that the area is safe.

About the Author

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Mr. John McAnulty is a chemical engineer in the Cargo and Hazardous Materials Division at Coast Guard Headquarters. In this field he is concerned with hazardous materials when shipped as dry bulk cargoes and with the storage and use of hazardous ships stores. He earned his degree in chemical engineering at the University of Pittsburgh in 1935 and has been a licensed professional engineer since 1949. He has been engaged in the design, construction and operation of chemical, petrochemical and nuclear plants and with risk analysis and quality assurance of explosives and military ammunition.

DEPT. OF TRANSP., USCG, CG-5070 (REV. 1-76)

**THIS
STICKER
CAN**



ANY PERSON IN CHARGE OF A VESSEL OR OF AN ONSHORE OR AN OFFSHORE FACILITY SHALL, AS SOON AS HE HAS KNOWLEDGE OF ANY DISCHARGE OF OIL OR A HAZARDOUS SUBSTANCE FROM SUCH VESSEL OR FACILITY, IMMEDIATELY NOTIFY THE APPROPRIATE AGENCY OF THE UNITED STATES GOVERNMENT. ANY SUCH PERSON WHO FAILS TO NOTIFY IMMEDIATELY SUCH AGENCY OF SUCH DISCHARGE SHALL, UPON CONVICTION, BE FINED NOT MORE THAN \$10,000 OR IMPRISONED FOR NOT MORE THAN ONE YEAR, OR BOTH.

FEDERAL WATER POLLUTION CONTROL ACT, SECTION 311(b)(5).

**REPORT
OIL OR CHEMICAL SPILL
TO THE COAST GUARD
TOLL FREE NUMBER
ANYTIME**

800-424-8802



Officer, pointing to cigarette butt on deck: "Son, is that yours?"
Seaman: "That's all right, sir. You saw it first."

Lessons from Casualties

Like the "stitch in time" philosophy, preventive maintenance certainly pays off in the long run! In fact, neglect of routine maintenance or haphazard repairs can be downright dangerous, as illustrated in the two episodes below.

* * *

A 33-foot passenger vessel experienced an engine failure at sea due to overheating. The cause was determined to be an accumulation of small bits of clear plastic (the type used for food wrapping) in the main engine sea suction valve. The reduced cooling water flow resulted in excessive engine temperatures.

There seems to have been a rash of these incidents lately, all resulting from engine sea suction lines becoming clogged with debris. These casualties should serve as a reminder that it is always important to watch your temperature gage(s). If a malfunction is indicated,

- Secure the engine before it seizes;
- Check the strainer on the intake (is there a strainer?);
- Backflush the cooling line if possible.

In addition, a large number of failures at sea have recently been reported involving sea water pumps. Pump failure may result from normal wear and tear; impellers, seals, bearings and even the bodies may fail. Likewise, it is common for the belt (or belts) driving the pump to wear out. A little preventive maintenance can spare you time and trouble later. It's a good idea to:

- Check the cooling pump regularly;
- Replace a worn pump;
- Check drive belts regularly;
- Carry spare belts.

* * *

During a routine "abandon rig drill" in the Gulf of Mexico, the wire hoisting line raising a 24-man survival capsule failed at the socket. The capsule, being docked at the time, plummeted 70 feet into the ocean. Ten of the eleven crewmen on board suffered serious injuries, mostly to their backs and spines.

Some time previous to the casualty, the rig crew noted that the capsule's retrieving wire was corroded and that the rope socket was damaged. The rig supervisor directed on board repairs despite the fact that no one felt qualified to make suitable repairs.

The repairs were subsequently made; however, no weight test was conducted. When a representative of the company which manufactured the capsule and attendant docking structure came aboard for a routine examination of the repairs, he noted an electrical failure of the limit switches, which prevent "two-blocking" the capsule against the launch and hold frame. New ones were delivered but not installed prior to the casualty.

A post-casualty examination revealed that the manufacturer's recommended repair procedures were not followed. For instance, the babbitt material was lead base versus the recommended molten zinc. The wire was not seized to prevent unraveling and was not cleaned with a degreaser and muriatic acid solution.

Where lifesaving equipment is concerned, the practice of good seamanship is not restricted to ships. From this casualty we are all reminded:

- To utilize knowledgeable repair sources;
- To follow the manufacturer's recommended repair guidelines;
- To conduct post-repair dummy load tests;
- To insure that all related safety devices are in good working order.

1980 INTERNATIONAL ICE PATROL SERVICE

In February or March 1980, depending upon iceberg conditions, the International Ice Patrol will commence its annual service of guarding the southeastern, southern and southwestern limits of the regions of icebergs in the vicinity of the Grand Banks of Newfoundland. Reports of ice in this area will originate from passing ships and from flights by Ice Patrol aircraft. Ice Patrol will broadcast a bulletin twice each day, containing ice information to inform ships of the extent of this dangerous region. Broadcasts of the Ice Patrol Bulletin will be made as indicated below:

BROADCAST STATION	TIME OF BROADCASTS (GMT)	FREQUENCIES (kHz)
<u>SITOR ICE BROADCAST</u> Coast Guard Communication Station Boston/NIK	0018 1218	5340, 8502 8502, 12750
<u>CW BROADCASTS</u> Coast Guard Communication Station Boston/NIK (Best to follow SITOR best)	0030 (APPROX) 1230 (APPROX)	5302, 8502 8502, 12750
Canadian Forces Station Mill Cove/CFH	0130, 1330	438 (Off-air 1200- 1600 second Thurs. each month) 4255 (2200-1000) 6430 Continuous 8697 Continuous 12726 (1000-2200) 16926.5 On request 22397.5 On request
Navy LCMP Broadcast Norfolk, VA/NAM	0030-0115 0630-0715 1000-1100 1230-1300 1900-1945 2300-2359	8090 Continuous 12135 Continuous 16180 Continuous 20225 (1200-2359)
Thurso, Scotland	same times	7504.5 Continuous 12691 (0800-1900) 3724 (1900-0800)
Keflavik, Iceland	same times	5167 (1900-0800)

BROADCAST STATION	TIME OF BROADCASTS (GMT)	FREQUENCIES (kHz)
RADIOFACSIMILE BROADCASTS		
Coast Guard Communications Station Boston	1600	8502, 12750 (+400 Hz)
Canadian Forces Station Mill Cove/CFH (Primarily sea ice in Gulf of St. Lawrence and North. Limits of icebergs sometimes given)	0000, 1300, 2200	133.15 Continuous (Off air 1200-1600 second Thursday each month) 4271 (2200-1000) 6330 Continuous 9890 Continuous 123510 (1000-2200)
Radio Station Bracknell, United Kingdom/GFE (Eastern North Atlantic Sea Ice Observations)	1413	2618.5 (1800-0600 Oct 1-Mar 31 1900-0500 Apr 1-Sep 30) 4782 Continuous 9203 Continuous 14436 Continuous 18261 (0600-1800 Oct 1-Mar 31; 0500-1900 Apr 1-Sep 30)
SPECIAL BROADCASTS		
Canadian CG Radio Station St. John's/VON	As required when icebergs are sighted outside the limits of ice between regularly scheduled broadcasts	478 Preceded by Inter- national Safety Signal (TTT) on 500 kHz.
International Ice Patrol Vessel	When in the vicinity of ice in periods of darkness or fog. Format located in Appendix 1 to Annex A	2670 Preceded by Inter- national Safety Signal (SECURITE) on 2182 kHz.

REPORTS OF ICE, SEA SURFACE TEMPERATURES, AND WEATHER

All shipping may assist in the operation of International Ice Patrol by reporting all sightings of ice at once to COMINTICEPAT NEW YORK NY via the radio stations listed in the following section. When reporting ice, please include the following information:

POSITION
SIZE AND SHAPE OF ICEBERG
CONCENTRATION OF ICE (FOR SEA ICE IN TENTHS)
THICKNESS OF ICE (FOR SEA ICE, SPECIFY IN FEET OR METERS)

The following tables describe icebergs reported to the Ice Patrol:

DESCRIPTIVE NAME	HEIGHT (feet)	(meters)	LENGTH (feet)	(meters)
Growler	(G) less than 4	less than 1	less than 20	less than 6
Small Iceberg	(S) 4 - 50	1 - 15	20 - 200	6 - 60
Medium Iceberg	(M) 51 - 150	16 - 45	201 - 400	61 - 122
Large Iceberg	(L) more than 150	more than 45	more than 400	more than 122

TYPE	
SHAPE	DESCRIPTION
Blocky	(B) Steep sides with flat top. Very solid. Length-height ratio less than 5:1.
Tilted Blocky	(V) Blocky iceberg which has tilted to present a triangular shape from the side.
Drydock or near waterline.	(K) Eroded such that a large U-shaped slot is formed with twin columns. Slot extends into
Pinnacled	(P) Large central spire or pyramid.
Dome	(D) Large round smooth top. Solid type iceberg.
Tabular	(T) Flat topped iceberg with length-height ratio greater than 5:1

In addition to ice reports, sea surface temperature and weather reports are important to the Ice patrol in predicting the drift and deterioration of ice and in planning aerial patrols. Please make these reports to the Ice Patrol every 6 hours when within latitudes 40N to 50N and longitudes 42W to 60W. Ships with one radio operator may prepare the reports every 6 hours and hold them for transmission when the radio operator is on watch. When reporting, please include the following:

SHIP POSITION, COURSE, SPEED, VISIBILITY, AIR AND SEA SURFACE TEMPERATURE, WIND DIRECTION AND SPEED

It is not necessary to make the above weather report if the ship is making routine weather reports to METEO WASHINGTON.

COMMUNICATIONS WITH COMMANDER, INTERNATIONAL ICE PATROL (COMINTICEPAT)

Report ice sightings, weather, and sea surface temperature to COMINTICEPAT NEW YORK NY through U.S. Coast Guard Communication Stations, or, if unable to work these stations, Canadian Coast Guard Radio Station St. John's/VON. Make these reports in accordance with the following chart. Note that direct printing radio teletype (SITOR) is available through USCG Communications Station Boston (NMF, NIK).

CALL	LOCATION	BANDS	GUARDED	NIGHT	WORKING FREQUENCY
		DAY			
NMF NIK	USCG Communications Station, Boston, MA	500 kHz		500 kHz	427/472 kHz
		CALLING FREQUENCIES (Channel 4-5-6)			
		8 MHz		8 MHz	8459.0 kHz
		12 MHz		12 MHz	12783.0 kHz
		DIRECT PRINTING RADIO- TEPE TYPE SELCALL 1.01195 (Assigned frequency shown)			
		4176.0 kHz		4176.0 kHz	4355.5 kHz
		6292.0 kHz		6292.0 kHz	6500.0 kHz
		8349.5 kHz		8349.5 kHz	8710.5 kHz
		12497.0 kHz		12497.0 kHz	13077.0 kHz
		16666.0 kHz		16666.0 kHz	17203.0 kHz
		22198.0 kHz		22198.0 kHz	22567.0 kHz
		SSB VOICE FREQUENCIES (Carrier frequency shown)			
		6200.0 kHz		6200.0 kHz	6506.4 kHz
NMN	USCG Communications Station, Portsmouth, VA	500 kHz		500 kHz	466 kHz

CALLING FREQUENCIES

(Channel 4-5-6)

8 MHz	8 MHz	8465.0 kHz
12 MHz	12 MHz	12718.0 kHz
16 MHz		16976.0 kHz

SSB VOICE FREQUENCIES

(Carrier frequency shown)

1200-0200 GMT	0200-1200 GMT	
	4143.kHz	4428.7 kHz
200.0 kHz	6200.0 kHz	6506.4 kHz
241.5 kHz	8241.5 kHz	8765.4 kHz
12342.4 kHz		13113.2 kHz

VON	Canadian Coast Guard Radio Station, St. John's, NFLD	500 kHz	500 kHz	478 kHz
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Vessels equipped with MARISAT may send messages at their own expense to COAST GUARD NYK (TELEX NO. 126831).

Telephone communications are available to the Ice Patrol Office in New York throughout the season. the numbers are:

212-668-7882 (Ice Patrol Duty Officer) or
212-668-7055 (Coast Guard Operations Center, New York)

GULF OF ST. LAWRENCE INFORMATION

The Canadian Ministry of Transport provides sea ice information services for the Gulf of St. Lawrence, as well as the approaches, from 58-00W to 66-30W longitudes including the Strait of Belle Isle to west of Belle Isle, during the approximate period December to late June. Ships may obtain ice information by contacting Ice Operations Officer, Dartmouth, Nova Scotia via any east coast Canadian Coast Guard radio station. Details of the services are available from Ice Operations Office, Marine Services Information Center, Ministry of Transport, P.O. Box 1013, Dartmouth, Nova Scotia. Telephone 902-426-5664 or 5665. TELEX 019-22625.

SUPPLEMENTARY ICE INFORMATION

Obtain supplementary ice conditions and navigational warnings for the Strait of Belle Isle, the coast of Newfoundland, and the Grand Banks by contacting Canadian Coast Guard radio stations, St. Anthony/VCM, Comfort Cove/VOO, St. Lawrence/VCP, or St. John's/VON.

WARNINGS

1. In spite of the best efforts of the Ice Patrol to prevent such occurrence, icebergs have and will drift unnoticed into the usual shipping routes in the area of the Grand Banks. The positions of icebergs in the Ice Bulletin are for 12 hour drift intervals. However, after about 5 days without resighting, the positions estimated by driftings are unreliable. The Ice Bulletin indicates the dates of iceberg sightings.

2. In general, only icebergs south of about 48N appear in the Ice Bulletin. In the event there are large numbers of icebergs south of 48N, the Ice Bulletin will carry the positions of only those icebergs near the limits of ice and isolated icebergs.

3. Careful tests by the Ice Patrol proved that radar cannot provide positive assurance of iceberg detection. Since sea water is a better reflector of radar signals than ice, an iceberg or growler inside the area of sea return on the radar scope may not be detected. The average range of radar detection of a dangerous growler or very small iceberg, if detected at all, is only 4 miles. While radar remains a valuable aid for ice detection, its use cannot replace the traditional caution exercised in the vicinity of the Grand Banks while transiting south of the estimated limits of all known ice.

COMMENTS

Ice Patrol earnestly solicits comments, particularly concerning the effectiveness of the times and frequencies of radio transmissions. Please mail facsimile charts received at sea to Commander, International Ice Patrol, Governors Island, New York, NY 10004. Please indicate the frequency used and position of the ship when it received the broadcast.

Nautical Queries

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

DECK

(1) The reaction of a Gyro compass to forces or torques applied to the spinning gyro to keep it aligned in a north indicating direction is known as what?

- A. Precession
- B. Earth rate
- C. Gyroscopic inertia
- D. Gravity effect

REFERENCE: Dutton, 12th Ed.

(2) What is the basic magnetic principal on which the operation of the magnetic compass is based?

- A. Magnetic materials of the same polarity repel each other and those of opposite polarity attract.
- B. The earth's magnetic lines of force are parallel to the surface of the earth.
- C. Magnetic meridians connect points of equal magnetic variation.
- D. The compass needle(s) will, when properly compensated, lie parallel to the Isogonic lines of the earth.

REFERENCE: Dutton, 12th Ed.

(3) When you are using a radar in which your own ship is shown at the center of the screen and 0 degrees always appears at the top of the screen, the bearings can be defined by which of the following?

- A. Relative
- B. True
- C. Compass
- D. Magnetic

REFERENCE: Dutton, 12th Ed.

(4) When using OMEGA which of the following is a true statement?

- A. A diurnal correction is applied to the readout obtained from the receiver.
- B. The readout from the receiver is plotted directly without correction on the OMEGA chart.
- C. Due to the long range of OMEGA a sky wave correction must be applied.
- D. The lane count must be added to the readout from the receiver before plotting.

REFERENCE: Dutton, 12th Ed.

(5) The current that, in many respects, is similar to the Gulf stream is the

- A. Kuroshio.
- B. California Current.
- C. Oyashio.
- D. Benguela Current.

REFERENCE: Bowditch, 1962 Ed.

ENGINEER

(1) Water hammer in steam lines can be prevented by

- A. keeping lines drained and insulated.
- B. replacing all 90 degree elbows with capped tees.
- C. opening the steam supply valve wide to prevent pressure drop.
- D. keeping steam temperature below the saturation point.

REFERENCE: Modern Marine Engineer's Manual, Osbourne

(2) Cold weather starting of a diesel engine may be made easier by

- A. decreasing the compression ratio.
- B. using a special fuel having a high ignition temperature.

- C. increasing the starting air supply.
- D. heating the jacket water.

REFERENCE: Diesel Engine Operation and Maintenance, Maleev

(3) A short circuit in the armature of a D.C. motor would cause the motor to

- A. run fast.
- B. hum when energized.
- C. spark at the brushes.
- D. vibrate.

REFERENCE: Preventive Maintenance of Electrical Equipment, Hubert

(4) Coast Guard regulations require that vents from ballast and fuel tanks shall

- A. extend above the weather deck.
- B. be equipped with a ball check valve.
- C. be closed by means of an automatic hinged closure.
- D. not extend more than 30 inches above the weather deck.

REFERENCE: 46 CFR 56.50

(5) Pumps normally used for fuel oil service are

- A. two-stage centrifugal pumps.
- B. positive displacement rotary pumps.
- C. explosion proof gear pumps.
- D. nonvented plunger pumps.

REFERENCE: Marine Engineering, Harrington

ANSWERS

Deck

1. A; 2. A; 3. A; 4. A; 5. A

Engineer

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

MERCHANT MARINE SAFETY PUBLICATIONS

The following publications may be obtained from the nearest marine safety office, marine inspection office or by writing: **Commandant (G-CMA/TP26), U.S. Coast Guard, Washington, DC 20593.** Because changes to the rules and regulations are made from time to time, these publications can be kept current between revisions only by referring to the Federal Register. (Official changes to all Coast Guard authored federal regulations are published as final rules in the Federal Register on Mondays or Thursdays.) Following the title of each publication in the table below are the dates of the most recent editions and changes, if any.

The Federal Register may be obtained by subscription (\$5 per month or \$50 per year) or by individual copy (75 cents each) from SupDocs, U.S. Government Printing Office, Washington, DC 20402.

CG No.	TITLE OF PUBLICATION
CG-101-1	Specimen Examinations for Merchant Marine Deck Officers (2nd and 3rd Mate) (4-1-77).
CG-101-2	Specimen Examinations for Merchant Marine Deck Officers (Master and Chief Mate) (7-1-78).
CG-108	Rules and Regulations for Military Explosives and Hazardous Munitions (4-1-72). FR 7-21-72, 12-1-72, 6-18-75.
CG-115	Marine Engineering Regulations (8-1-77). FR 9-26-77, 10-10-78, 11-16-78, 12-4-78, 3-12-79, 5-3-79.
CG-123	Rules and Regulations for Tank Vessels (8-1-77). Ch-1, 4-78. FR 8-18-77, 9-12-77, 9-26-77, 1-11-79, 3-12-79, 5-3-79, 6-14-79, 7-2-79, 11-19-79.
CG-169	Navigation Rules - International - Inland (5-1-77). FR 7-11-77, 7-14-77, 9-26-77, 10-12-77, 11-3-77, 12-6-77, 12-15-77, 3-16-78.
CG-169-1	Colregs Demarcation Lines (7-15-77).
CG-172	Rules of the Road - Great Lakes (7-1-72). FR 10-6-72, 11-4-72, 1-16-73, 1-29-73, 5-8-73, 3-29-74, 6-3-74, 11-27-74, 4-16-75, 4-28-75, 10-22-75, 2-5-76, 1-13-77, 11-3-77, 12-6-77.
CG-174	Manual for the Safe Handling of Flammable and Combustible Liquids and Other Hazardous Products (9-1-76).
CG-175	Manual for Lifeboatmen, Able Seamen, and Qualified Members of Engine Department (3-1-73).
* CG-176	Load Line Regulations (2-1-71). FR 10-1-71, 5-10-73, 7-10-74, 10-14-75, 12-8-75, 1-8-76.
CG-177	Yacht Admeasurement and Documentation (9-72).
CG-182-1	Specimen Examinations for Merchant Marine Engineers License (2nd and 3rd Assistant) (4-75).
CG-182-2	Specimen Examinations for Merchant Marine Engineer Licenses; First Assistant Engineer, Steam and Motor, any Horsepower (4-76).
CG-182-3	Specimen Examinations for Merchant Marine Engineer Licenses; Chief Engineer Steam and Motor, any Horsepower (4-76).
CG-184	Rules of the Road--Western Rivers (8-1-72). FR 9-12-72, 12-28-72, 3-8-74, 3-29-74, 6-3-74, 11-27-74, 4-16-75, 4-28-75, 10-22-75, 2-5-76, 3-1-76, 6-10-76, 7-11-77, 12-6-77, 12-15-77.
* CG-190	Equipment Lists (8-1-77).
CG-191	Rules and Regulations for Licensing and Certificating of Merchant Marine Personnel (11-1-76). FR 3-3-77, 8-8-77, 4-9-79, 12-6-79.
CG-227	Laws Governing Marine Inspection (7-1-75).
CG-239	Security of Vessels and Waterfront Facilities (5-1-74). FR 5-15-74, 5-24-74, 8-15-74, 9-5-74, 9-9-74, 12-3-74, 1-6-75, 1-29-75, 4-22-75, 7-2-75, 7-7-75, 7-24-75, 10-1-75, 10-8-75, 6-3-76, 9-27-76, 2-3-77, 3-31-77, 7-14-77, 7-28-77, 9-22-77, 9-26-77, 12-19-77, 1-6-78, 1-16-78, 3-2-78, 11-16-78, 1-22-79, 1-25-79, 2-12-79, 11-5-79, 12-10-79.
CG-242	International Conventions & Conferences on Marine Safety (6-51).
* CG-257	Rules and Regulations for Cargo and Miscellaneous Vessels (9-1-77). Ch-1, 3-17-78. FR 9-26-77, 10-10-78, 1-11-79, 3-12-79, 5-3-79, 6-14-79, 7-2-79.
CG-258	Rules and Regulations for Uninspected Vessels (4-77). Ch-1, 3-17-78. FR 6-14-79, 7-2-79, 12-17-79.
CG-259	Electrical Engineering Regulations (7-1-77). FR 9-26-77, 10-10-78, 11-16-78, 12-4-78.
CG-268	Rules and Regulations for Manning of Vessels (7-1-77). FR 11-19-79.
CG-293	Miscellaneous Electrical Equipment List (6-73).
CG-323	Rules and Regulations for Small Passenger Vessels (7-1-77). Ch-1 3-17-78. FR 10-25-77, 7-17-78, 3-12-79, 6-14-79, 7-2-79, 12-13-79.
CG-329	Fire Fighting Manual for Tank Vessels (1-1-74).
CG-388	Chemical Data Guide for Bulk Shipment by Water (1976).
CG-403	Great Lakes Pilotage Regulations (7-76).
CG-439	Bridge to Bridge Radiotelephone Communications (12-1-72). FR 12-28-72, 3-8-74, 5-5-75, 7-11-77.
CG-467	Specimen Examinations for Uninspected Towing Vessel Operators (10-1-74).
CG-474	When You Enter That Cargo Tank (3-76).
CG-478	Liquefied Natural Gas, Views and Practices, Policy and Safety (2-76).
CG-480	Oil Pollution Control for Tankermen (6-75).
CG-482	Benzene Safe Handling Practices (12-76).
CG-486	Shippers Guide to Hazardous Materials Regulations (Water Mode) (8-77).
CG-491	Safety for Small Passenger Vessels (8-77).
OLD CG-497	Rules and Regulations for Recreational Boating (12-78), now M 16752.2 (12-78) FR 7-19-79.
*** CG-515	Rules and Regulations for Foreign Vessels Operating in the Navigable Waters of the U.S. (2-78). FR 1976--7-8, 8-26, 9-16, 9-20, 12-13. 1977--1-3, 3-31, 5-19, 6-16, 7-7, 7-14, 7-21, 7-25, 8-4, 8-11, 9-8, 9-12, 9-22, 9-26, 9-29, 11-10, 12-8, 12-15, 12-19. 1978--4-6, 5-18, 5-22, 6-29, 7-24, 9-25, 11-16, 11-20, 11-30, 12-7, 12-28. 1979--1-22, 1-25, 2-5, 2-12, 2-26, 3-29, 4-12, 4-16, 5-3, 5-7, 5-31, 6-14, 8-2, 8-16, 8-27, 9-4, 9-24, 10-15, 10-18, 11-1, 11-5, 11-19, 12-3, 12-10, 12-27.
CG-518	Marine Investigating Officer's Regulations Handbook (2-78). FR 2-16-78, 4-27-78, 5-25-78, 6-15-78, 9-25-78, 10-19-78, 11-20-78, 1-25-79, 7-19-79, 9-4-79.
CG-526	Utilizing the Packaged Hazardous Materials Regulations, 49 CFR (5-78).
	Safety of Life at Sea: Convention, with Regulations, London, June 17, 1960.
	Specifications for Merchant Vessel Equipment (Subparts of Chapter Q, 46 CFR, parts 160 to 164.

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**Under revision--can be found in Title 46 CFR Parts 41-69

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