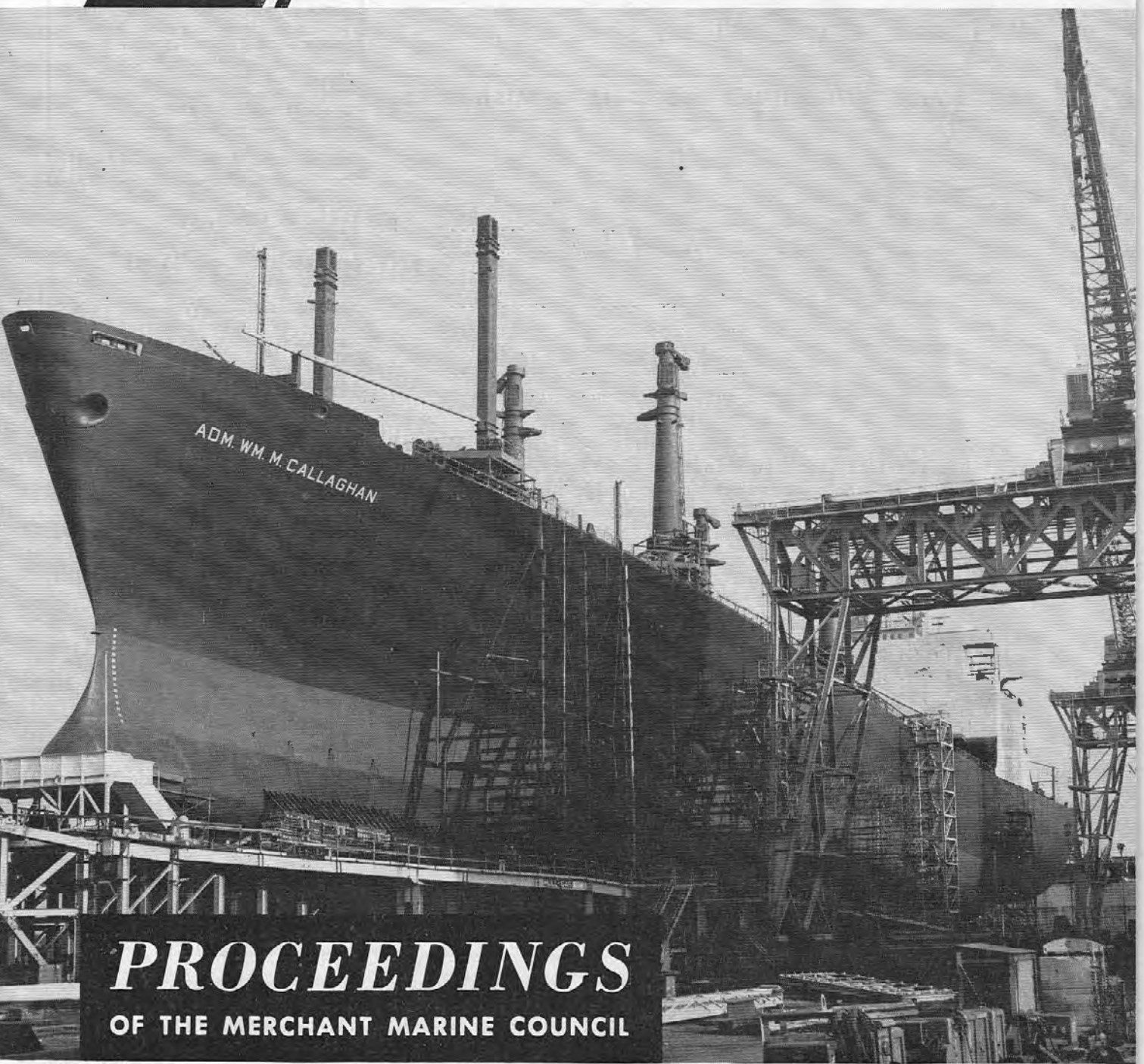
COAST GUARD



PROCEEDINGS

OF THE MERCHANT MARINE COUNCIL

Vol. 25, No. 1 CG–129 January 1968

IN THIS ISSUE . . .

Safety Problems in the Merchant Marine . . .

For The Want of a Trap Two Boilers Were Lost . . .

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COVERS

Front Cover: The 700-foot-long roll-on roll-off freighter Admiral William M. Callaghan, named in honor of the first Commander of the Military Sea Transportation Service, is owned jointly by the American Export Isbrandtsen Lines and Sun Shipbuilding and Drydock Co. The vessel will be operated for MSTS under a bareboat charter. *Courtesy MSTS.*

Back Cover: Scotland Sea Buoy, the U.S. Coast Guard's first super navigational sea buoy, was placed in operation on July 21, 1967, off Sandy Hook, N.J., as a replacement for retired *Scotland Lightship* (WLV–512).

The buoy is 40 feet in diameter, 42 feet high exclusive of its antennas, and draws 4 feet. Fully ballasted, the buoy displaces 100 tons and has 150 tons of reserve buoyancy.

Nested in its 33-foot mast is a 5,000-candlepower light (EFI) with a visibility range of about 10 miles in clear weather, a foghorn signal with an audible range of 3 miles, and a radiobeacon with a minimum range of 10 miles.

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PROCEEDINGS

OF THE

MERCHANT MARINE COUNCIL

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Safety Problems In The Merchant Marine

This outline of safety problems in the merchant marine is adopted from an address by Admiral Willard J. Smith, Commandant of the U.S. Coast Guard, to the American Merchant Marine Conference in October 1967.

THE HISTORY OF the seafarer is one of progress gained through lessons learned the hard way. Countless lives were lost and thousands of ships were wrecked before men learned very much about how to protect themselves from the dangers of the threatening sea. In the centuries gone by the value of human lives was not considered very high and danger was accepted as the natural lot of the seaman. Improvements in ship design were aimed at the economic benefits of speed and increased capacity with little regard for providing safety.

A century or so ago technological advances in all fields shifted into high gear. Innovations of all kinds with far reaching effects became commonplace. At the same time, there was a reformation of attitude toward the value of human life and the worth of the individual.

One brought new hazards into the life of the mariner. The other greatly increased awareness of the need for safety and the protection of life at sea.

Effective safety measures have historically been prompted by major marine disasters. The Coast Guard's marine casualty investigations are, in fact, for the purpose of determining means of preventing recurrences of similar accidents. However, appropriate as this after-the-fact approach is, it is not enough. Modern methods of testing and development of new materials and new techniques should permit us to anticipate hazards and avoid casualties by scientific analysis. This has brought about a change and, we believe, a better way for the Coast Guard to look at safety.

Let us examine some of the special safety problems that have faced us with the coming of new designs of specialized vessels and new concepts in transport systems. We have gained quite a lot of experience with the more conventional designs and materials, but how can we relate that to such radically different ideas as the hydrofoil for example? The same safety standards will not work.

HYDROFOIL

The idea of the hydrofoil is not very new. Alexander Graham Bell built one in 1919. But it is only within the last few years that the commercial potential of this type of craft has begun to be explored. Weight, of course, is a critical factor. If they are built to the usual standards of strength of heavy steel plate they might be safe enough from hull damage which might result from striking a log, but they would be too heavy to lift out of

FMC 30-foot hydrofoil at 40 knots on San Francisco Bay.

the water onto the foil. For the same reason carrying a heavy lifeboat would be impractical. So to maintain an adequate measure of safety a way must be found so that the vessel will stay afloat even if there is a tear in the hull. The foils must be designed to shear off, if an obstruction is hit, without puncturing the hull.

GROUND EFFECTS MACHINES

Some of the same problems apply to the ground effects machines which hold promise of great things for certain applications. There are also some operational problems involved in controlling this type of craft.

OFFSHORE DRILLING RIGS

Some of the offshore drilling rigs have been designed to be self-propelled, able to navigate from one drilling site to another. But their novel design does not fit the specific standards of the more usual vessels. They carry considerable numbers of technicians on the working platforms which are quite high above the water. This creates new problems in fire protection and launching of lifeboats. These factors have to be taken into account as well as considerations of strength and stability to provide acceptable safety.

CRYOGENICS

I could go on to discuss such innovations as powerplant automation, the safety effects of the increased use of aluminum in place of steel, the ever-increasing quantities of cryogenic cargoes and the potential hazards of explosion and fracture of conventional materials at very low temperatures. These are all matters of intensive interest to the industry and to the Coast Guard since they deal with both progress and with safety. However, for the time remaining to me today, I would like to limit myself to discussing safety considerations in the container concept and in the matter of pollution.

CONTAINERS

Not so very many years ago it became apparent throughout the transportation industry that a critical point had been reached. The transportation of goods could no longer continue as a series of stops and starts where the movement from producer to consumer was interrupted at each transshipment point. Unless ways were found to break the bottleneck and smooth out the rapid and ever-increasing flow of goods, the industry would retrogress. I say retrogress because if we cannot progress, we are standing still and that is the same as retrogression in a world that moves swiftly forward.

The forward looking saw the need for integration of the entire transportation process. A strong link across terminals was needed. The offloading, repackaging, and onloading for a different mode of transport was where the big delays were experienced.

The first step in solving this problem came with the roll-on, roll-off concept. This was a fine solution and still is for certain applications. But it was only a first step. It linked up sea and rail transport in some cases. In others sea and highway were bridged. However, the truck or the railroad boxcar is not the most efficient way to use cargo space on a ship. Nor did this system offer the flexibility for all modes of transportation including air transport which the later development, the container, offered.

With the container we see the full potential that can develop into an integrated transportation system. There

is also the lift-on lift-off barge or lighter idea. In the right place and for the particular need, any of these combinations of cargo container and vehicle can be used. There is a truly bright future for progress and growth.

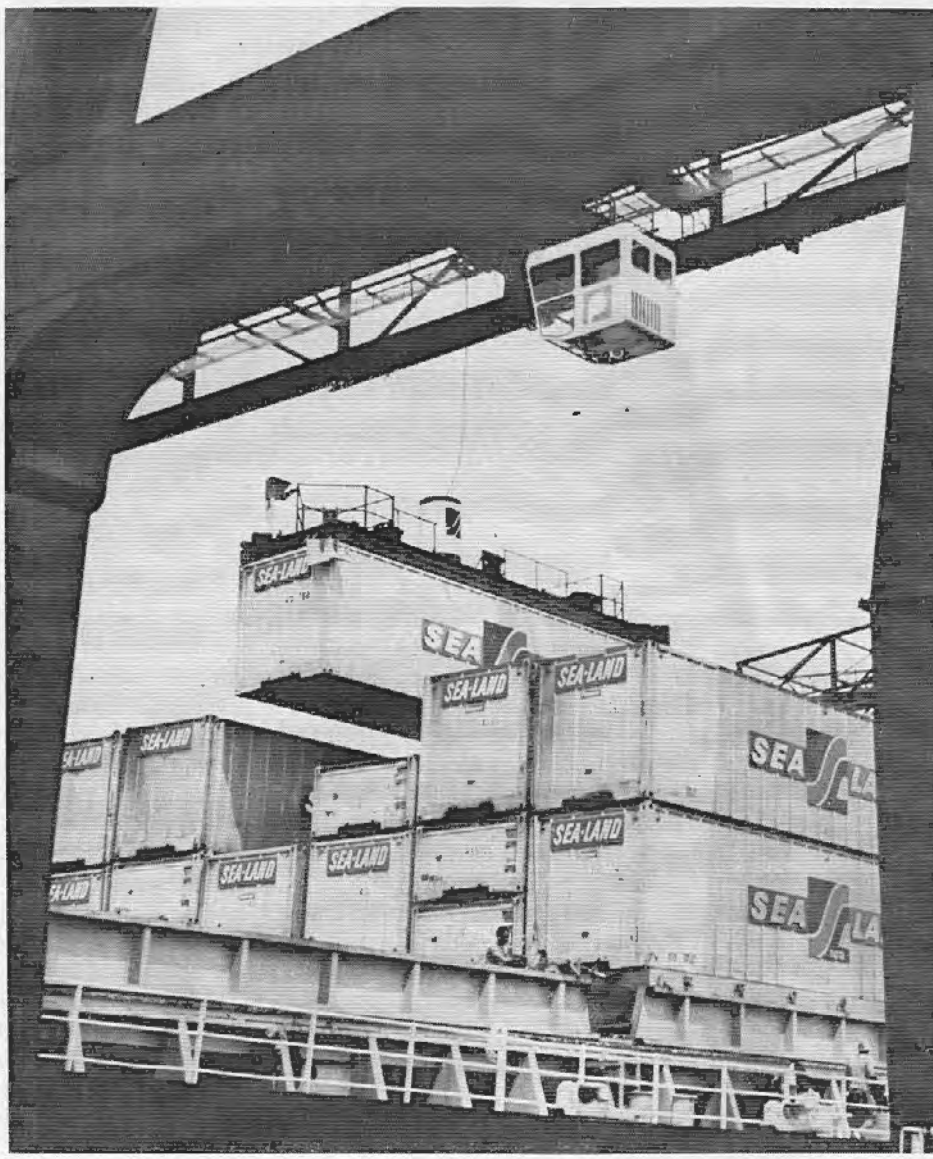
Before the container can reach its full potential, however, there are many problems which must be solved. Almost every new idea, especially one of such far-reaching scope as this, brings a lot of new problems. I am speaking mainly about problems in the marine field although containers create problems with other modes of transportation and in terminals and marshaling yards.

Some of the marine problems involve ship design. Stability is affected. A high stack of containers on deck raises the cargo center of gravity. The same stack of containers on deck provides a broad lateral surface to the wind. Visibility forward over the containers is another area of concern. These matters need careful review in the process of getting at the best and safest design for container carriers.

Another problem with containers is in the mixture of the contents. What is needed here is an adequate system of marking containers so that regulations dealing with the compatibility of various products can be controlled within a container and between containers stowed together or nearby. Marking also needs attention for customs purposes.

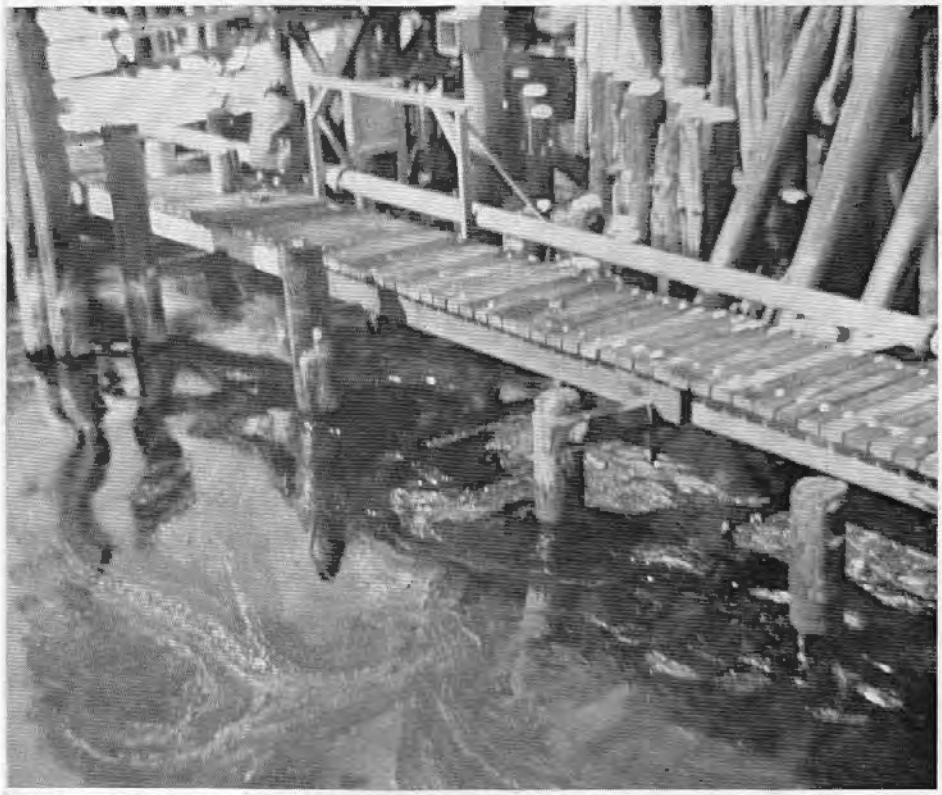
The containers themselves give rise to many questions. If they are built light enough for air transportation, will they be strong enough for shipboard use? If they are strong enough to take secure lashing and buffeting from the wind and sea, will they be too heavy for an airplane? If they are going to provide the basis for a truly integrated transportation system, they will have to be strong enough for one and light enough for the other at the same time. These are safety problems as well as economic ones. And there are others more economic in nature. For example, where should the handling gear be located, on the vessel, or on the shore facility?

It is entirely within the realm of reason that the container may become more than the intermodal boxcar it



Courtesy Sealift Magazine

The crane that lifts the containers to or from the ship has a striking resemblance to a ship's superstructure.



This picture shows what oil pollution can do to any harbor.

is, by becoming an international standard fixture. If so, the controversy concerning standard dimensions will have to be resolved. Then, too, if the container is to be widely spread throughout the transportation industry both here and abroad, a number of questions covering inspection, repair, and disposal of damaged containers will need to be answered.

In short, the container concept holds a great promise for progress but is accompanied by many problems both of economics and in the field of safety.

OIL POLLUTION

Now let us turn to the subject of pollution. The concern of the country for the pollution of its waters is not new. The Federal Government established a position as early as 1899, the date of the Refuse Act, and later in 1924 the Oil Pollution Act. However, common and acute awareness of the dangers of air pollution and pollution from industrial wastes dumped into our waters is quite recent. The rising population and multiplying of industrial sources stimulates the need for strong measures to protect the purity of our air and water. And this concern extends to all sources of pollution including marine sources. If you are worried about pollution, the *Torrey Canyon* disaster of last spring does very little to assure you that there is no problem. In fact, in spite of the generally excellent safety record in the tanker industry, the thousands of tons of oil washed up on the beaches of England and France from the *Torrey Canyon* stimulated a great deal of activity both nationally and internationally.

IMCO

In May, the Intergovernmental Maritime Consultative Organization under the United Nations held an emergency meeting in London to investigate the incident and means of reducing similar hazards in the future. On the national level, the President directed the Secretaries of Transportation and the Interior to conduct a joint study looking for measures to minimize potential major spills and ways of controlling them when they occur. Prior to this, the Coast Guard together with the Army Engineers and the Fresh Water Pollution Control Administration jointly organized an Oil Spillage Study Group. The oil pollution advisory panel of the Coast Guard's Merchant Marine Council is another interested party as is the National Oil Pollution Committee formed of a large number of Federal agencies with a number of industry advisors. All of these groups have been very actively engaged. I think it fair to say that, bad as the *Torrey Canyon* disaster was, it was less important than the activity it stimulated.

It is too early to predict with any degree of certainty what will come out of this activity. However, we can be sure that since this is a matter of safety involving maritime matters, the Coast Guard will play a major role. Our concern with the protection of life and property at sea is usually thought of as dealing with the seaworthiness of vessels and the protection of crew and cargo. But we are also deeply involved with protection of the environment in which the vessel operates. We care about the welfare of the transportation industry and we also care about the well being of the country. Where maritime activities come together with other concerns of national interest in the area of safety the Coast Guard has an obligation and a responsibility.

Whatever additional measures are taken to minimize the potential effects of gross pollution from petroleum cargoes or other pollutants, it is clear that procedures which reduce the hazards of collision and grounding hold great promise in this direction. Not only will improved procedures in the area of collision avoidance reduce the hazards of potential spills, they will also benefit the entire shipping industry. For as Thucydides wrote in the 5th century B.C., "A collision at sea can ruin your entire day."

BULK CHEMICAL CARGOES

With the supertanker now reaching the 300,000-ton class there are special problems. They are not necessarily new in kind but they are unprecedented in magnitude. They carry comparatively vast quantities of oil, they are longer, deeper draft and less maneuverable than ships of the more usual size. In addition there are more ships carrying other bulk chemical cargoes of many varieties and more general shipping in our ports and inland waters than ever before. It is only reasonable to assume that the potential for marine casualties will be directly proportional to the volume of traffic. And the urgency to improve the safe flow of that traffic is greatly heightened by the increased hazards of speed, size, and inherent character of cargoes.

UNIFIED RULES OF THE ROAD

Some time ago the Coast Guard started a study program to determine specific areas where navigational control could be improved. The marine industry was consulted and this resulted in three programs. These were to unify the rules of the road, to provide for bridge-to-bridge radio communications and to establish traffic lanes in the approaches to busy harbors.

The rules-of-the-road problem was highlighted by the opening of the St. Lawrence Seaway. There was a sudden influx of oceangoing deep-draft vessels in the Great Lakes. But the masters of these vessels were not entirely familiar with the Great Lakes rules. The same type of problem exists in the Mississippi River from New Orleans to Baton Rouge where the deep-water tonnage has increased threefold and fourfold in the past 10 years. It would certainly be easier to make the transition from international waters to our lakes and rivers if there were no change in the applicable rules of the road.

With this in mind we have prepared for congressional action a proposed set of unified rules of the road. These are not identical to the international rules because of some unavoidable special circumstances found in our inland waters. Bridge heights and sharp riverbends are among these. However, the differences have been greatly reduced in number and most of the remaining differences are minor ones.

BRIDGE-TO-BRIDGE COMMUNICATION

The advantages of bridge-to-bridge radio communications have long been apparent as an extension of whistle signals in restricted and crowded waters. Here again the Coast Guard has prepared a legislative proposal to provide for it. This was completed only after a careful examination of the benefit and necessity.

TRAFFIC LANES

Traffic lanes have played an important part in reducing the number of close-quarter situations between vessels in the Great Lakes. The Coast Guard has examined the feasibility of setting up separated traffic lanes in the approaches to our busiest ports and we now have them in the approaches to New York and to the Delaware Capes. Similar lanes are being proposed for the approaches to San Francisco and others may be proposed on the basis of necessity.

These programs, as you can see, have reached the stage of positive action. We hope that the legislative proposals that have been submitted are acted upon swiftly because we believe they are necessary improvements in marine casualty prevention.

SHORE-BASED RADAR

There is still another area where the Coast Guard is focusing attention. Shore-based radar advisory systems are used in many large harbors in Europe. They help to move vessels safely and smoothly in and out of confined waters during periods of low visibility. This is similar to the service that our sister agency in the Department of Transportation, the Federal Aviation Administration, renders to the airplane. There are obvious differences between the aircraft traffic control problem and the shipping control problem. But there are similarities too.

CONCLUSION

It is a reasonable guess that the merchant marine industry is not looking for more Federal regulation. But I think the industry will agree that collision prevention can stand some improvement and modernizing. We believe that safer operation will result from a single set of U.S. rules of the road, from the use of modern communications equipment as an anticollision aid, the use of separate traffic lanes and possible radar advisory systems.

The American Merchant Marine can be assured that the Coast Guard will spare no effort in keeping abreast of new techniques, designs and systems to provide the climate for a safer, more modern and more competitive merchant marine. ⚓

FOR THE WANT OF A TRAP TWO BOILERS WERE LOST

Lt. W. J. Campbell
U.S. Coast Guard, Marine Inspection Office, Jacksonville, Fla.

An unusual, cascading chain of events recently crippled a large oceangoing tanker. This article reveals what happened in the engine-room of a tanker and why it occurred.

ON 8 FEBRUARY 1967, the port boiler superheater screen tubes developed a leak. The boiler was secured when one of the tubes ruptured. Later the same day, the starboard boiler experienced an identical failure and it was secured.

The vessel was towed to Jacksonville Shipyards, Jacksonville, Fla., for repair. An investigation was conducted to determine the cause with a view to preventing subsequent recurrences.

WHAT HAPPENED

The trigger to the chain of events was a malfunctioning ball float steam trap installed in an inverted position between the fuel oil heater and its drain cooler. The term "inverted" is used in the sense that the trap was upside down and the inlet and outlet ends were reversed. The trap allowed steam to pass from the fuel oil heater to the fuel oil heater drain cooler. Steam impingement occurred on the drain cooler tube bundle. Note here that with the trap operating properly, the steam would have been prevented from passing the trap and subsequently impinging on the tube bundle. Tubes in the path of the oncoming steam took the brunt of the wet steam attack. The drain cooler was not designed with an impingement plate to protect the tubes because the *usual* state of the fluid entering the shell side of the cooler was liquid. (*See Figure 1.*) The casualty proved that the *usual* was not the case.

Lt. William J. Campbell is a 1960 graduate of the U.S. Coast Guard Academy. In 1960 he served on the CGC "Mackinac" as Student Engineer, and on CGC "Winona" as Assistant Engineer, Damage Control. His present position is Engineering Inspector in the Marine Inspection Office, Jacksonville, Fla.

Drain cooler tubes hit by steam eventually necked to a critical wall thickness allowing fuel oil pressure inside the tube (300 p.s.i.g.) to penetrate the boundary of the tube wall and contaminate the drain system. The oil was not observed in the contaminated drain tank immediately, so it continued unnoticed to the clean

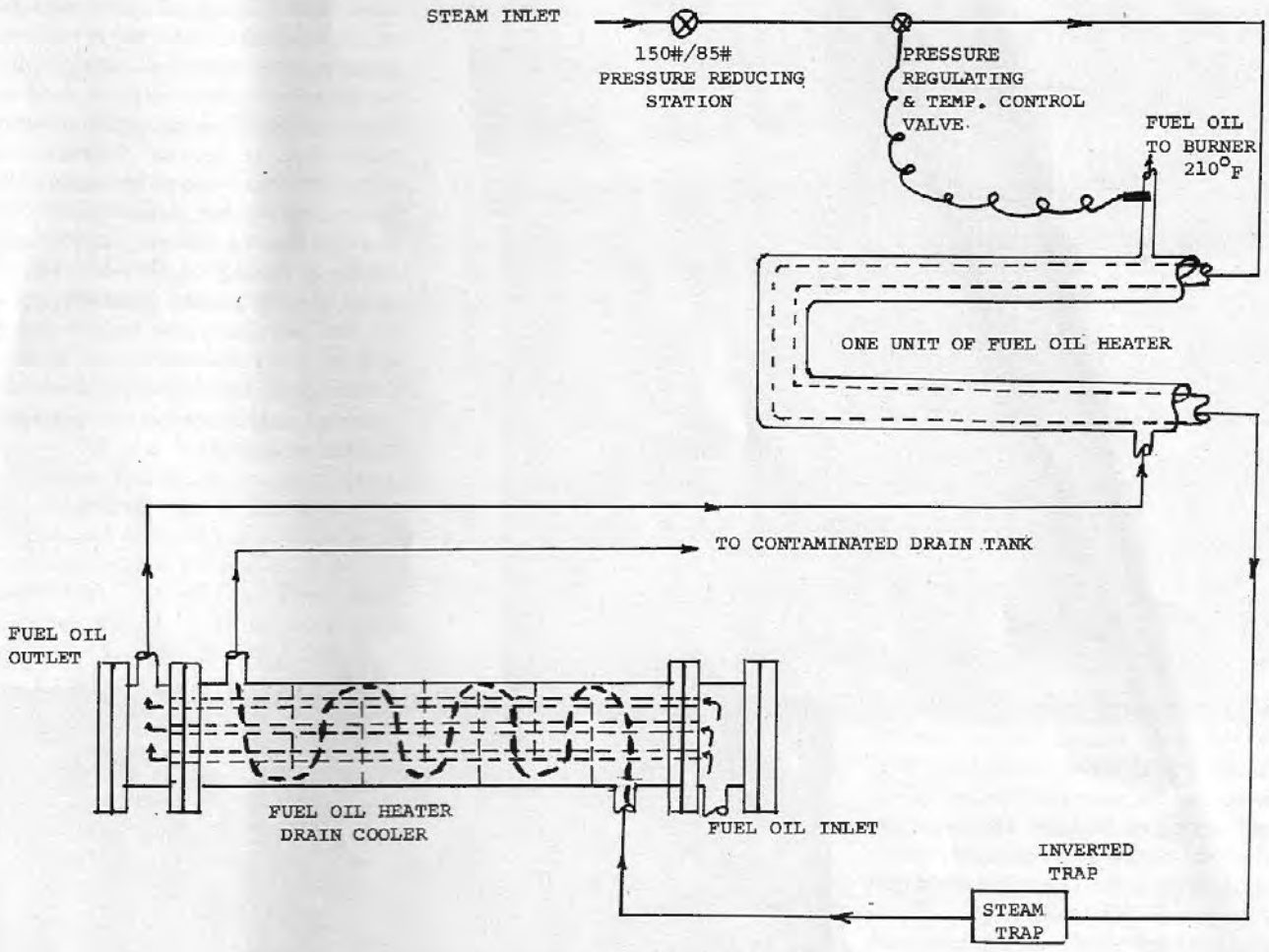


FIGURE 1.—*Schematic of fuel oil heater and fuel oil heater drain cooler.*

drain system, through the atmospheric drain tank, drain cooler and deaerator tank. It then entered the boiler feed water system, progressed through the boiler feed pumps to the third stage heater, and finally through the economizer tubes, water drums, generating tubes, steam drums and superheater tubes of the boilers.

The superheater screen tubes, subjected to the hottest temperature in the furnace, experienced localized heating of the metal at locations where fuel had baked on. This laminated crust of fuel oil on the waterside of the generating tubes prevented proper heat transfer between the hot metal of the tube and the cooling medium of the contaminated fluid channeled through the tubes. Blisters developed in the generating tubes and eventually ruptured under the high pressure on the water side. (*See Figure 2.*)

OPERATION OF THE TRAP

Further analyzing the situation, the trap as installed had the drain enter under the needle valve seat, flow up an internal nozzle, over the inner opening of the nozzle, onto the top of a ball float, then under a baffle

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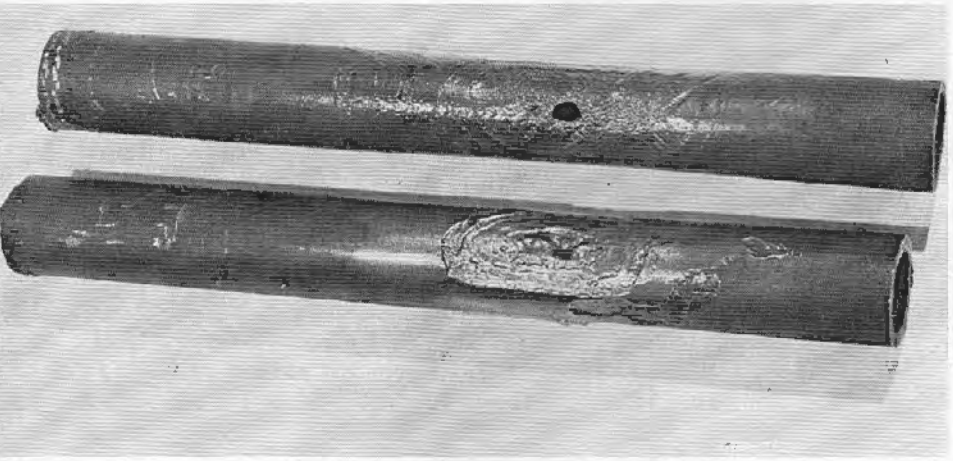


FIGURE 2.—*Fuel oil heater drain cooler tube damage.*

Two features of the trap should have been glaring indications of an inverted position. First, the cover containing the threaded drain plug would logically have to be on the bottom to allow the drain action to function when it became necessary to clean the trap—this cover was on the top rendering the drain action useless. Next, the steam baffle plate, which is usually on the inlet end of traps to deflect steam from impinging on the ball float, was on the outlet end of the problem trap. The only function of the baffle plate in the inverted trap was to act as a platform for the ball float.

plate to the outlet nozzle. (*See Figure 3.*) With the trap in this position, the needle valves are open when the trap is empty because the weight of the ball acting on its lever arm is greater than the needle valve assembly acting on its lever arm. The trap would only function in this position (*See Figure 1*) if it were always maintained with a level of water. In this way, action of the ball float would not be necessary to trap the steam. The trap would be a loop type instead of a ball float type. For the trap in the inverted position to maintain this level of water it would have to be low down in the system with a potential head pressure equal to zero. The trap was installed in the system higher than the fuel oil heater drain cooler so the water was not, in fact, held in the trap as a buffer to steam. The water simply gravitated to a lower level. In normal operation then, the trap was dry and the valves were open resulting in a "no trap" trap.

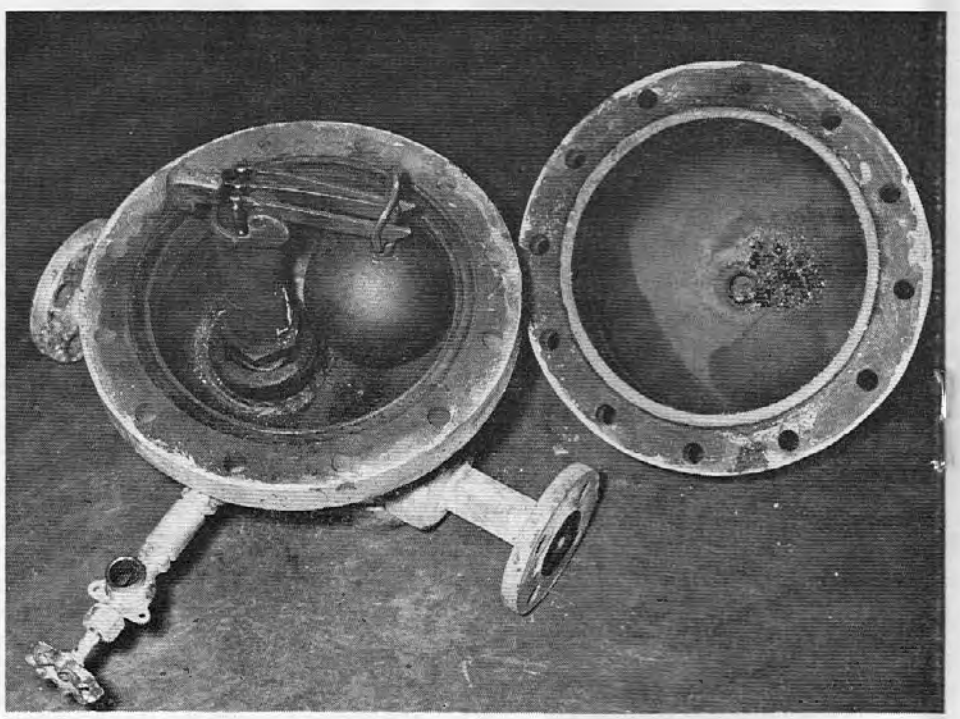


FIGURE 3.—*Trap assembly.*

The trap, if installed properly, would have presented a resistance to the steam entering it. Since the trap was unable to function, this back-pressure in the steam line was reduced and the steam could flow with more ease.

The steam cuts observed in the threads of the inlet nozzle were made by the steam seeking an easier access to the outlet than through the three small openings offered by the three needle valve seats. (*See Figure 4.*)

Had temperatures and pressures been recorded at the inlet and outlet ends of both heat exchangers, a better analysis of the heat transfer might be made. Since this was not done, only estimated values can be used.

The fuel oil heater is a G-fin type, with steam present in the tubes and fuel oil on the shell side. The system is counterflow with steam flowing in an opposite direction to oil flow.

The drain cooler operates with oil in the tubes of the straight tube bundle and condensate baffled across the bundle in its one pass through the cooler. The condensate, although traveling in a cross flow method, has a resultant course parallel to the oil.

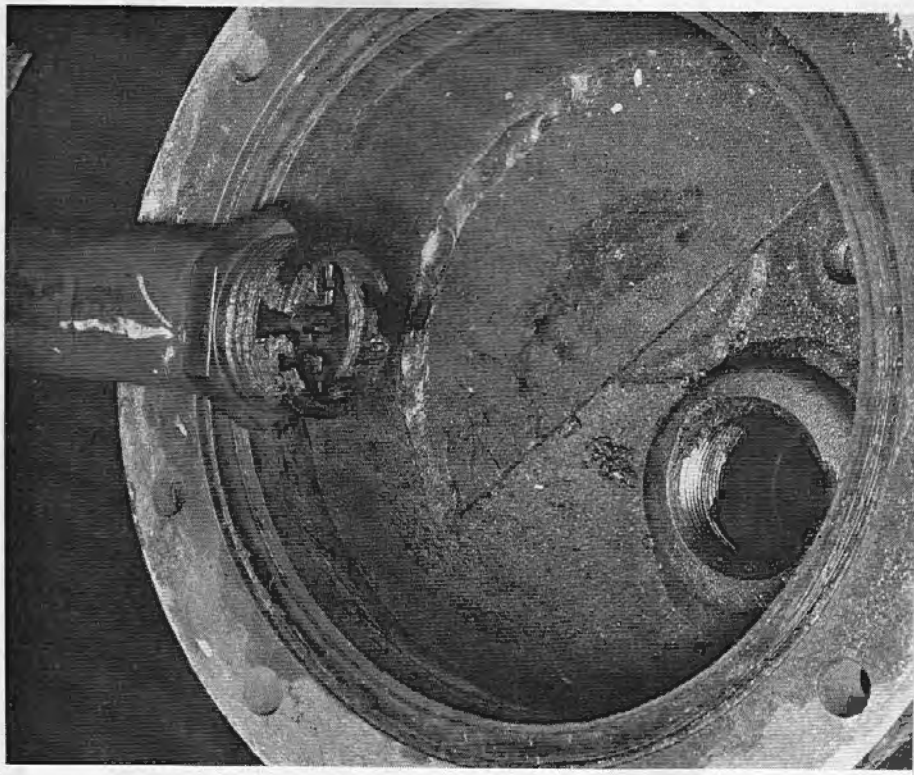


FIGURE 4.—*Dismantled steam trap showing deterioration.*

STEAM IMPINGEMENT ON COOLER TUBES

Figure 2 illustrates two of the drain cooler tubes and shows two types of steam attack on metal, wire drawing and splatter steam impingement corrosion. Wire drawing, the cleaner looking of the two attacks is commonly found across the seats and discs of steam valves. Splatter is caused by the high-velocity droplets of water in wet steam striking a surface and shattering tangentially. Many deep, clean grooves are shown in the cavity of the holed tube, the neck is less severe on this tube. Orientation of the holed tube with respect to the flow of steam must have been such that the hole was 90° from a point on the surface of the tube in line with the steam flow. The nonholed tube must have been subjected directly to the flow of steam.

PREVENTION OF CASUALTY IN THE FUTURE

It is interesting to note the happenings and determine the cause of this casualty, but yet a more important task is to arrive at a means of preventing it in the future.

The casualty illustrates areas of questionable safety standards in need of improvement. During the time ships personnel traced the course of oil contamination, oil flowed from the contaminated oil tank to the bilges. A major fire could have erupted, but the vessel was fortunate in this respect.

Again, when the boilers were rendered useless making the vessel unseaworthy, the geographic position of the vessel could have been more precarious. This casualty could have been more costly than the bill for repair encountered at the shipyard; lives could have been lost. ⚓

NEW AMBROSE OFFSHORE LIGHT STATION NEW YORK HARBOR

When *Ambrose Lightship* (WLV–613) blasted a mournful foghorn farewell as the U.S. Coast Guard placed into operation the new permanent Ambrose Offshore Light Structure on August 23, 1967, it signaled the end of a succession of red lightships that had guarded the entrance to New York Harbor since 1823.

The 128-foot, 540-ton *Ambrose* (WLV–613), built in 1952, was the last lightship built. No others are likely to be built in view of the Coast Guard's long-range program of replacing lightships with permanent offshore towers. With the reassignment of the WLV–613 to a new sentinel post along the New England coast, replacing an older lightship due for retirement, there presently remain only 13 permanent lightships and four relief lightships in the entire service.

LOCATION OF THE TOWER

New Ambrose Light Station, manned by Coast Guard military personnel, sits in 74 feet of water at the entrance to New York Harbor approximately 7 miles east from Sandy Hook, N.J. (Latitude, 40°27′31″ N.; Longitude, 73°49′51″ W.).

UNDERWATER STRUCTURE

Designed to withstand the worst of hurricanes that may strike the New York area, the tower is supported by a jacket portion or framework consisting of four 42-inch diameter steel main pipe legs. These are crossbraced with 18 and 20-inch diameter steel pipes, horizontally, vertically, and diagonally. The jacket or framework rises from the ocean floor to an elevation of 14 feet above mean low water. The jacket forms a template through which four 36-inch diameter steel piles are driven and seated on bed rock at an approximate depth of 245 feet below mean low water. These piles are filled with concrete from an elevation of 13 feet above mean low water to a minimum of 40 feet

below the ocean floor. Space between the piles is filled with grout.

The tower is protected from corrosion by 20 aluminum alloy sacrificial anodes approximately 20 inches in diameter by 5 feet long, attached to the jackets of the legs.

ABOVE WATER STRUCTURE

The structure which sits atop the jacket as a support for the platform rises to an elevation of 80 feet above mean low water. This framework consists of four 36-inch diameter steel pipes reinforced with 18-inch diameter steel pipe horizontal and diagonal bracings.

The platform is two decks high—the lower deck housing the fuel and water tanks, while the upper deck provides living quarters for six permanently assigned men and three transient personnel, as well as a generator room, radio room, laundry, and other facilities.

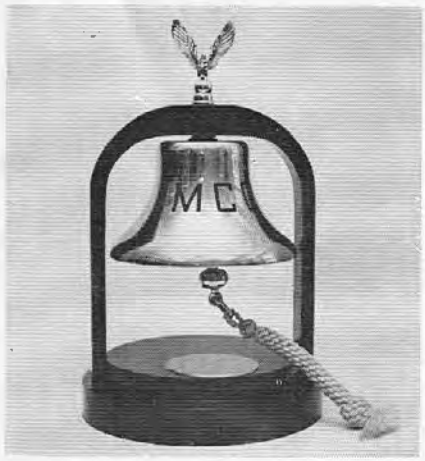
The 70-foot square roof over the top deck serves as a helicopter landing port, accommodating the latest model of Coast Guard rescue helicopters.

Rising from the southeast corner of the platform roof are the radiobeacon antenna and the main light tower, from which the focal plane of the main light is approximately 136 feet above mean low water.

The superstructure of the tower is painted red with the exception of the radiobeacon antenna which is painted to meet FAA requirements. Quarters are painted white.

NAVIGATIONAL AIDS CHARACTERISTICS

The main light beacon operates at a high intensity of 6 million candlepower and at a low intensity of 600,000 candlepower, with a visibility range of 18 miles. Mariners can recognize the characteristics of the light by its group flashes of white—3 flashes every 7.5 seconds.



"The IMCO Bell" was cast from a brass plate cut from Ambrose Lightship (WLV–613) *for presentation on behalf of the United States by Admiral Willard J. Smith, U.S. Coast Guard Commandant, to the International Maritime Consultative Organization (IMCO) during the London Conference in October 1967. The bell is a relic from the last of the line of bright red lightships that guided ships of all flags through Ambrose Channel into New York Harbor from 1908 until a modern fixed offshore tower took over as sentinel on August 23, 1967.*

The beacon apparatus is of an advanced design using a quartz tube filled with xenon gas. It requires considerably less electrical power to produce candlepower than does a conventional or older type beacon. Light is directed by simple reflective arrays, differing from the fragile and expensive prismatic lenses generally used in lighthouses. Its characteristic signal is established through simple transistor circuits, eliminating the massive rotational equipment necessary to produce a flashing signal from the older types of lanterns.

A standby light, operated by storage batteries, is ready to take over in event of failure of the main light. It has the same flashing characteristics as the main light, but with reduced candlepower.

Obstruction lights are located at the four corners of the structure, to be displayed in the event of failure of both the main light and the standby light.

Since Ambrose tower is situated at a strategically busy entry and exit point for marine traffic from around the world, it is, therefore, necessary that the tower be visible to the passing vessels. For this purpose, the tower is lighted from its highest point down to the water line.

An electronic fog signal operating at 300 cycles, with an audible range of 4 miles, is regulated to produce one blast every 15 seconds.

The radiobeacon, operating on a frequency of 286 kc., covers a range of 100 miles.

POWER SOURCE

Electrical power for Ambrose Offshore Light Station is produced from three 50 kw. diesel generators.

OCEANOGRAPHIC EQUIPMENT

To further the U.S. Coast Guard's ocean science program, Ambrose tower is equipped with an oceanographic laboratory and several types of sensors which are installed on the maintenance deck. The oceanographic sensors consist of the following: A Station Water Oceanographic Research Data (SWORD) system to make continuous recordings of surface and subsurface water temperature, salinity, and currents; a continuously recording wave sensor; and a continuously recording tide gage.

Surface meteorological equipment is used at Ambrose tower to report the weather conditions at the station.

LOGISTICS

Ambrose Light Station is supplied from shore by either Coast Guard helicopters or surface vessels. ⚓

Line Handlers Beware

Despite repeated warnings by safety organizations and supervisory personnel, many seamen who are involved in line handling operations fail to recognize the inherent danger of their duties. Whipping synthetic hawsers which part under stress are responsible for numerous fatalities and serious injuries; however, all lines present hazards to the unwary.

A seaman's legs were recently severed by a synthetic mooring line which parted as a large vessel was undocking. It was the Master's intention to spring the vessel from the dock by heaving on the head line and using his spring line to check forward motion. Due to a strong onshore wind and the lack of adequately powered assisting tugs, it was decided to also use the engine at various slow and dead slow ahead bells. In this manner the vessel's stern would move away from the dock and the vessel could then back clear. This was a maneuver which had recently been used in this port and in various similar ports on the vessel's usual itinerary.

The undocking operation on the foc's'le head was under the direction of the First Officer who was at the bow between the anchor chains in order to signal the men tending the lines on the gypsy heads of the windlass. Two men were assigned to the starboard gypsy head to handle the starboard spring line which was a 7-inch synthetic hawser secured to the gypsy head by six round turns and one back turn. The line led off around the fairlead bitt and through a three-roller chock at the after starboard corner of the foc's'le where the victim was standing, and then to a bollard on the dock.

The Master was on the starboard wing of the bridge observing the vessel's progress, and orders were passed to the First Officer via a loudspeaker inside the bulwark forward. He, in turn, passed the orders to the men tending the gypsy head by hand signals. While going ahead on the engine the Master warned several dockside line handlers to stand well clear of the spring line. The head line was then let go and taken in. About this time the victim was also warned to stand clear of the spring line; he then moved approximately 3 feet.

Just as the Master ordered the engine telegraph put astern, but before the propellor could take effect, the line parted at the first turn on the gypsy head. The line carried aft and the frayed ends struck a glancing blow to a seaman standing near the windlass control. The line then struck the victim completely severing both legs, and also bent a 2½ inch steel stanchion to a 90° angle.

Although neither the age of the line nor the period it had been in use was definite, it had been routinely inspected when broken out and again when stowed by the victim who served as Chief Boatswain. Since the victim was only watching the line, he should have put himself in the safest possible position, particularly since he had previously been warned by a fellow crewmember.

Another casualty which recently occurred on board a towing vessel is typical of the many similar accidents which befall the unwary while handling lines on all types of vessels.

While in the process of making up a tow of numerous barges a seaman's right leg was crushed against a towing bitt. While under tension the line that he had been handling began rendering around the bitts and subsequently fouled around his leg. As a result of this accident, it was necessary to amputate the man's foot leaving him impaired for life.

In another case where a serious injury resulted, the victim was not even handling lines. He just happened to be in an unprotected place at the wrong time. A short synthetic breast line parted when the vessel surged at the dock. The line snapped back striking the gangway watchman in the left leg and pelvic region. This person received multiple fractures requiring more than 6 months' hospitalization.

As can be seen, needless casualties involving mooring lines continue to occur. The Coast Guard will continue to emphasize Lessons From Casualties in an endeavor to bring about an awareness of the inherent dangers. ⚓

SS *Steel Maker* Receives Highest Award

During shipboard ceremonies July 28, 1967, the Isthmian Lines' dry-cargo vessel *Steel Maker* received the maritime industry's highest award for feats of safety at sea. The presentation was made on behalf of the American Merchant Marine Institute and the Marine Section, National Safety Council, the joint sponsors of the award, by Captain Wilbur S. Doe, USCG, Chief, Merchant Marine Safety Division, 3d Coast Guard District. On board for the occasion were Ralph E. Casey, president of the American merchant marine institute, and Frank C. Grant, general chairman of the marine section, National Safety Council. Mr. John M. Dempsey, Jr., vice president of Isthmian Lines, attended on behalf of the company.

The *Steel Maker* and her crew were cited for their rescue of four seamen from the Spanish ship *Monte Palomares,* during January, 1966. En route to New York from Alicante, Spain, the *Steel Maker* received the *Monte Palomares'* SOS, and immediately altered course to assist the sinking vessel. Battling near-hurricane conditions, she arrived on the scene during darkness and commenced search operations. Spotting a red flare from a liferaft, the Captain maneuvered his ship to bring the survivors alongside. Three were able to scramble up the ship's cargo net to safety, but a fourth, apparently injured, was unable to make the ascent. Third Mate Paul Hellevrand of the *Steel Maker* descended the net and, secured to a lifeline, swam to the raft and brought the injured man aboard.

The ship safety achievement award is presented to the dry-cargo vessel which, during the year, performs the most outstanding demonstration of maritime safety. The award consists of a "green cross of safety" pennant, to be flown by the vessel, and certificates to the officers and crewmembers in recognition of their individual contributions to the rescue operation. ⚓

Shown during the award presentation are from left to right, John M. Dempsey, vice president of Isthmian Lines; Capt. Wilbur S. Doe, USCG; Capt. R. Minor, SS Steel Maker.

DECK

Q. How would you get your anchor up if the windlass was broken down?

A. If the windlass was broken down and it became necessary to heave up the anchor, the method employed would vary according to the layout and construction of the ship and the equipment available. It might be possible to rig a tackle to a deck winch and heave in the chain in bights, stoppering off each time it became necessary to shift the tackle. The foremast or forward booms might be used, taking care that whatever equipment selected is adequate for the load.

The ship may be maneuvered to advantage in keeping any unnecessary strain off the equipment while heaving up.

Q. State in detail the precautions to be observed when coming to an anchorage.

A. Prior to approaching an anchorage, the charts should be carefully checked and the "Sailing Directions" or "Coast Pilot" read for any pertinent information or regulations. Tide and current information should be known.

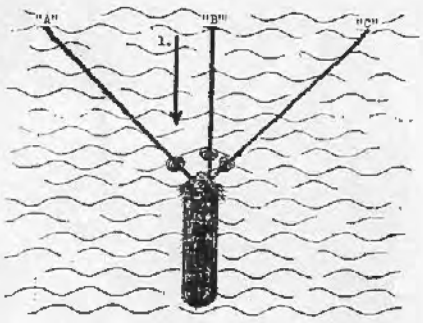
The anchors, cables, and windlass should be all clear and crew necessary for maneuver at stations. Anchor lights or signals prepared.

Approaching the anchorage the vessel should reduce speed in sufficient time. Unless it is desired to swing after anchoring, the vessel should stem the tide or head into the wind as may appear appropriate. After letting go the anchor the vessel should have sufficient way over the bottom that the chain is stretched out rather than allowed to pile up and the engines should be used if necessary in bringing up the vessel without excess momentum to strain the cable.

ANCHORS

Q. A vessel has one anchor down at Position "A". If she drops another anchor, will she put a greater stress on the chains with the anchors spread well apart as at "C" or with the anchors comparatively close together as at "B"? Why?

Note 1. Direction of wind or current.



A. A greater stress will be put on the cables if the second anchor is dropped at "C" due to the "span" effect. The stress on each chain could be resolved by composition of forces.

Q. If one tackle is hooked onto the hauling part of another, what is the effect?

A. The power gained by this combination would be the product of the powers of the two tackles composing it. However, what is gained in power is lost in speed.

ENGINE

Q. Where is the thrust bearing located in turbine engines? How is it constructed and adjusted?

A. The turbine thrust bearings are of the Kingsbury segmental type, located on the forward end of the turbine shaft. The thrust bearing consists of a steel thrust collar, keyed to the turbine shaft, tilting shoes faced with babbitt on one side and holding hardened steel buttons on the other; leveling plates and a base ring. The thrust bearing may be adjusted axially by two methods. On the older type bearing the thrust elements could be moved fore-and-aft by a worm gear. In the other method liners are added or removed from between the thrust housing and the bearing cage and from between the bearing cage and the cover plate to give any desired adjustment.

Q. Name and describe the various parts of a single-flow reaction turbine.

A. Casings—Upper and lower, bolted together at the centerline flanges and machined to receive the blades.

Rotors—May be solid forgings made integral with the shaft or rotor may be shrunk and keyed on to the shaft.

Moving Blades—Dovetailed or keyed into the rotor, the ends of which are made more rigid by shrouding or binding wire and include seals between their outer edges and the casing.

Dummy Piston—An extension of the rotor drum at the high pressure end and fitted with a section of the casing known as the dummy cylinder. Labyrinth packing is installed between the dummy piston and the dummy cylinder.

Bearings—Sleeve type, supporting the shaft at each end.

Shaft Glands—Labyrinth or carbon placed at each end where the shaft extends through the casing.

Fixed Blades—Dovetailed or keyed into the casing, the ends of which are made more rigid by shrouding and include seals between their edges and the rotor.

AMENDMENTS TO REGULATIONS

TITLE 46 CHANGES

SUBCHAPTER B—MERCHANT MARINE OFFICERS AND SEAMEN

PART 10—LICENSING OF OFFICERS AND MOTORBOAT OPERATORS AND REGISTRATION OF STAFF OFFICERS

Deck Licenses as Master and Mate of Freight and Towing Vessels of Not More Than 1,000 Gross Tons

1. The establishment of qualifications and issuance of licenses as masters and mates of freight and towing vessels of not more than 1,000 gross tons, which also allow the holders while serving as masters or mates of such vessels to serve as "pilots" within conditions and terms endorsed on such licenses, are provided for in the new regulations. In the Federal Register of February 25, 1966 (31 F.R. 3122–3123), a notice of proposed rule making was published on this subject, and a supplement to the Merchant Marine Council Public Hearing Agenda dated March 21, 1966 (CG–249), giving the details as "Item XIb—Deck Licenses as Master and Pilot and as Mate and Pilot of Freight and Towing Vessels of not more than 1,000 Gross Tons" was distributed to all persons known to be interested in this subject. Item XIb was considered at a Merchant Marine Council Public Hearing on March 21, 1966. The Merchant Marine Council, after extensive review and consideration of this subject, including informal consultations with affected unions, management, and operators of small freight and towing vessels, recommended authorization of holders of licenses as masters and mates of freight and towing vessels of not more than 1,000 gross tons while employed as masters or mates of such vessels to serve as "pilots" within the conditions and terms endorsed on their respective licenses. The proposals, as revised, are approved and set forth in this document. The actions of the Merchant Marine Council with respect to comments received regarding these proposals are approved. As reflected by the regulations in this document, these actions are:

a. The licenses of "master of freight and towing vessels of not more than 1,000 gross tons" and "mate of freight and towing vessels of not more than 1,000 gross tons" are established and issuance authorized to applicants who qualify therefor under the regulations in this document.

b. Within the conditions and qualifications endorsed on their respective licenses, the persons holding licenses as master or mate of freight and towing vessels of not more than 1,000 gross tons may serve as master or mate, as well as the navigator of such vessels, and when prescribing the minimum manning of such inspected vessels in the certificates of inspection, the Officer in Charge, Marine Inspection, will permit such persons to serve in the dual capacity of master or mate and pilot of such vessels.

c. The regulations for the new licenses as master or mate of freight and towing vessels of not more than 1,000 tons are added to 46 CFR Part 10 governing the licensing of merchant marine officers, and shall be effective January 1, 1968: *Provided,* That the requirements in this document may be complied with during the period prior to the effective date specified in lieu of existing requirements, and these licenses may be issued to qualified applicants on and after date of publication in the Federal Register.

The complete text of these changes are published in the Federal Register of November 16, 1967.

STORES AND SUPPLIES

Articles of ships' stores and supplies certificated from November 1, to November 30, 1967, 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:

Filing Complaints Against Seamen

From time to time complaints are filed at U.S. Coast Guard Headquarters, Washington, D.C., by masters, seamen, and company representatives concerning the objectionable conduct of seamen aboard commercial vessels. While such practice is not prohibited, the preferred procedure for filing a complaint is to contact the nearest officer in charge, Marine Inspection, either prior to or at payoff from the voyage in question. In this manner the complaint can be promptly investigated while witnesses are still available for interrogation before the crew is paid off. Following payoff the crew usually scatters in all directions and it is extremely difficult and sometimes impossible to locate former crewmembers for interviews and to testify at hearings.

In serious cases where parties to an offense are leaving their ships in foreign ports the complainant should contact the nearest U.S. consul. These officials have the statutory duty to investigate crew complaints while a U.S. vessel is in a foreign port and to take necessary corrective measures.

Coast Guard marine inspection offices are located in some 49 port cities in the United States, and there are Coast Guard merchant marine details in Europe and the Far East. It is at these facilities that initial complaints should be originated since they are considered more effective than a letter addressed to the Commandant some time after the offense has occurred.

Alex C. Fergusson Co., 44 East Oregon Avenue, Philadelphia, Pa. 19148: *Certificate No. 758* dated October 24, 1967, AFCO #5303; *Certificate No. 759* dated October 24, 1967, AFCO #5305; *Certificate No. 760* dated October 24, 1967, AFCO #9611.

Murray Chemical Co., Inc., Pier 46–A, The Embarcadero, San Francisco, Calif. 94107: *Certificate No. 761* dated November 8, 1967, MURCO 858; *Certificate No. 762* dated November 8, 1967, MURCO FOT #1; *Certificate No. 763* dated November 8, 1967, MURCO OSE #2; *Certificate No. 764* dated November 8, 1967, MURCO EB–4.

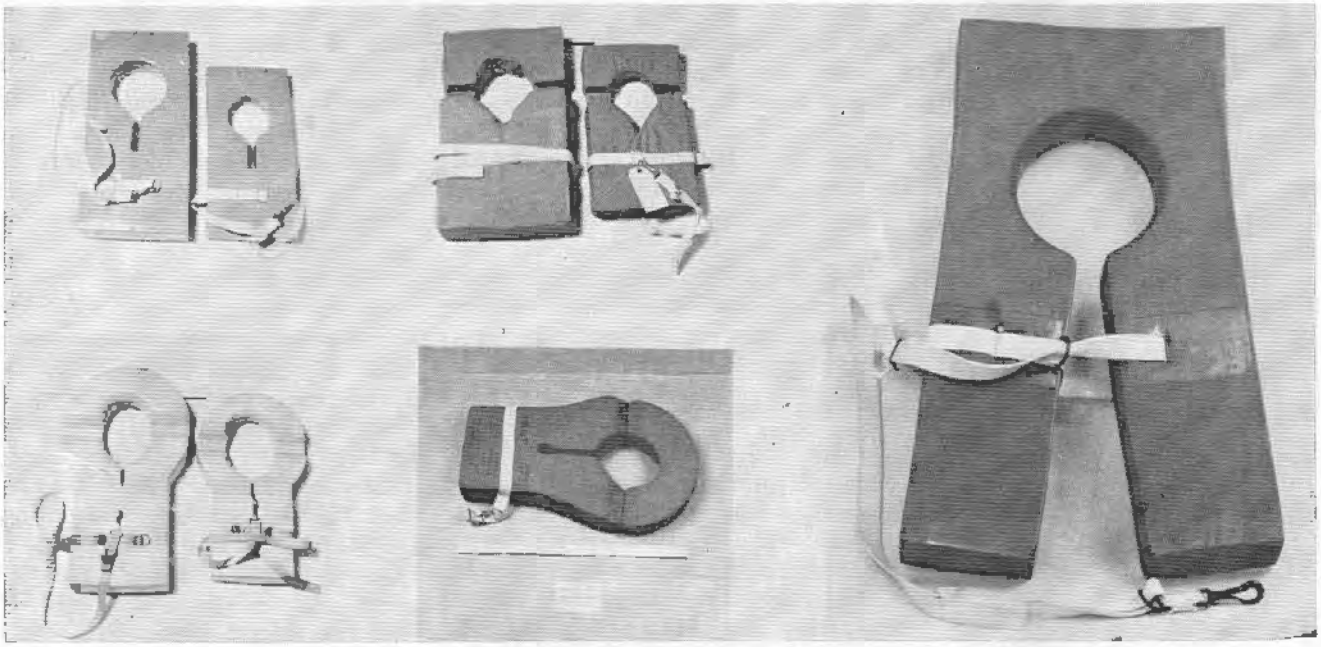
Hampton Roads Chemical Corp., Post Office Box 1848, Newport News, Va. 23601: *Certificate No. 765* dated November 17, 1967, EZEE–WASH; *Certificate No. 766* dated November 17, 1967, DEGRECO.

Magnus Chemical, 400 South Avenue, Garwood, N.J. 07027: *Certificate No. 767* dated November 17, 1967, MAGNUS 799.

Willamette Chemical Co., 1231 Northwest Hoyt Street, Portland, Oreg.: *Certificate No. 768* dated November 20, 1967, "D" Grease.

Drew Chemical Corp., 522 Fifth Avenue, New York, N.Y. 10036: *Certificate No. 755* dated November 21, 1967, Oil Spill Emulsifier #1.

CERTAIN PLASTIC LIFESAVING DEVICES NO LONGER APPROVED



NOT APPROVED
NOT ACCEPTED

NO LONGER APPROVED
STILL ACCEPTED

APPROVED
ACCEPTED

The U.S. Coast Guard recently amended Federal regulations making certain plastic lifesaving devices obsolete after November 1, 1967.

Vinyl coated unicellular plastic foam lifepreservers with a solid-bib front are out. Beginning November 1, they no longer meet Coast Guard requirements. These preservers were taken off the acceptable list when tests revealed they became stiff and hard to put on in cold weather. The head opening couldn't be stretched enough to slip the preserver on easily.

The same type of unicellular plastic foam preservers, not slit in front but cloth covered, will no longer be approved either. However, previously approved cloth-covered devices are still acceptable as meeting Coast Guard requirements if they are in good condition.

The only vinyl coated unicellular plastic foam lifepreservers that are both approved and accepted are split in front and have a revised body strap arrangement. The body strap keeps the front halves of the device together when it is worn. Low temperatures do not affect these preservers and they are still reversible.

The unicellular plastic foam lifepreservers no longer approved are included in Coast Guard approval numbers 160.055/1/0 through 160.055/29/0. Lifepreservers bearing approval numbers 160.055/50/0 or higher are acceptable under the amended regulation. ⚓

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.

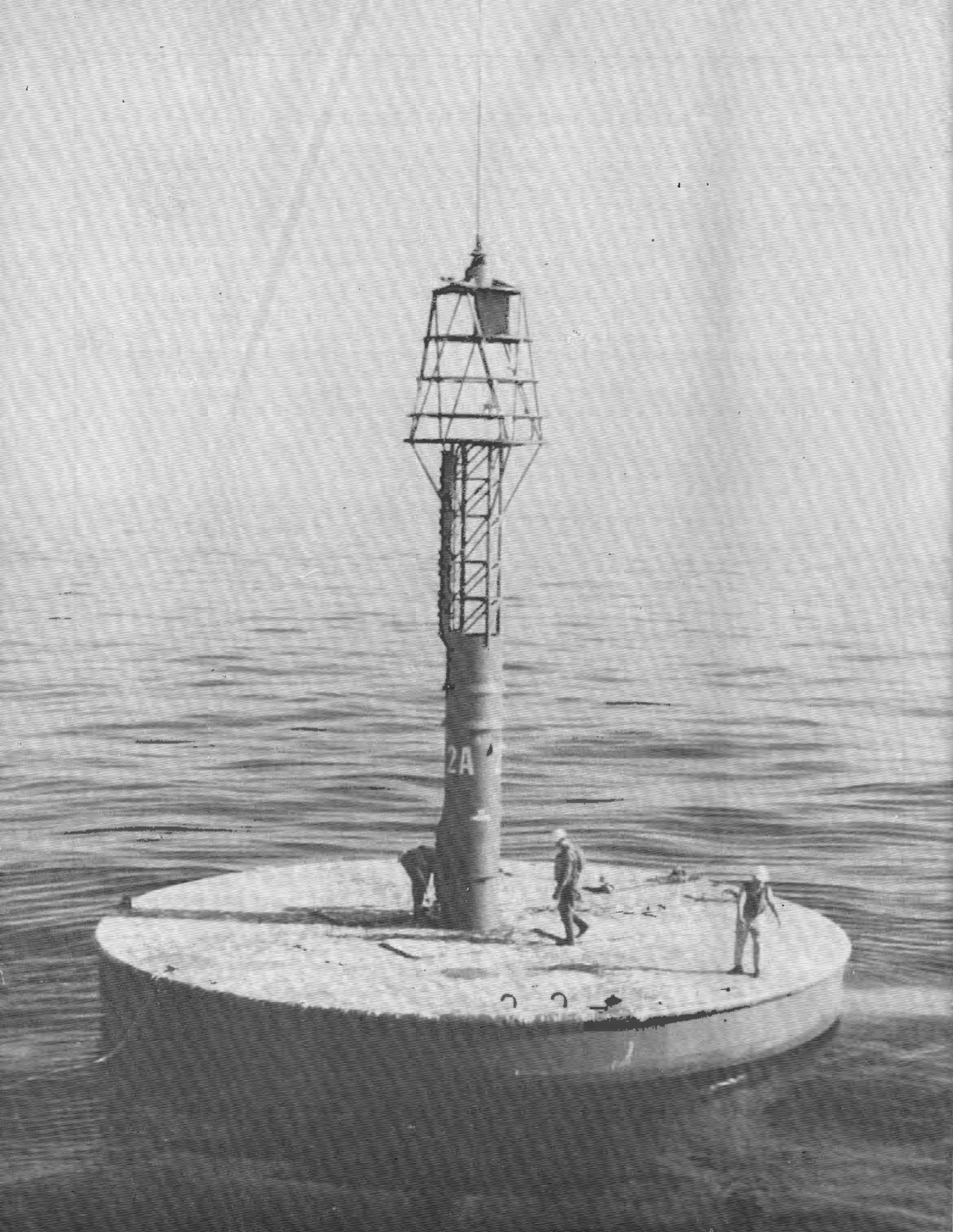
The Federal Register may be purchased from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. Subscription rate is $1.50 per month or $15 per year, payable in advance. Individual copies may be purchased so long as they are available. The charge for individual copies 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, 1967 and Supplement dated July 1, 1967, are now available from the Superintendent of Documents, price basic book: $2.50; supplement: 40 cents.

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.
123	Rules and Regulations for Tank Vessels (5–2–66). F.R. 12–6–66.
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.
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.
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.
191	Rules and Regulations for Licensing and Certificating 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.
200	Marine Investigation Regulations and Suspension and Revocation Proceedings (5–1–67).
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.
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.
257	Rules and Regulations for Cargo and Miscellaneous Vessels (1–3–66). F.R. 4–16–66, 12–6–66, 1–13–67.
258	Rules and Regulations for Uninspected Vessels (3–1–67.)
259	Electrical Engineering Regulations (3–1–67).
266	Rules and Regulations for Bulk Grain Cargoes (11–1–66).
268	Rules and Regulations for Manning of Vessels (5–1–67).
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.
329	Fire Fighting Manual for Tank Vessels (4–1–58).

CHANGES PUBLISHED DURING NOVEMBER 1967

The following has been modified by Federal Register:
CG–191 Federal Register, November 16, 1967.

U.S. GOVERNMENT PRINTING OFFICE: 1968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