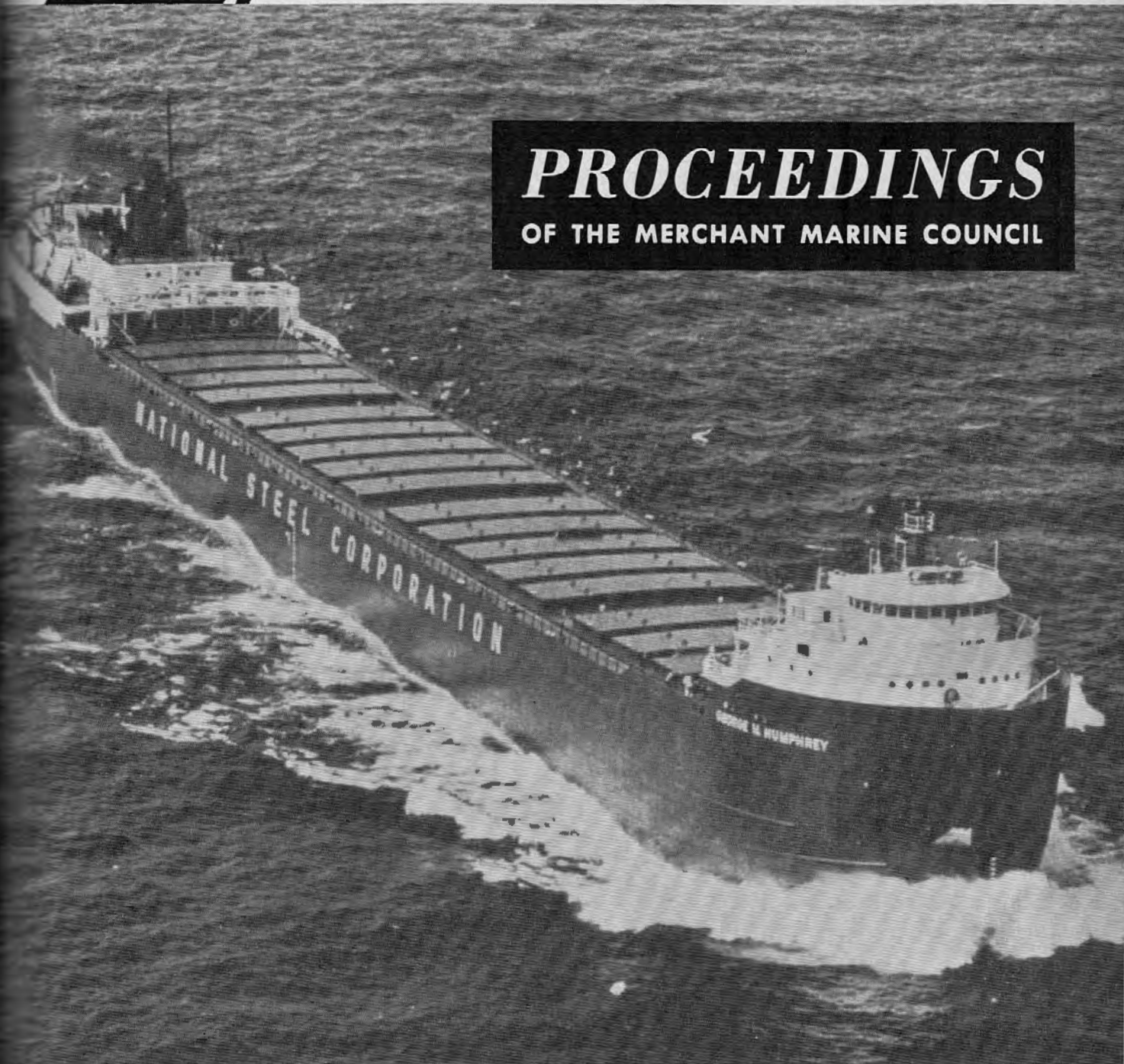




COAST GUARD

PROCEEDINGS OF THE MERCHANT MARINE COUNCIL



Safety and Radiotelephone

Communications on the

Great Lakes . . .

SS Daniel J. Morrell Sinking . . .

THIS COPY FOR NOT LESS THAN 20 READERS—PLEASE PASS IT ALONG

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COVERS

FRONT: The Great Lakes bulk carrier *George M. Humphrey* underway. *Courtesy National Steel Corp.*
 BACK: A safety poster published in the interest of Marine Safety by the Marine Transportation Department of Socony Mobil Oil Co., Inc.

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PROCEEDINGS

OF THE

MERCHANT MARINE COUNCIL

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The Merchant Marine Council of The United States Coast Guard

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PUBLIC HEARING

The Commandant, U.S. Coast Guard, has accepted the recommendations of the Merchant Marine Council, regarding proposals revising the Navigation and Vessel Inspection Regulations. The Merchant Marine Council held its Annual Session on March 25 and 26, 1968.

The proposals to revise the Navigation and Vessel Inspection Regulations were set forth in one volume of the Merchant Marine Council Public Hearing Agenda, CG-249, and described in the February issue of the Proceedings.

The proposals considered concerned: (1) load line regulations; (2) dangerous cargo regulations; (3) lifesaving equipment; (4) fire protection on passenger vessels; (5) rules of the road—boundary line change in New York Harbor; (6) electrical engineering regulations; (7) drydock and tailshaft examination; (8) specifications — electric floating water lights.

The Merchant Marine Council in Executive Session considered the oral and written comments, received at the Public Hearing March 25 and the additional 127 written comments submitted, containing suggestions for changes in the proposals. The proposals, as recommended by the Merchant Marine Council, are being submitted to the Commandant for approval and publication in the Federal Register as soon as possible.

In brief, the Council's recommendations included the following

actions: With respect to PH 1-68 regarding load lines, the text of 46 CFR Part 42 was edited to track the applicable provisions of the International Convention on Load Lines, 1966, wherever practicable. With respect to the dangerous cargo proposals in Item PH 2-68, the provisions with respect to radioactive materials were separated from the other proposals and will be published after the Hazardous Material Regulations Board of the Department of Transportation has completed its actions with respect to land transportation of radioactive materials. The proposals regarding miscellaneous changes in the Dangerous Cargo Regulations will be published in the Federal Register with an effective date of July 1, 1968. Minor changes were accepted to the proposals regarding lifesaving equipment in Item PH 3-68, and electrical engineering in Item PH 6-68. The proposals regarding fire protection in Item PH 4-68 and the boundary line for New York Harbor in Item PH 5-68 were accepted as set forth in the Agenda. The proposals in Item PH 7-68 regarding drydock and tailshaft examinations were approved with an effective date of July 1, 1968. Final actions with respect to the proposed specifications for electric floating water lights in Item PH 8-68 were withheld pending further study of the subject by the Merchant Marine Technical Division, including the various comments received. †

SAFETY AND RADIO CATIONS ON

John W. Manning, Superintendent of Vessel Operations

ON AUGUST 27, 1934, the ship-to-shore radiotelephone of the Steamer *William C. Atwater* was used for the first time to obtain medical advice for an injured seaman. The seaman in this case was Captain E. R. Morton who fell down a companionway and was knocked unconscious. Fearing a fractured skull, the crew followed a physician's instructions for first aid treatment. The vessel put into the nearest port where an ambulance was waiting to rush the Captain to the hospital. In due course, he recovered and returned to his ship.

Thus, the first radiotelephone on a Great Lakes vessel, only three months after its installation, proved itself to be an essential safety aid in Great Lakes shipping.

In 1936, members of the Lake Carriers' Association chose to develop a radiotelephone system rather than equip their vessels with radiotelegraph equipment requiring radio operators. With the radiotelephone system of communication, the Master and Mates are licensed to operate the telephone.

In those days, there were several uncoordinated systems on the Lakes including a U.S. Coast Guard system.

From an address before the 1967 Marine Section, of the National Safety Congress and Exposition.

The Lake Carriers' Association engaged the radio and electronics firm of Jansky and Bailey to devise a system whereby there would be universality of contact and working channels.

The uncoordinated systems were integrated into a common system having a common contact and safety distress calling channel together with ship-to-ship and ship-to-shore working channels. The safety channel is known as Channel 51 or 2182 kilocycles. This channel was set aside for the exclusive use of Great Lakes shipping until 1947 when the Atlantic City Radio Conference allocated Channel 51 for world wide use as a safety distress channel.

By 1937, fifty-seven vessels were equipped with radiotelephones and by the late forties, every vessel on the Great Lakes was so equipped. The development of this system required the cooperation of the Lake Carriers' Association, the U.S. Coast Guard, the

Federal Communications Commission, the Canadian Dominion Marine Association and the Canadian Department of Transport as well as equipment manufacturers, suppliers and coast stations. These efforts resulted in a treaty between Canada and the United States called the Great Lakes Agreement which came into force in 1954.

The Great Lakes Agreement requires that every large U.S. vessel have a multichannel radiotelephone, FCC approved type, having all of the operating controls of the set on the bridge; provision for loud-speaker monitoring of Channel 51; ability to operate on the intership and Coast Guard channel, plus additional channels for handling public correspondence. Channel 51 must be monitored at all times while the ship is underway except when traffic is being handled on one of the working channels. Also, Channel 51 is monitored at all times by shore stations and Coast Guard stations.

An interesting thing about the Great Lakes Agreement is that although the requirement came into effect in 1954, almost all vessel operators had recognized the safety

TELEPHONE COMMUNI- THE GREAT LAKES

The Hanna Mining Co., Cleveland, Ohio

communications requirement and had met the provisions ten or more years in advance on a voluntary basis.

By 1946, it became obvious that the volume of traffic on the air waves would increase to a point where an improvement in the radiotelephone system was needed. Channel 51 was about to be released for maritime use on the rivers, coast and oceans and interference was anticipated. Heretofore, we have talked about a medium frequency (MF) radiotelephone which is good for long distance, i.e. up to a thousand miles or more at night. Since perhaps 70 percent of the radio traffic on the lakes is of less than fifty miles, the Lake Carriers' consultants worked with very high frequency (VHF) sets loaned by the U.S. Coast Guard and found them to be highly satisfactory for short range work. VHF has the advantage of being static free and highly reliable for any distance under forty or fifty miles.

The Lake Carriers', as a result of the successful tests, petitioned the FCC to set up a multichannel VHF system to supplement the existing MF system. In 1951, the FCC approved the system and adopted 156.8 megacycles as the safety and calling channel. The regulations provide for 18

channels of which nine are in general use on the Great Lakes today.

VHF has proved to be of tremendous value to maritime safety and was later adopted by international conventions for world wide use. Once again, the Great Lakes safety channel (16) is now the international safety channel. Today it is estimated that during the peak navigation season on the Lakes, there are at any one time from 500 to 600 vessels (excluding pleasure craft) equipped with VHF and all monitoring 156.8 Mc (Channel 16).

Today, most Great Lakes vessels are equipped with the MF/HF (AM) system and the VHF (FM) system, both of which have sets using eight channels. Each system is constantly monitored in the pilot house while the vessel is under way. (Please refer to Table on page 133 for the function of each of the channels.)

There are usually two or three remote control stations for the radiotelephone, one being in the chart room and the other in the Captain's office. The principal station is at what on the Lakes is known as "the front window". This is where the Captain or Mate stands to pilot the vessel. From this position, he is within easy

reach of the phones, engine order telegraph, radar, whistle control, intercom, general alarm and on some vessels, bow thruster and engine control. (See Figure 1.)

In addition to the open speaker monitoring system, most sets are equipped with a selective ringer system whereby a shore station may broadcast a tone to ring a bell on the vessel being called. This has the effect of giving each vessel an extra two to five monitors and keeps traffic off of the calling and safety channel. This ringer system is most effective on the longer frequencies for long distance where voice transmission is not audible on a shorter frequency or on the calling channel. Additionally, the major coast stations monitor up to five working channels, which helps to free the emergency channel.

To assist the mariner on the Lakes and St. Lawrence River, there are numerous shore based stations. All of these stations are equipped with multichannel equipment so that there is a universality of contact and working channels with all vessels. The number and type of stations are approximately 22 MF/HF (AM) and 250 VHF (FM), which include

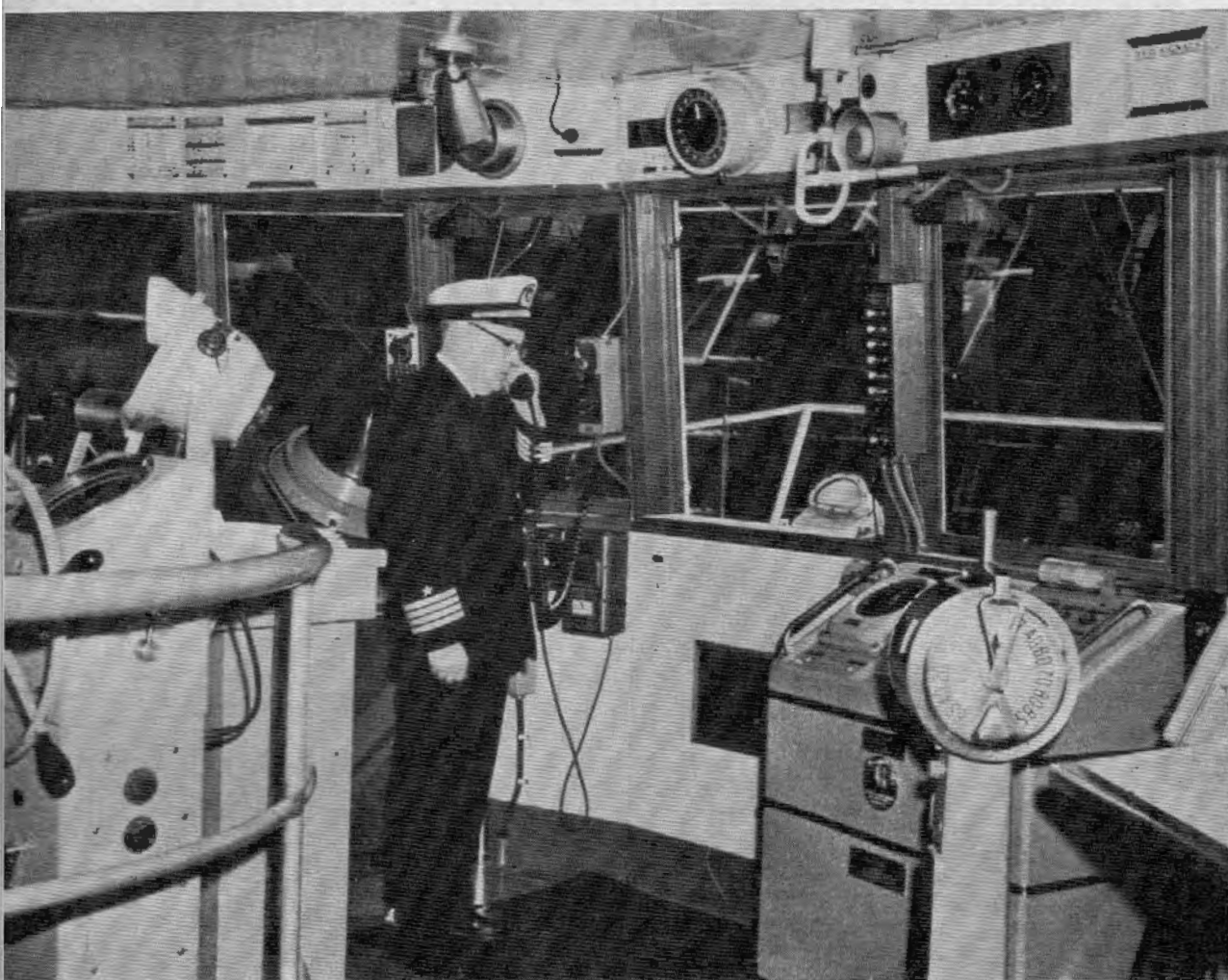


FIGURE 1.—Pilot House Showing Radiotelephones and Navigation Equipment.

public correspondence, U.S. Coast Guard, port operations, docks, piers, locks, bridges, tug dispatch stations and pilotage stations.

Probably the most unique system of VHF operation on the Lakes is centered in the dispatch office of the Great Lakes Towing Company in Cleveland's Terminal Tower. With antennas located 600 feet above lake level, the dispatcher can contact his tugs within Cleveland Harbor and

those within a 75-mile radius. Then with land line tie-ins to remote control stations in Detroit, Toledo, Ashabula and Buffalo, every tug and every vessel on Lake Erie can communicate with the dispatch office. This is a multichannel system operating on channels 10, 12, 16 and 18A. It has proved to be highly successful.

In November of 1966 the Lakes shipping industry was struck a severe blow by the loss of the ore carrier

Daniel J. Morrell on Lake Huron. All but one of the crew was lost. There was a great deal of publicity in the national press about this disaster and much of it questioned the safety of Great Lakes vessels. Up to the time of this casualty, vessel operators on the Great Lakes thought they had the finest marine communication system in the world. We were overlooking a remote loophole in our system which we are rapidly plugging.

The vessel which sank was a conventional bulk carrier with machinery aft and the navigation bridge forward. The source of power for all the navigation equipment was aft. When the vessel suddenly, and apparently without warning, broke in two during a fierce storm, there was no power to operate the radiotelephone to send out a distress message to numerous vessels and a shore station in the vicinity of the sinking.

Members of the Lake Carriers' Association immediately launched a study to remedy this situation and concluded that the best method available today was to install 100 watt AM transceivers powered by a 12 volt nickel cadmium battery with battery charger. Most of these sets have a single channel, i.e., the safety and distress channel 51. The equipment occupies very little room in the pilot house and is used for emergency only. The range is sufficient to reach shore stations and other vessels within a 50 to 150 mile radius. (See Figure 2.)

Today, more than 100 vessels have been equipped with emergency radiotelephones and perhaps another fifty units have been ordered. In a few years, it is expected most Great Lakes vessels will have emergency sets independent of the ship's power supply or have an emergency power supply for the regular unit.

This equipment is being installed on a voluntary basis in spite of a safety record that shows only three commercial vessels foundered on the Lakes during a 24 year period from 1943 through 1966. Of the three, only one was unable to get out a radiotelephone distress message. In the 42 years since 1924, only one commercial vessel foundered on Lake Huron. In that period, there were 810,000 vessel passages through the Soo Locks which is an indication of the traffic on Lake Huron.

Also, the Lake Carriers' members have under study an overboard radio-

telephone; that is, one that is compact, watertight and powerful enough to reach out some distance. This equipment would be kept close at hand and ready to take over the side in a lifeboat or rubber life raft. There is some equipment on the market today, but we do not consider it good enough to do the job. We are hopeful that a VHF set can be developed to meet our specifications. In this area, there is

thought being given to a unit which will also emit a signal that will be picked up by radio direction finders to enable the rescue vessels or aircraft to obtain a position fix.

The safety features of a coordinated radiotelephone system are so numerous that it is difficult for those who have been using the system for over twenty years to understand why a similar system is not in use on the

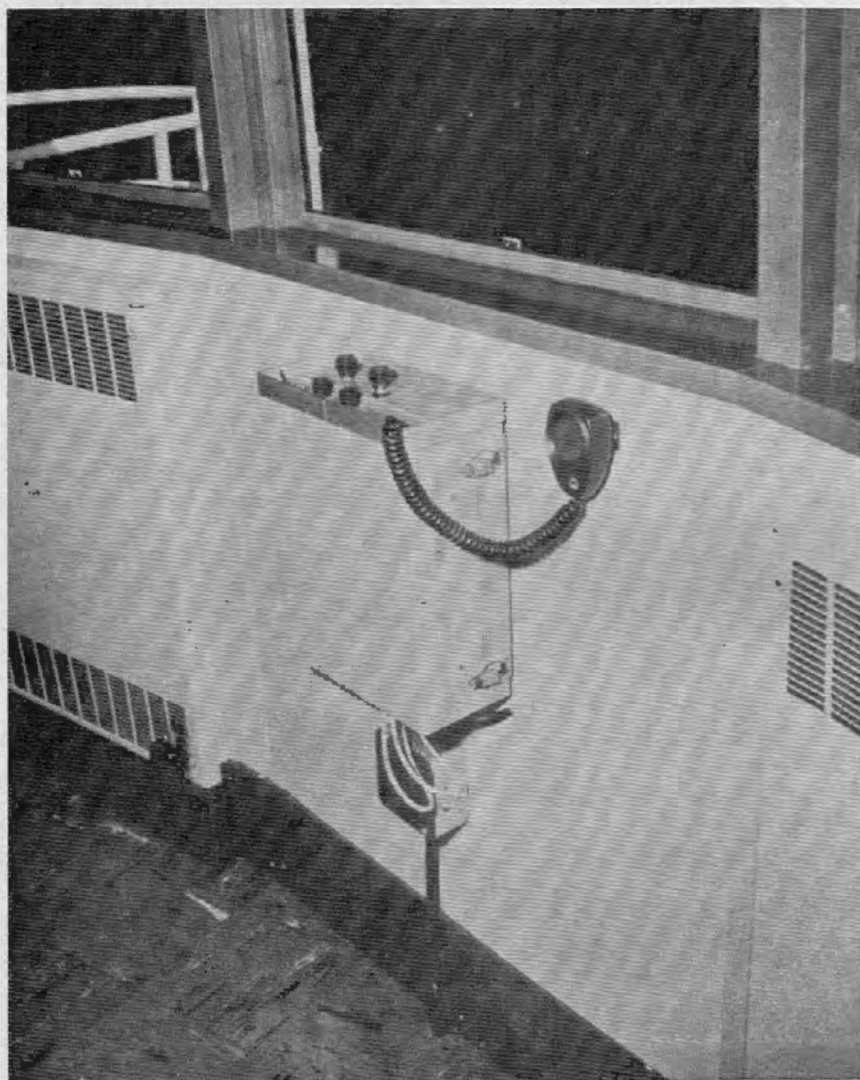


FIGURE 2.—Emergency Radiotelephone Unit on Bridge of Great Lakes Vessel. Battery and Battery Charger are Located Below Deck.

seacoasts of the United States. We understand numerous port, pilotage and shipping associations in the past few years have set up or are now setting up VHF communication systems. We know that the Coast Guard is encouraging legislation for VHF bridge-to-bridge communication.

We suggest that interested parties, including agencies of the Federal Government, visit the Great Lakes and take a first hand look at a successful system. This system, we are convinced, will eventually be used world wide. Part of the system was approved at the 1947 Atlantic City Radio Conference. The Inter-American Radio Conference in Washington in 1949 adopted a part of the system. The Baltic-North Sea Radiotelephone Conference in 1955 resulted in a treaty signed by 13 countries adopting Channel 51 as the emergency channel. The Hague Conference in 1957 adopted a system very similar to the Great Lakes system. The Hague agreement was signed by 14 countries including the U.S.S.R. The ports of Liverpool and Southampton, and many ports on the continent have adopted this system. In some cases, it is used with a shore-based harbor advisory radar system. At the time of this writing (September-November 1967) 69 countries are meeting in Geneva to consider maritime radio problems. We believe our system will receive wide support.

In using the radiotelephone as a safety tool, bridge-to-bridge communication is probably first in importance. Those areas and vessels which are limiting themselves to a single channel system are limiting themselves to a one shot operation. By installing shipboard multichannel equipment on the bridge, rather than using portable units, vessels will eventually be able to use this equipment in all ports around the world and at sea. Collisions are not limited to river and harbor areas. A few words on the

VHF might have prevented the *Stockholm-Andrea Doria* collision.



Mr. John W. Manning started his maritime career as a seaman on Great Lakes vessels before going deep sea to sail as a deck officer during World War II. While on the Murmansk run in November of 1942, his ship was torpedoed and sunk. After spending seven days in a lifeboat above the Arctic Circle, he reported to Coast Guard Headquarters to give his recommendations on changing and improving lifeboat equipment.

Mr. Manning attended John Carroll University and Georgetown University School of Foreign Service. Prior to joining Hanna, he was a ship sales representative for the Maritime Administration in Washington and a partner in a New York ship brokerage firm. He is Chairman of the Electronics Committee of the Lake Carriers' Association, member of the Society of Naval Architects and Marine Engineers and Treasurer of the Propeller Club, Port of Cleveland.

We know there may have been a language barrier, but at least an un-

derstanding on courses could have been exchanged.

On the Lakes, every pilot on entering or leaving a dock and/or port, gives a security call on Channels 51 and 16 announcing his expected arrival, departure or intention. Every vessel in the vicinity is then on the alert. The security call is also given before blind turns on the rivers and in other congested waters. In many cases, the pilots will have already agreed on their meeting signal before they are in sight of one another.

In the Detroit River, there is a vessel passage once every 22 minutes. These vessels may be arriving, departing, turning, anchoring, meeting or passing. Rules of the Road are strictly adhered to and proper whistle signals are given. But without bridge-to-bridge communication, some of these situations would be disastrous. All vessels announce their intentions. If there is any misunderstanding or danger, the pilots are on the telephone to straighten it out.

There is quite a bit of fog over the Lakes during the navigation season. Almost all vessels are equipped with radar. The telephone is a great helpmate to radar, and many collisions have been averted by one target talking to the other. Pilots are proficient at plotting radar and do so, but in many cases there is insufficient time or it is impossible to work a plot.

Separate courses have been in effect on the Lakes since 1911, nonetheless there is apt to be the stray and there are many areas where the courses converge or cross. The telephone is an invaluable aid in sorting out the intentions of the vessels in good weather or foul.

Since 1954, there were only three major collisions involving vessel losses. In all instances, a foreign flag vessel was involved and there was a failure to establish proper bridge-to-bridge communication. In one instance, the foreign vessel was on its first voyage into the Lakes and was exempt from

the Great Lakes Treaty requiring a monitor and control station on the bridge. Foreign flag vessels entering the Lakes are becoming increasingly proficient in using their radiotelephones. In fact, in recent years, two of them played an important part in saving lives after a sinking and a collision.

River and lake conditions are passed along from pilot to pilot. If fog closes a portion of a river, the first ship arriving in the fog area gives a security call and announces his exact position of anchorage. Vessels up or down the river then know exactly what to look for and how to gauge their speed or to plan their anchorage.

All dredges and workboats are equipped with radiotelephones. They will caution pilots where they are working. In some cases, the Coast Guard will control traffic by radiotelephone past certain dredge, wreck or work areas.

The Soo Locks, Welland Canal and St. Lawrence Seaway all control traffic by radiotelephone. Some years the Soo Locks handle a ship every 17 minutes, locking through tonnage greater than the Panama, Suez, Manchester, Welland, and Cape Cod Canals combined. Obviously, such density of traffic needs close coordination. Without radiotelephones, it could not be accomplished safely.

For a vessel in distress, there exists on the Lakes a system much less sophisticated than the Coast Guard Automated Merchant Vessel Reports. The vessel puts out a MAYDAY on Channels 51 and 16. Because of the number of coast stations and equipped vessels, word is passed around almost like lightning. He undoubtedly will receive assistance in short order either from the Coast Guard or from a nearby vessel.

Constant weather information is of vital importance to safety. Shore stations broadcast conditions and forecasts every six hours. Storm warnings are broadcast more frequently. Over

GREAT LAKES AND ST. LAWRENCE RIVER RADIOTELEPHONE SYSTEM

CHANNEL FUNCTION	CHANNEL NO.	FREQUENCY (KC/s)
MF/HF (AM):		
Distress/Safety/Calling.....	51	2182
Intership.....	52	2003
Intership (Mostly yachts, etc.).....	54	2638
Intership (East of Montreal).....	55	2738
Coast Guard.....	56	2670
Public Correspondence.....	57	2118/2514
Public Correspondence.....	58	2158/2550
Public Correspondence (Canadian).....	59	2206/2582
Public Correspondence (Canadian).....	81	4110.8/4415.8
Public Correspondence.....	82	4117.2/4422.2
Public Correspondence.....	83	4129.9/4434.9
Public Correspondence (Future).....	91-94	6000-7000
Public Correspondence (Canadian).....	95	8236.4/8786.4
Public Correspondence.....	96	8249.2/8799.2
VHF (FM):		
Distress/Safety/Calling.....	16	(MC/s) 156.8
Intership (G.L. & International).....	6	156.3
Intership.....	7A	156.35
Intership.....	8	156.4
Yachts and Non-Commercial.....	9	156.45
Business and Operational.....	10	156.5
St. Lawrence River Control.....	11	156.55
Coast Guard and U.S. Locks.....	12	156.6
Port Operations.....	13	156.65
Soo Locks, Welland Canal, Army Engineers...	14	156.7
Tugs and Operational.....	18A	156.9
Public Correspondence.....	26	157.3/161.9
Public Correspondence.....	28	157.4/162.0

30 vessels are equipped with government instruments and send in observations to the weather bureau on a regular schedule. The co-ordinated data is broadcast to all the Lakes within an hour. In addition to the "official" weather information, a great deal of on the spot information is passed on from pilot to pilot.

Personal injury or serious illness cases are handled quickly by expert medical advice over the radiotelephones. In some cases, the Coast Guard will dispatch a cutter or a helicopter to render assistance or remove a seaman. All of these arrangements can be made in a matter of minutes.

Without the radiotelephone, day to day business would be difficult to accomplish. Position reports are the first order of business in the morning. Docks, railroads, tugs, pilots, suppliers are advised. Orders for the next voyage, fuel requirements, repairs,

personnel needs, etc. are discussed directly with the business office. During the night, messages can be left with coast stations who will have them on the teletype by early morning. On weekends and nights, dispatchers work directly from their home telephones. All of this leads to an orderly, safe operation.

The future role of communication for maritime safety is a topic for many other papers. It will cover single side band, direct dial ship to shore VHF, direct ship-to-shore data processing, microwave satellite communication, a separate system for pleasure craft, emergency position-indicating radiobeacons, instant position reporting and certainly a sound bridge-to-bridge worldwide system. Organizations such as the Radio Technical Commission for Maritime Services and the Maritime Safety Committee are working hard on these projects. ‡

SS "DANIEL J. MORRELL" SINKING

The National Transportation Safety Board and the Commandant have announced their Actions on the Marine Board of Investigation convened to investigate the sinking of the SS *Daniel J. Morrell* in Lake Huron with loss of life on 29 November 1966.

NATIONAL TRANSPORTATION SAFETY BOARD'S ACTION

1. This marine accident was investigated by the U.S. Coast Guard at a public proceeding in Cleveland, Ohio, conducted December 5, 1966 through March 21, 1967, under authority of 46 USC 239 and the regulations prescribed in 46 CFR 136. The report of this Marine Board of Investigation¹ and the Commandant's action thereon is included in and made a part of this report, for the convenience of the public. By publication of this report, the National Transportation Safety Board does not adopt the portions of the Coast Guard report which are concerned with activities within the exclusive jurisdiction of the Department of Transportation and the U.S. Coast Guard.

2. The Department of Transportation Act, effective April 1, 1967, assigned the responsibility to the National Transportation Safety Board for determining the cause of transportation accidents, and reporting the facts, conditions, and circumstances related to such accidents. Accordingly, the Board has considered those facts in the Coast Guard report of this accident investigation pertinent to its statutory responsibility to make a determination of the cause.

3. The Board finds the cause of this accident with attendant loss of life was the structural failure of the main hull girder amidships, which caused the vessel to break in two and both sections to sink. Factors which are considered to have contributed to this structural failure

are: high longitudinal stress on the hull girder due to height and wave length of the seas; limited original design section modulus for a vessel having such a large length to depth ratio; use in the original construction of the vessel of steel which is highly notch sensitive at the low atmospheric and sea temperatures experienced; a notch in the structure which was the nucleus of the initial fracture; low cycle stress fatigue; and steel of high transition temperature characteristics, relatively susceptible to brittle fracture.

4. Factors which are considered to have contributed to loss of life of all but one crew member are (1) no distress signal or communications from the sinking vessel were received, (2) report of the vessel being overdue was received by the Coast Guard a day and a half after the sinking, and (3) lifesaving equipment on the SS *Morrell* did not provide the weather protection necessary for survival under existing weather and sea conditions.

By THE NATIONAL TRANSPORTATION SAFETY BOARD

(S) JOSEPH J. O'CONNELL, Jr.,	Chairman.
(S) OSCAR M. LAUREL,	Member.
(S) JOHN H. REED,	Member.
(S) LOUIS M. THAYER,	Member.
(S) FRANCIS H. McADAMS,	Member.

¹ Due to space limitations the Coast Guard report of the Marine Board of Investigation is not printed herein.

FEBRUARY 9, 1968.

LETTER OF RECOMMENDATION TO THE COAST GUARD

Department of Transportation National Transportation Safety Board

Washington D.C. 20591

February 8, 1968

OFFICE OF
THE CHAIRMAN

Admiral Willard J. Smith,
Commandant, U.S. Coast Guard,
Washington, D.C. 20591.

Dear Admiral Smith:

In reviewing the Marine Board of Investigation on the sinking of the SS *Daniel J. Morrell*, and your action on that report, the National Transportation Safety Board is concerned that a similar tragedy may occur to other bulk carriers under similar circumstances. The fractures sustained by the sister ship SS *Edward Y. Townsend* in the same vicinity and under like conditions substantiate this concern. Another example is the breaking and sinking of the SS *Carl D. Bradley* in Lake Michigan on November 18, 1958, which was attributed to an undetected structural weakness or defect.

In the *Morrell* case, the recommendations of the Marine Board should adequately cope with emergencies resulting from fractures and other accidents in these vessels. We are also concerned with measures to prevent the failure of the hull girder in vessels of that general type.

We share your interest and responsibility for the prevention of accidents. Accordingly, we request a summary of the results of your special inspections of the older Great Lakes vessels, and of joint studies now in process, at an early date. In addition, information is requested concerning current plans for construction of replacement vessels, which seems to be the ultimate solution to this problem. A list of the current U.S. Great Lakes bulk carrier fleet, giving date of construction, size, owner, and other significant data would also be helpful to the Board.

While we fully appreciate the economic aspects involved in methods that would help prevent failure of hull girders, from a safety standpoint, we recommend that you consider further action as follows:

A. Strengthen the deck and/or sheer strake structure in the midships area in vessels over 400 feet long constructed prior to 1948, or curtail the operation of these vessels during specific days and period of the fall season when adverse weather and wave conditions approach or exceed those encountered by the SS *Daniel J. Morrell*.

B. Based on the special inspection program, implement a progressive structural renewal program on an individual ship basis.

The Safety Board recognizes the efforts of all those involved in the research and study of the forces and effects of sea and weather on the safety of vessels, and urges the continuation and intensification of such studies to develop objective technical criteria relating hull structural integrity to weather, sea, and other conditions of operation.*

This Board concurs in the recommendations contained in the *Morrell* report, and urges implementation of them prior to the next shipping season, along with our recommendation to provide emergency lighting in the forward quarters and liferaft embarkation location. The need for a position-reporting system is considered of prime importance, and voluntary compliance by the Great Lakes operators should be obtained prior to next season.

Sincerely,

(S) JOSEPH J. O'CONNELL, Jr.
Chairman.

* The Chairman and Members McAdams and Laurel concur in the observations made with respect to the desirability of the continuation and intensification of efforts to develop better objective criteria relating to hull structural integrity, but wish still further to stress and amplify on the importance of such a program.

Specifically, they have this to say:

"Completely adequate information was not available to the master of the SS *Morrell* as to the hull strength of his vessel under temperature and sea conditions forecast and observable at the time he determined to leave port. As you know, the master of another vessel of nearly identical design also left port and proceeded in the vicinity of the SS *Morrell* under identical temperature and sea conditions and was fractured in the same manner, but to a lesser degree. Both ships, however, had exceeded the margins of fracture resistance and it seems clear that the master of neither ship had reason to expect what happened. We recognize that efforts are constantly being made by the Coast Guard and private organizations to learn more of the forces and effects of sea and weather on the safety of vessels, and it is apparent that this tragedy has resulted in a continuation and intensification of them.

"However, we wish to emphasize that even had the master of the SS *Morrell* had all the currently available information concerning the basic structural integrity of the vessel under sea conditions, temperature and loading conditions existing immediately prior to the accident, he would still have been unable to make an intelligent judgment as to the hull integrity of the vessel under the then existing conditions. Under the conditions here present, the master could have estimated the sea conditions but could not have estimated the ability of the vessel to meet them, and therefore we are of the belief that special efforts seem warranted to develop information better calculated to provide a master with data useful and, in this case, vital to intelligent decisions."

COMMANDANT'S ACTION

The record of the Marine Board of Investigation convened to investigate subject casualty has been reviewed and the record, including the Findings of Fact, Conclusions and Recommendations, is approved subject to the final determination of the cause of the casualty by the National Transportation Safety Board and the following comments.

REMARKS

1. The Coast Guard instituted a review immediately after this casualty looking into every Great Lakes bulk cargo vessel structural failure since 1956. The review considered vessel age, section modulus, length to depth ratio, structural changes, repowering, location of the failure together with the circumstances of the failure including the prevailing air temperature. This review served to pinpoint those vessels of the Great Lakes bulk cargo vessel fleet that warranted particular examination for possible incipient fractures or other indications of structural weakness. Sixteen such vessels were examined for incipient fractures primarily in the critical area of midships hatch corners. Two were found to be in need of corrective action. Corrective action was taken on one vessel. The other vessel remains in a laid-up status and will require corrective action before being permitted to return to operation. This program was then extended and is continuing to include additional vessels. One of the results of the program has been the development of a relatively simple non-destructive method of examining concealed portions of the main deck stringer plating in way of hatch coamings.

2. In order that the magnitude of the dynamic forces involved may be better understood, a number of comprehensive scientific studies have been underway for a considerable period of time. With the close participation of the Coast Guard, The Society of Naval Architects and Marine Engineers have been working on the following projects.

a. In cooperation with a number of government agencies of both the United States and Canada, the Society is conducting a detailed study of Great Lakes wave action. Analysis of results of observations for 1965 and 1966 is expected before the end of 1967.

b. A U.S. Great Lakes bulk cargo vessel has been provided with stress measuring and recording equipment which will make available a determination of the dynamic forces to which the vessel's hull is subject during all stages of her operation. Stress data is available for 1965 and 1966, and will be available for part of 1967. This information will be correlated with wave data obtained by means of radio wave buoys recorded in 1966 and with the further data being recorded for 1967. The

Canadian Government is also conducting similar studies and has several vessels so instrumented.

c. Models of 700-foot and projected 1,000-foot Great Lakes vessels are now being tested. The information obtained in the wave data and the vessel stress project will be correlated with the model basin tests.

3. A joint Canadian-U.S. Great Lakes Load Lines Technical Committee has been established by the Coast Guard and the Canadian Board of Steamship Inspection. The objective of this Committee will be to determine the strength, freeboard and other requirements pertinent to the assignment of applicable vessel load lines. This Committee will utilize the latest and most up-to-date scientific information. It is expected that the groups working on these studies will make a worthwhile contribution to a better understanding of the problems of adequate hull strength.

4. In order to determine the cause of the casualty as fully as possible the Board had the benefit of underwater diving and television picture relays on the sunken stern section. In addition, a large section of the sheerstrake and a small section of deck plate were recovered and subjected to metallurgical study. This enabled the Board to determine that the fracture sustained was "brittle fracture typical of many prior ship fractures in pre-1948 steel." However, while the fracture was clearly of brittle type, it differed from fractures previously noted in welded ships in that it progressed through a transverse line of rivet holes. Thus, the rivet holes clearly were not effective as crack arrestors. In the case of the sheerstrake fracture a rivet hole was identified as a fracture source.

ACTION CONCERNING THE RECOMMENDATIONS

1. The Board's recommendations concerning providing inflatable liferafts, emergency source of power for radio communication, and modifications to the general alarm system are being given prompt consideration by the Coast Guard and will be submitted to the Merchant Marine Council for consideration of implementing regulations. Insofar as the emergency source of power for radio communication is concerned this recommendation is being considered in cooperation and in conjunction with the Federal Communications Commission which has indicated its support of the recommendation.

2. The Board's recommendation that future Great Lakes bulk cargo vessels be constructed with sufficient compartmentation so that the vessel can remain afloat even if any one main cargo hold is flooded, warrants consideration and study. All organizations and individuals interested in safety on the Great Lakes must be concerned with casualties such as this and the loss due to the collision of the *Cedarville* and *Topdalsfjord* in May 1965. In that casualty, the *Topdalsfjord* struck the fully

laden *Cedarville* amidships at nearly a right angle. Once the main cargo hold was breached by collision and the flooding could not be controlled, the vessel's sinking was inevitable. It seems that the departures from present design and construction which would be necessary to provide an effective degree of compartmentation may be small enough to be justifiable having regard to economics as well as safety. Accordingly, the Coast Guard will undertake to consult with other interested organizations looking to the feasibility of such a design.

3. The Board recommended evaluation of the need for tarpaulins on vessels equipped with secured sliding plate type hatch covers during all seasons when not carrying cargo. Since this involves an amendment to the existing load line regulations, the recommendation will be forwarded by the Coast Guard to the joint Canadian-United States Great Lakes Load Lines Technical Committee for consideration and evaluation.

4. The Board's recommendation concerning providing the Master of a Great Lakes bulk cargo vessel with a loading manual that would indicate the limiting longitudinal bending moment factor that his vessel can safely sustain will likewise be presented to the joint Canadian-United States Great Lakes Load Lines Technical Committee.

5. The absence of a distress message precluded prompt institution of search and rescue efforts. Therefore, the recommendation that vessels be provided with a datum marker buoy has considerable merit. This subject has been under discussion and study by the Maritime Safety Committee of the Inter-Governmental Maritime Consultative Organization for some time. There is now international agreement on the characteristics and frequencies of such marine emergency position indicating radio beacon. Therefore, the Coast Guard will undertake a study in consultation with concerned industry representatives, government agencies and others to determine whether this emergency radio beacon should be required on United States vessels. In the interim the voluntary equipping of Great Lakes vessels with the device is encouraged.

The record indicates that the owners of the *Daniel J. Morrell* had in effect a daily reporting system during certain periods of the operating season. The Board's recommendation that when a vessel fails to report as scheduled positive action should be instituted by the persons concerned has been presented to the owners and operators. This positive action should include early notification to the Coast Guard in order that their search and rescue facilities may be alerted while the vessel's owners continue to try to determine the status of the vessel. This early notification, preferably within one hour, will enable all facilities at hand to be more promptly utilized.

6. A copy of the Board's report will be forwarded by the Coast Guard to the Environmental Science Services

Administration of the U.S. Department of Commerce for study and consideration of the recommendation that on-scene sea conditions be reported in regular marine weather broadcasts. Preliminary discussions with personnel of that agency have been held.

7. Concerning the reported separation of the signal pistol, Coast Guard casualty statistics do not indicate a similar failure of a signal pistol screw such as is reported to have occurred. Accordingly, in lieu of an amendment to the regulations governing the construction of this signal pistol, the Coast Guard has taken steps to carefully examine these pistols at subsequent vessel equipment inspections in order to determine if similar conditions exist. In addition, the manufacturers of currently approved signal pistols have been advised of the necessity for adequate securing of these screws.

CONCLUDING REMARKS

1. While every effort is being taken to prevent recurrence of this type of casualty, the magnitude of the problem must be recognized in order that the corrective steps taken or contemplated or subsequently deemed necessary may be understood within the parameters of the situation as it exists. The average age of the Great Lakes bulk carrier fleet is about 45 years. There are more vessels in the 50 to 60 year age group than any other 10 year period. These vessels are constructed of a type of steel which has not been used in large vessel construction since 1948. This pre-1948 steel generally has a high transition temperature, and is therefore susceptible to brittle fracture. While it is true that corrosion of steel under the fresh water conditions of the Great Lakes is minimal, fatigue as a result of repeated stress cycling over a long period of years can and does result in local structural deterioration in the form of fatigue cracks. This type of deterioration may be difficult to detect despite diligent inspection. Because of these conditions it must be recognized that the remedial steps necessary to reduce the possibility of a recurrence of this tragedy must involve all groups concerned. The vessel's loading, discharge and ballasting must be such as to minimize stress. Full allowance and consideration must be given to the restrictions that adverse weather will place upon the vessel. The operation, maintenance and husbanding of the vessel must at all times give full recognition to these factors and therefore result in prudent, careful operating procedures and practices. Safe operation of the present Great Lakes fleet will require the efforts of all groups and individuals concerned.

4 October 1967.

W. J. SMITH,
Admiral, U.S. Coast Guard,
Commandant.

NEW ATTEMPT

AT SHAPE

SAFETY

In September of 1965, Rule 5 of the International Regulations for Preventing Collisions at Sea was amended to require that an underway diamond shape be displayed on towed vessels of over 600 feet.

To comply with this amendment aboard a large unmanned bulk cement barge, a shape was hung in the traditional manner from the forward mast (See Figure 1). The shape, constructed of steel plate and hung with a manila halyard, proved highly unsatisfactory for two reasons. First, the wind action on the shape resulted in chafing of the halyard, and many times on voyages in which rough seas were encountered the shape was washed overboard. Also the halyard occasionally was sufficiently weakened that it parted as the shape was being lowered or raised.

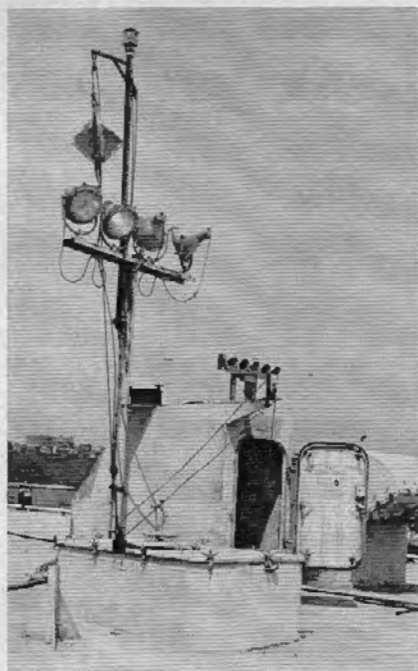


Figure 1.

The shape falling to the deck created an extremely hazardous condition.

In an attempt to eliminate these problems later shapes were constructed of wood, and a wire rope halyard was used. While this solved some of the problems, the wood construc-



Figure 2.

tion was unsuitable to the wear and tear of rough seas and winds. The shape was a lesser threat to safety but still not completely satisfactory.

To provide both safety and endurance a complete re-evaluation was made to develop a system that would

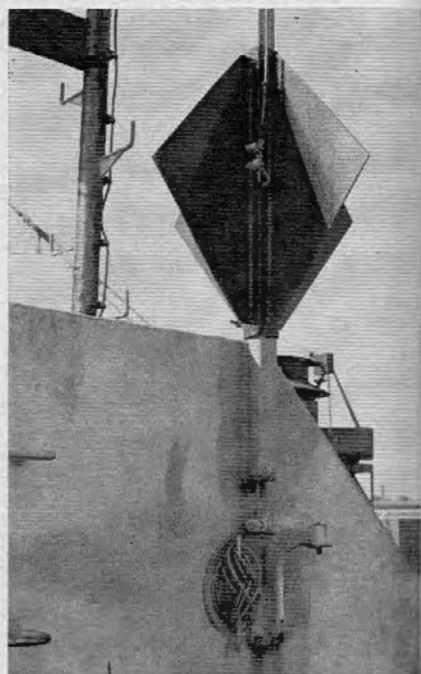


Figure 3.

(a) withstand the effects of the elements; (b) remain stable in wind; and (c) ensure safety of personnel.

Figure 2 shows the installation that resulted from these objectives. The system consists of a square stainless steel mast fitted with a square collar to prevent rotation of the shape. The shape is formed from aluminum plating welded to the collar (See Figure 3). The lifting halyard is wire rope of the new noncorroding type and is passed down through the center of the square mast to prevent chafing. The mast has a positive stop at a height to prevent injury should the lifting wire break. ‡

Courtesy Atlantic Cement Co. Inc.,
Marine Division.

maritime sidelights



Admiral Willard J. Smith, Commandant U.S. Coast Guard, presents the Legion of Merit to Rear Admiral Charles P. Murphy, right, and Rear Admiral Mark A. Whalen, left, at Coast Guard Headquarters on May 28, 1968. Copies of the citations are printed below.

THE SECRETARY OF TRANSPORTATION WASHINGTON, D.C. 20590

The President of the United States takes pleasure in presenting the LEGION OF MERIT to

REAR ADMIRAL CHARLES PATRICK MURPHY
UNITED STATES COAST GUARD

for service as set forth in the following

CITATION:

"For exceptionally meritorious conduct in the performance of outstanding service, as Chief, Office of Merchant Marine Safety from June 1966 to April 1968. Rear Admiral MURPHY as a U.S. Delegate or advisor at sessions of Intergovernmental Maritime Consultative Organization bodies distinguished himself on numerous occasions through his leadership and organization in matters relating to the Coast Guard's role in international maritime safety. These meetings have included those of the IMCO Maritime Safety Committee in April 1965, January, May and October 1966, March 1967, and March 1968; the IMCO Council in May 1967, the IMCO Assembly in October 1967; and the IMCO Extraordinary Assembly in November 1966 which dealt with such internationally, politically sensitive subjects as fire

safety of passenger vessels and, more recently, oil pollution. At the request of the Department of State, Rear Admiral MURPHY lent his vast technical knowledge while accompanying the Assistant Secretary of State for the Bureau of Economic Affairs on a tour of the capitols of European maritime nations in April and May 1966. This tour was successful in accomplishing its purpose of persuading those nations to accede to a U.S. proposal which led towards the upgrading of the passenger vessel fire safety requirements of the 1960 Safety of Life at Sea Convention and ultimately towards the adoption of U.S. fire safety standards for new passenger vessels. At the IMCO Maritime Safety Committee meeting in March 1965, Rear Admiral MURPHY was elected Chairman for a one-year term, thus becoming the first American to serve in this important position. In all his endeavors, Rear Admiral MURPHY has shown an outstanding degree of diplomacy and tact in his associations with industry, governmental, and international organizations. His competence and devotion to duty have been in keeping with the highest traditions of the United States Coast Guard."

For the President,

(S) ALAN S. BOYD.

THE SECRETARY OF TRANSPORTATION WASHINGTON, D.C. 20590

The President of the United States takes pleasure in presenting the LEGION OF MERIT to

REAR ADMIRAL MARK ALEXANDER WHALEN
UNITED STATES COAST GUARD

for service as set forth in the following

CITATION:

"For exceptionally meritorious conduct in the performance of outstanding service while serving as Chief of Staff at Coast Guard Headquarters from August 1966 to June 1968. Rear Admiral WHALEN, exercising dynamic leadership and outstanding professional competence, met the challenge of this difficult and exacting assignment during the period when the United States Coast Guard was organizationally transferred from the Treasury Department to the newly created Department of Transportation. Under his leadership and guidance, the multiplicity of administrative and organizational details of the transfer were smoothly accomplished concurrently with the extremely difficult administrative workload normally experienced during the budgetary cycle. Subsequent to this transfer, he has continued his outstanding performance of duty in this assignment displaying keen foresight and superb organizational ability in orienting Coast Guard programs and initiatives to support those of the Department of Transportation. Rear Admiral WHALEN's diplomatic leadership, professional skill, organizational ability, and zealous devotion to duty reflect the highest credit upon himself and the United States Coast Guard."

For the President,

(S) ALAN S. BOYD.

DECK

Q. If, when in ballast, with the wind and sea on the port bow, you were set in close to the land on your lee with the ship refusing to come up into the wind and no room to come around on right rudder, what would you do to get sea room?

A. Helm amidships and come full speed astern. The wind and sea will pay the bow off towards the land and the stern will come up into the wind. Keep backing until you have sufficient sea room and go full ahead with full rudder, bringing the wind on the starboard bow. Most likely, with sufficient sea room, she will come around best on left wheel since she could be given a good start swinging.

Q. The term "camel" is used to mean:

- (a) A method of handling cargo with a swinging derrick.
- (b) A portable steel hatch cover.
- (c) A small barge.
- (d) A device for relieving excess stress on a cargo boom.
- (e) A heavy fender float for keeping a vessel off a wharf.

A. (e) A heavy fender float for keeping a vessel off a wharf.

Q. A carling is:

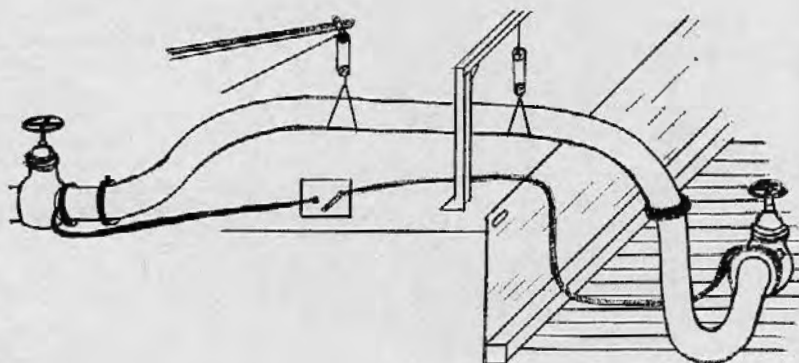
- (a) A line for clewing up square-rigged sails.
- (b) A fore-and-aft jumper stay.
- (c) A small car generally used for hauling coal to the fireroom.
- (d) A longitudinal beam in the inner bottom.
- (e) A short fore-and-aft timber or girder under a deck to stiffen it.

A. (e) A short fore-and-aft timber or girder under a deck to stiffen it.

OIL

Q. (a) What is the purpose of a bonding wire as illustrated and where should it be connected?

(b) Why should a bonding wire be connected before connecting the cargo hose and the connection maintained until the hose is removed? Explain the use of a switch in the bonding cable.



A. (a) The purpose of a bonding wire is to provide a path for static electric charges, or stray electric charges between the ship and the shore pipe lines. It should be connected between the ship's manifold and the metal shore lines. Static electricity may be generated by the flow of a dielectric fluid such as petroleum products through the pipe and hose and sparking could occur where metal-to-metal contact is broken as between flanges separated by a gasket unless the conductive bond is provided.

(b) Bonding wires should be connected prior to connecting hose and not disconnected until hose is disconnected and any spillage removed, because bringing the two metal flanges together or moving them apart might create conditions for spark discharge between them unless the bond is available for the charge to flow through. When a switch is provided in the bonding cable, it should be open when connecting the cable and removing it; such a switch should, of course, either be explosion-proof or operated in atmosphere and area free from hazard.

ENGINE

Q. What is meant by adjustment of the blowdown of a safety valve?

A. "Blowdown" is the drop in pressure which takes place between the time of opening and closing of a boiler safety valve. In most forms of spring pop safety valves, the amount of blowdown may be varied by adjusting the position of a ring, called the blowdown ring, which surrounds the valve seat and deflects the escaping steam in such a manner as to assist

in holding the valve open until the boiler pressure has been reduced by the amount of blowdown.

Q. Explain why it is becoming increasingly necessary to deaerate the feed water of modern water-tube boilers.

A. Chemical reaction and corrosion is accelerated by high temperatures and the presence of oxygen, hence it is necessary to deaerate the feedwater used in modern boilers utilizing higher temperatures and pressures or serious pitting will occur.

AMENDMENTS TO REGULATIONS

Title 46 Changes

LIFESAVING EQUIPMENT, VESSEL INSPECTION, AND MOTORBOAT OPERATORS OR OPERATORS OF SMALL PASSENGER VESSELS

Pursuant to the notice of proposed rule making published in the Federal Register of January 24, 1967 (32 F.R. 795-807), and the Merchant Marine Council Public Hearing Agenda dated March 20, 1967 (CG-249), the Merchant Marine Council held a public hearing on March 20, 1967, for the purpose of receiving comments, views, and data. The proposals considered were identified as Items PH 1-67 to PH 13-67, inclusive. Item PH 8-67 contained proposals regarding lifesaving equipment (CG-249, pages 130 to 147, inclusive). Item PH 9-67 contained proposals regarding vessel inspections (CG-249, pages 148 to 169, inclusive). Item PH 11-67 contained proposals regarding operators or ocean operators of small passenger vessels and motorboat operators (CG-249, pages 187 to 197, inclusive). These proposals, as revised, are adopted and set forth in this document.

Interested persons have been afforded an opportunity to participate in the consideration of these proposals and certain changes were made in the proposals as a result thereof. With respect to the additional life preservers required on small passenger vessels (Item PH 8a), the text of 46 CFR 180.25-5(b) was revised to reflect that it applied when the vessels are on international voyages and are carrying more than 12 passengers. The proposal regarding color of lifeboats and buoyant apparatus on small passenger vessels (Item PH 8b) was changed so that the effective date therefor in 46 CFR 180.10-5, 180.10-15, and

180.10-20 will be July 1, 1968. The proposal regarding hydraulic (hydrostatic) and manual releases for lifesaving equipment (Item PH 8d) in 46 CFR subpart 160.062 was revised and additional procedures designated 46 CFR 2.75-17 to 2.75-19, inclusive, were added. The major changes provide for compliance with requirements of the Administrative Procedure Act and the Director of the Federal Register regarding incorporation of standards by reference. The changes in 46 CFR 33.20-20, 75.15-10(e), 94.15-10(e), 167.35-3, 180.20-1(c), and 192.15-10(e) clarify and require after July 1, 1969, only approved hydraulic releases and provide for existing hydraulic releases to be reconditioned to obtain Coast Guard approval.

With respect to the proposals regarding vessel inspection (Item PH 9a), the text of 46 CFR 35.10-3, regarding display of plans on tank vessels (TB/ALL), was clarified to show that application applied only to tank vessels of more than 100 gross tons. The miscellaneous updating changes

for various inspection regulations (Item PH 9d) were revised. The changes in 46 CFR 31.01-5, 71.20-15, 91.20-15, and 176.05-5 clarify the requirements and include reference to inspections of unfired pressure vessels. The proposal to define "primary lifesaving equipment" for tank, passenger, cargo and miscellaneous vessels was withdrawn. With respect to requirements for masts and sails on lifeboats, the requirement that the cover be made of canvas was deleted from 46 CFR 33.15-10(s), 75.20-15(s), and 94.20-15(s). In the proposals to update the regulations for uninspected vessels (Item PH 9e), the definitions for barge and oceanographic vessels were clarified, see 46 CFR 24.10-2 and 24.10-20. With respect to pilot ladders, the requirement in 46 CFR 26.03-15 was changed to require that at night illumination for such ladder shall be readily available rather than a specific requirement to have a light shining over the side.

With respect to the proposals regarding operators or ocean operators of auxiliary sailing vessels (Item PH 11a), the language was edited to have uniformity of style without changing the requirements. The proposal regarding recency of service for license as motorboat operator (Item PH 11d) was withdrawn.

The proposals in Items PH 8-67, PH 9-67, and PH 11-67 not mentioned in the preceding paragraphs were accepted as proposed. The Merchant Marine Council's actions with respect to comments received and proposals in Items PH 8-67, PH 9-67, and PH 11-67 are approved. With the publication of this document, the actions based on the Merchant Marine Council Public Hearing Agenda (CG-249), dated March 20, 1967, have been completed.



Various editorial amendments to the rules and regulations have been included in this document to bring them up to date and to show the assignment of functions to the U.S. Coast Guard in the Department of Transportation, including deletion of references to Treasury Department Orders describing delegations of authority.

The amendments and new regulations in this document shall be effective on July 1, 1968, or such later date as may be stated in specific regulations; however, the regulations may be complied with in lieu of existing requirements prior to that date.

The complete text of these changes has been published in the Federal Register of April 12, 1968, Part II.

Approved Equipment

Commandant Issues Equipment Approvals

By Commandant Action of April 9 and 11, 1968, Coast Guard approval was granted to certain items of lifesaving, and other miscellaneous equipment and materials.

Those interested in these approvals should consult the Federal Registers of April 16 and 17, 1968, for detailed itemization and identification.

NVIC 3-68

This circular publishes information on the application, installation and inspection of tensile fasteners used as structural connections on inspected vessels. This information is furnished for guidance purposes. Where specifics are given it should be understood that mandatory application is not intended. Nothing herein shall be taken as amending regulations or limiting the authority and responsibility of the Officer in Charge, Marine Inspection in the exercise of his good judgment.

Over the years, considerable experience has been gained in the use

of tensile fasteners for making structural connections on vessels. Some general conclusions can now be drawn with regard to satisfactory types, sizing, spacing, installation and proper applications. Constructive comments and suggestions are solicited and will be the basis for future revisions to the attached notes.

Copies of this circular with enclosure (1) may be obtained at the local marine inspection office or by writing Commandant CAS-2, U.S. Coast Guard, Washington, D.C. 20591.

STORES AND SUPPLIES

Articles of ships' stores and supplies certificated from April 1 to May 31, 1968, inclusive, for use on board vessels in accordance with the provisions of Part 147 of the regulations governing "Explosives or Other Dangerous Articles on Board Vessels" are as follows:

CERTIFIED

Marine and Ship Supply, Inc., 110 Brannan St., San Francisco, Calif. 94107: Certificate No. 800, dated April 2, 1968, BILGE AND FUEL TANK CLEANING COMPOUND, NO. 77.

W. E. Zimmie, Inc., 810 Sharon Drive, Westlake, Ohio 44145: Certificate No. 801, dated April 1, 1968, ZIMMITE MUD REMOVER, ZM 100.

Research Products, Inc., 408 South Royal St., Mobile, Ala. 36603: Certificate No. 802, dated April 26, 1968, MARSOL EC.

Bull & Roberts, Inc., 785 Central Ave., Murray Hill, N.J. 07971: Certificate No. 803, dated April 26, 1968, BROMAR MARINE FUEL TREATMENT.

Airwick Industries, Inc., Commerce Rd., Carlstadt, N.J. 07072: Certificate No. 804, dated April 30, 1968, AIRKEM MULTI-PURPOSE SOLVENT CLEANER SPECIAL.

LPS Research Laboratories, Inc., 1934 Cotner Ave., West Los Angeles,

Calif. 90025: Certificate No. 805, dated May 8, 1968, LPS #1; Certificate No. 806, dated May 8, 1968, LPS #2; Certificate No. 807, dated May 8, 1968, LPS #3.

W. E. Zimmie, Inc., 810 Sharon Drive, Westlake, Ohio 44145: Certificate No. 808, dated May 10, 1968, ZF 400; Certificate No. 809, dated May 10, 1968, ZF 405; Certificate No. 810, dated May 10, 1968, ZF 455.

The Perolin Co., Inc., Empire State Building, 350 Fifth Ave., New York, N.Y. 10001: Certificate No. 811, dated May 10, 1968, PEROLIN FUEL OIL TREATMENT NO. 655-CS.

Murray Chemical Co., Inc., Pier 46-A, The Embarcadero, San Francisco, Calif. 94107: Certificate No. 812 dated May 22, 1968, MURCO RINSE AWAY, TYPE B; Certificate No. 813 dated May 22, 1968, MURCO FOT #2.

BULL & ROBERTS, INC., 785 Central Ave., Murray Hill, N.J., 07971: Certificate No. 814 dated May 27, 1968, BROMAR TANK AND BILGE CLEANER.

AFFIDAVIT

The following affidavits were accepted during the period from March 15, to May 15, 1968:

Bailey Engineering Co., P.O. Box 15215, New Orleans, La. 70115 VALVES & FITTINGS.

Charles Wheatly Co., Nuclear Division, 414 South Detroit Ave., Tulsa, Okla. 74120 VALVES.

Hills-McCanna Co., 400 Maple Ave., Carpentersville, Ill. 60110, VALVES.

ELKHART BRASS MANUFACTURING CO., INC., 1302 West Beardsley Ave., Elkhart, Ind. 46514, FLANGES.

ITT General Controls, 801 Allan Ave., Glendale, Calif. 91201, VALVES.

Durion Co., Inc., P.O. Box 1019, Dayton, Ohio 45401, VALVES.

Pima Valve Co., P.O. Box 765, Chandler, Ariz. 85224, VALVES.

MERCHANT MARINE SAFETY PUBLICATIONS

The following publications of marine safety rules and regulations may be obtained from the nearest marine inspection office of the U.S. Coast Guard. Because changes to the rules and regulations are made from time to time, these publications, between revisions, must be kept current by the individual consulting the latest applicable Federal Register. (Official changes to all Federal rules and regulations are published in the Federal Register, printed daily except Sunday, Monday, and days following holidays.) The date of each Coast Guard publication in the table below is indicated in parentheses following its title. The dates of the Federal Registers affecting each publication are noted after the date of each edition.

The Federal Register may be purchased from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. Subscription rate is \$1.50 per month or \$15 per year, payable in advance. Individual copies may be purchased so long as they are available. The charge for individual copies of the Federal Register varies in proportion to the size of the issue but will be 15 cents unless otherwise noted in the table of changes below. Regulations for Dangerous Cargoes, 46 CFR 146 and 147 (Subchapter N), dated January 1, 1968, are now available from the Superintendent of Documents, price: \$2.50.

CG No.	TITLE OF PUBLICATION
101	Specimen Examination for Merchant Marine Deck Officers (7-1-63).
108	Rules and Regulations for Military Explosives and Hazardous Munitions (8-1-62).
115	Marine Engineering Regulations and Material Specifications (3-1-66). F.R. 12-6-66, 12-20-67.
123	Rules and Regulations for Tank Vessels (5-2-66). F.R. 12-6-66, 12-9-67, 12-27-67, 1-26-68, 1-27-68, 2-10-68, 4-12-68.
129	Proceedings of the Merchant Marine Council (Monthly).
169	Rules of the Road—International—Inland (9-1-65). F.R. 12-8-65, 12-22-65, 2-5-66, 3-15-66, 7-30-66, 8-2-66, 9-7-66, 10-22-66, 12-23-67.
172	Rules of the Road—Great Lakes (9-1-66).
174	A Manual for the Safe Handling of Inflammable and Combustible Liquids (3-2-64).
175	Manual for Lifeboatmen, Able Seamen, and Qualified Members of Engine Department (3-1-65).
176	Load Line Regulations (1-3-66). F.R. 12-6-66, 1-6-67, 9-27-67.
182	Specimen Examinations for Merchant Marine Engineer Licenses (7-1-63).
184	Rules of the Road—Western Rivers (9-1-66). F.R. 9-7-66, 12-23-67.
190	Equipment Lists (8-1-66). F.R. 9-8-66, 11-18-66, 2-9-67, 6-6-67, 6-14-67, 6-30-67, 8-29-67, 10-7-67, 4-16-68, 4-17-68.
191	Rules and Regulations for Licensing and Certifying of Merchant Marine Personnel (2-1-65). F.R. 2-13-65, 8-21-65, 3-17-66, 10-22-66, 12-6-66, 12-13-66, 6-1-67, 11-16-67, 4-12-68.
200	Marine Investigation Regulations and Suspension and Revocation Proceedings (5-1-67). F.R. 3-30-68.
220	Specimen Examination Questions for Licenses as Master, Mate, and Pilot of Central Western Rivers Vessels (4-1-57).
227	Laws Governing Marine Inspection (3-1-65).
239	Security of Vessels and Waterfront Facilities (3-1-67). F.R. 3-29-67, 12-23-67.
249	Merchant Marine Council Public Hearing Agenda (Annually).
256	Rules and Regulations for Passenger Vessels (5-2-66). F.R. 12-6-66, 1-13-67, 4-25-67, 8-29-67, 12-20-67, 1-27-68, 4-12-68.
257	Rules and Regulations for Cargo and Miscellaneous Vessels (1-3-66). F.R. 4-16-66, 12-6-66, 1-13-67, 12-9-67, 1-26-68, 1-27-68, 2-10-68, 4-12-68.
258	Rules and Regulations for Uninspected Vessels (3-1-67). F.R. 12-27-67, 1-27-68, 4-12-68.
259	Electrical Engineering Regulations (3-1-67). F.R. 12-20-67, 12-27-67, 1-27-68, 4-12-68.
266	Rules and Regulations for Bulk Grain Cargoes (11-1-66). F.R. 4-12-68.
268	Rules and Regulations for Manning of Vessels (5-1-67). F.R. 4-12-68.
270	Rules and Regulations for Marine Engineering Installations Contracted for Prior to July 1, 1935 (11-19-52). F.R. 12-5-53, 12-28-55, 6-20-59, 3-17-60, 9-8-65.
293	Miscellaneous Electrical Equipment List (4-1-66).
320	Rules and Regulations for Artificial Islands and Fixed Structures on the Outer Continental Shelf (10-1-59). F.R. 10-25-60, 11-3-61, 4-10-62, 4-24-63, 10-27-64, 8-9-66.
323	Rules and Regulations for Small Passenger Vessels (Under 100 Gross Tons) (1-3-66). F.R. 12-6-66, 1-13-67, 12-27-67, 1-27-68, 4-12-68.
329	Fire Fighting Manual for Tank Vessels (4-1-58).

CHANGES PUBLISHED DURING APRIL 1968

The following have been modified by Federal Registers:

CG-123, CG-191, CG-256, CG-257, CG-258, CG-259, CG-266, CG-268 and CG-323, Federal Register, April 12, 1968, Part II. CG-190, Federal Registers, April 16 and 17, 1968.

CHANGES PUBLISHED DURING MAY 1968

(No Changes)

SO CONY-BIL SAYS:

"Don't be a Booby for
these **TRAPS!**"

GALLEY

CAREFUL OF KNIVES
IN MURKY WATERS.
THEY MAY CAUSE CUTS
THAT HADN'T OUGHTER.



MOP UP ALL SPILLS
ON THE DECK,
Before THEY CAUSE
A HUMAN WRECK.

POOR JONESY HERE
IS A PAINFUL SIGHT.
WHEN HANDLING LINE
HE STEPPED IN A BIGHT.



IF YOU'RE NOT AN
ELECTRICIAN, DO NOT
TAMPER. YOU MAY LIGHT
UP LIKE A 250 WATT LAMPER.



DON'T WEAR WRONG FOOTGEAR
ON A DECK THAT'S WET,
OR YOU MAY GET A PAIN
WHERE YOU NORMALLY 'SET'.



SAFETY

OBEDY ALL SAFETY RULES,
- SUGGEST SOME MORE.
STAY HEALTHY ABOARD,
DON'T BE CARRIED ASHORE.

